

**Adolescent Personality in Social Contexts
Pals, Partners, and Problems**

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Adolescent Personality in Social Contexts

Pals, Partners, and Problems

Persoonlijkheid van Adolescenten in Sociale Context

Vrienden, Partners, en Problemen

(met een samenvatting in het Nederlands)

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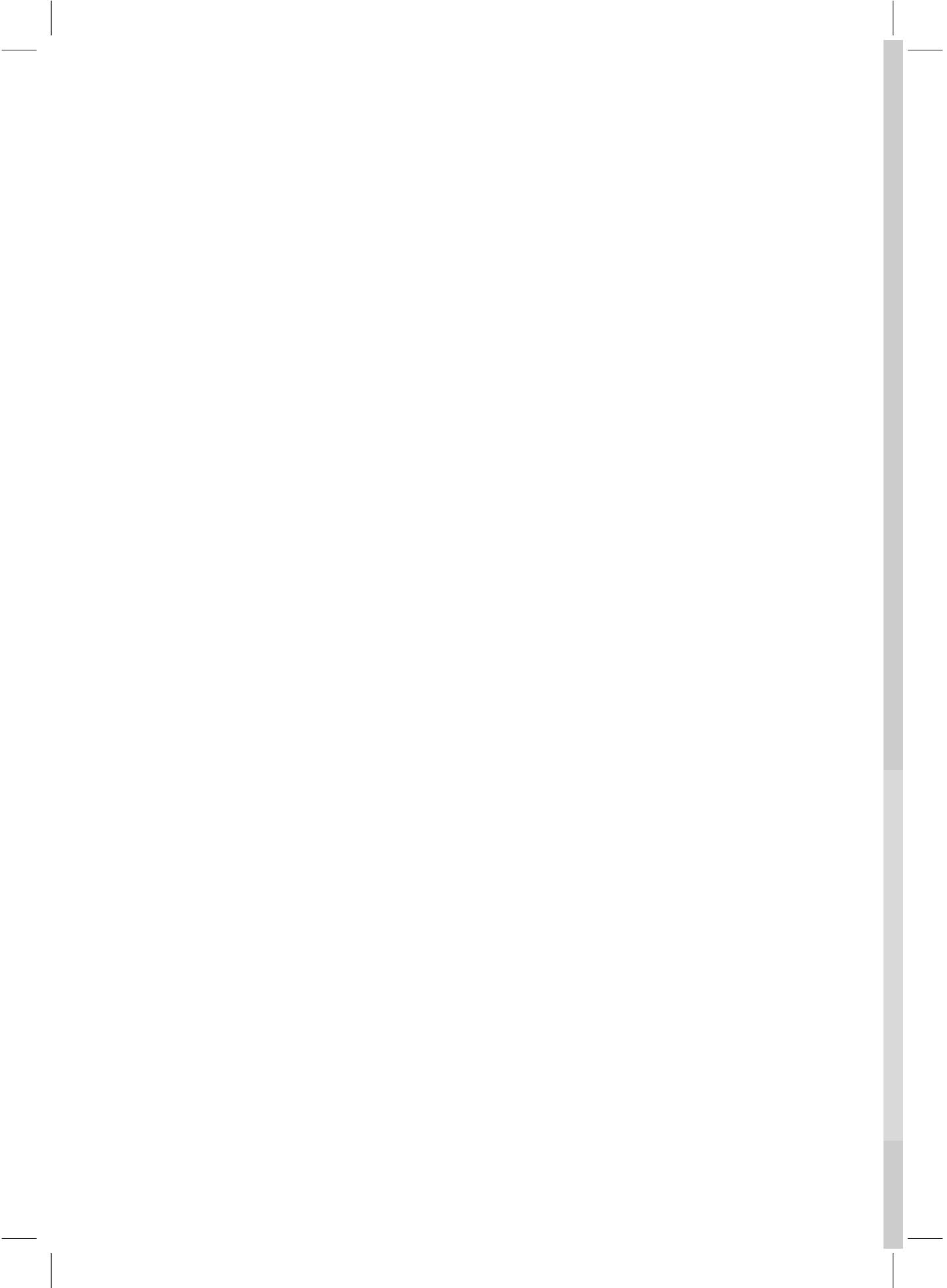
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CHAPTER 1

General Introduction

1.1 GENERAL INTRODUCTION

The pursuit of pleasure and the avoidance of pain are the basic drives of what we think and how we act, according to the ancient Greek philosophers Democritus (460-370 B.C.) and Aristippus (435-356 B.C.). Following this ancient philosophy, personality theorists propose that the approach and avoidance distinction is fundamental to the study of personality: individual differences in the way of feeling, thinking, and acting (Carver, 2006; Elliot & Covington, 2001; Elliot & Thrash, 2010). Some people, by nature, are highly engaged in the pursuit of pleasure and have a stronger approach tendency. These individuals tend to act on a whim, despite the obvious risks. Others, by contrast, are fixated on the possibility of threat and are generally more avoidant. These more avoidant individuals are often slow to warm up. Still, there are others who are more balanced and adaptive, knowing when to approach and when to avoid (Carver, 2005). During adolescence, personality develops toward greater maturity and many adolescents become more controlled and less alienated (Klimstra, Hale III, Raaijmakers, Branje, & Meeus, 2009; Roberts, Caspi, & Moffitt, 2001, 2003).

Adolescents' personality differences may have implications for their problem behaviors, as well as for their friendships and romantic relationships, two relationships that are increasingly important from adolescence to young adulthood (Brown, 2004; Erikson, 1968; Tackett, 2006; Holland & Roisman, 2008). Approach and avoidance are the building blocks of behavior (Carver, 2006; Miller & Dollard, 1941). Individuals who have a strong avoidant tendency are prone to internalizing problems whereas those who have a strong approach tendency are inclined to develop externalizing problems (Herman-Stabl, Stemmler, & Petersen, 1995; Hirshfeld-Becker, Biederman, Calltharp, Rosenbaum, Faraone, & Rosenbaum, 2003). As for social relationships, the balance between approach and avoidance tendencies is proposed to guide individuals towards potential positive interpersonal outcomes (Elliot, Gable, & Mapes, 2006). Thus, personality differences might pervade individuals' problem behavior, friendships and romantic relationships in important ways.

Adolescents with different personality characteristics might also vary in the extent to which their developmental outcomes are affected by their social relationships environments. According to the differential susceptibility hypothesis (Belsky, 1997; Belsky, Bakermans-Kranenburg, & Van IJzendoorn, 2007), some individuals are more susceptible to both negative and positive environmental influences than others. It is possible that these differential susceptibilities might be due to adolescents' personality characteristics. Adolescents who are more extreme in and less balanced in approach and avoidance tendencies might be more susceptible to environmental influences such as friends' behaviors and romantic relationship quality.

The overall aims of this dissertation were to examine: to what extent adolescent personality

differences are related to the development of problem behaviors (1), and experiences in friendships and romantic relationships (2), and whether adolescents with different personality characteristics differ in their susceptibility to friendships and romantic relationships (3). Figure 1.1 presents the conceptual model of this thesis.

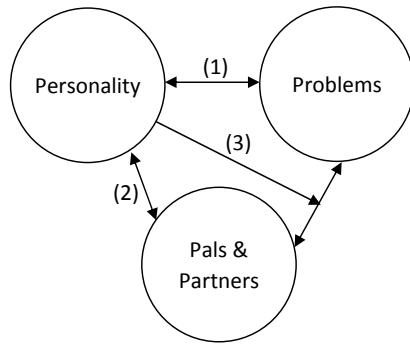


Figure 1.1 Conceptual Model Guiding this Dissertation

1.2 THEORIES OF AND APPROACHES TO PERSONALITY

Three inter-connected personality distinctions reflecting approach and avoidance tendencies are adopted in this dissertation. The first distinction is the behavioral inhibition system (BIS) and behavioral approach system (BAS) distinction proposed by Gray's reinforcement sensitivity theory (1987). The second distinction is the ego-control and ego-resiliency distinction suggested by Block and Block (1980), based on which three personality types are distinguished (i.e., overcontrollers, undercontrollers, resilients). In addition, the personality disorder classification according to the DSM (Diagnostic and Statistical Manual of Mental Disorders) and ICD (International Classification of Diseases) is also employed, as both theory and research have suggested that personality disorders represent the extreme variants of normal personality rather than distinct personality structures (Costa & McCrae, 1990; Hutteman, Denissen, Asendorpf, & Van Aken, 2009; Miller, Pilkonis, & Clifton, 2005; Samuel & Widiger, 2008).

Gray's Reinforcement Sensitivity Theory

Gray's reinforcement sensitivity theory (Gray, 1987) is a dimensional method to study approach and avoidance tendencies, focusing on motivational systems. This theory posits that the BIS and BAS are the two essential dimensions of personality, which reflect individual differences in reactive sensitivity to environmental stimuli. The BIS is an aversive motivational system, which responds to threats or dangers. The BIS is thought to alert individuals to the possibility of punishment. The activation of this system causes inhibition and the avoidance

of movement toward an intended goal. Parallel to the BIS is the BAS, which is an appetitive motivational system that responds to signals of impending reward or escape from punishment. The activation of this system provokes approach behavior toward desired goals.

Block and Block' Personality Typology

Many studies on personality distinguish three types: overcontrollers, undercontrollers, and resilients. This typology is based on Block and Block's (1980) theory of ego-control and ego-resiliency, reflecting levels and balance of approach and avoidance tendencies. The three personality types can be constructed as specific combinations of ego-control and ego-resiliency. Ego-control is defined as the tendency to contain versus express motivational impulses and ego-resiliency is defined as the tendency to respond flexibly to environmental demands. Resilients are characterized by high levels of ego-resiliency and moderate levels of ego-control, and tend to respond flexibly to environmental demands. Overcontrollers and undercontrollers both have low levels of ego-resiliency and maintain relatively high and low levels of ego-control, respectively. More specifically, overcontrollers are prone to excessive impulse control, delay of gratification, and strong inhibition of action and affect. Undercontrollers tend to have an insufficient impulse control, an inability to delay gratification, and an immediate and direct expression of motivation and affects (Block & Block, 1980).

Personality Disorders

When individuals show pervasive and maladaptive patterns in affection, cognition, diagnoses of personality disorders could be made. Personality disorders represent the extremes of normal personality (Samuel & Widiger, 2008; Widiger & Costa, 1994). For instance, extreme variants of personality proposed by the personality theories of Gray (1987) and Block and Block (1980) may be conceptualized as personality disorders. At the high extreme of the BAS, and low extremes of ego-control and ego-resiliency, are people who seem to be unable to tolerate any delay of gratification and who express their feelings and desires immediately (Carver, 2005). These characteristics are parallel to features of a cluster of personality disorders, including antisocial, borderline, histrionic, and narcissistic personality disorders, which share problems with impulse control and emotional regulation (American Psychiatric Association, 2013; Bijttebier, Beck, Claes, & Vandereycken, 2009; Caspi, Moffitt, Newman, & Silva, 1996; Pastor et al., 2007). At the high extreme of the BIS, and the high extreme of ego-control in combination with low ego-resiliency, are those who delay gratification endlessly and who inhibit their actions and feelings (Carver, 2005). These features are similar to that of a cluster of personality disorders, including avoidant, dependent, and obsessive-compulsive personality disorders, which share a high level of anxiety and fear (American Psychiatric Association, 2013; Bijttebier et al., 2009; Fowles, 1993; Gray, 1985).

Similarities among Personality Distinctions

There are clear overlaps between the three personality distinctions. Block's overcontrollers seem to reflect a strong BIS tendency since they show high inhibition and are often withdrawn. Block's undercontrollers seem to present a strong BAS tendency since these individuals are generally impulsive and outgoing. Indeed, empirical research has observed high levels of the BIS in overcontrollers, high levels of the BAS in undercontrollers, and low/intermediate levels of the BIS and BAS in resilients (Knyazev & Slobodskaya, 2006). Furthermore, as mentioned before, extreme variants of the BIS and BAS, and ego-control and ego resilience may be conceptualized as different forms of personality disorders.

Approaches to Personality

Research has distinguished two main approaches in the study of personality: a person-centered approach, which focuses on the patterning and organization of personality dimensions within a person; and a variable centered approach, which focuses on differences among individuals on a given personality dimension. Both person-centered and variable-centered approaches are valuable in understanding personality and their associations with individuals' developmental outcomes (Bergman & Magnusson, 2001; Hart, Atkins, Fegley, Robins, & Tracy, 2003; Robins & Tracy, 2003; Widiger & Costa, 1994). The personality distinctions used in this dissertation represent both variable-centered (i.e., Gray's BIS/BAS distinction) and person-centered approaches (i.e., Block and Block's personality typology and categorical approach of personality disorders).

1.3 PERSONALITY AND PROBLEM BEHAVIORS

Adolescents' personality and problem behaviors tend to correspond to one another. Personality characteristics, defined as general and relatively enduring behavioral tendencies, are often considered as "core" traits. Behaviors, which are highly specific and fluctuate across situations, are often regarded as "surface" traits (Ajzen, 2005). Latent and hypothetical personality characteristics are proposed to be related to external and observable behaviors (Ajzen, 2005; McCrae et al., 2000; Tellegen, 1991). Specifically, adolescents' strong approach tendency may be associated with externalizing problem behaviors. Adolescents' strong avoidance tendency may be linked to internalizing problem behaviors.

BIS/BAS Scales and Problem Behaviors

Gray's reinforcement sensitivity theory posits that the BIS and BAS are the core elements in the regulation of behaviors. An overactive BAS could leave an individual vulnerable to aggressive

and delinquent behaviors, and overactive BIS may render a person susceptible to anxiety and depressive symptoms (Fowles, 1993; Quay, 1988). To assess the two essential concepts, Carver and White (1994) developed the BIS/BAS scales, which are considered to be the most successful contribution measuring the fundamental components of Gray's theory and have been used frequently in adult samples (e.g., Franken, Muris, & Rassin, 2005; Smillie, Jackson, & Dalgleish, 2006). The relevance of Gray's theory to adolescents has become apparent in recent years (Gomez, Cooper, & Gomez, 2005). However, investigation of the psychometric characteristics of the scales in this age group has received little attention especially among non-English speaking adolescents. Additionally, in the current state of the literature, it is still unclear whether the BIS/BAS scales could be applied to longitudinal studies assessing different stages of adolescence, as well as to intergenerational transmission research on adolescents and middle-aged adults. Thus, comparisons of the factor structure between different stages of adolescence and between adolescents and their parents are needed. Moreover, to examine the BIS/BAS scales' external validity among Dutch adolescents, it is necessary to test the associations between BIS/BAS and internalizing and externalizing problem behaviors that were demonstrated in previous studies (Johnson, Turner, & Iwata, 2003; Muris, Meesters, De Kanter, & Timmerman, 2005).

Personality Disorders and Antisocial Behaviors

Narrative reviews have suggested an increased risk of antisocial behaviors in personality disordered patients (Duggan & Howard, 2009; Fountoulakis, Leucht, & Kaprinis, 2008). To our knowledge, a quantitative synthesis of the primary studies to summarize the extent of the increased risk and to investigate sources of heterogeneity among studies, has not been conducted. We expect that there may be a paucity of research on adolescent personality disorders and antisocial behaviors, as personality disorders have been primarily considered as adult disorders (Bleiberg, 1994), although there is a growing interest in examining the link between personality disorders and psychosocial adjustments in adolescents (Hutteman et al., 2009). Nevertheless, a number of published investigations have indicated that personality disorders can be diagnosed reliably among adolescents and the stability of personality diagnosis from adolescence to young adulthood has been empirically demonstrated (Chanen, Jackson, McGorry, Allot, Clarkson, & Yuen, 2004; Johnson et al., 2000; Miller, Muehlenkamp, & Jacobson, 2008). Therefore, even though the literature might be dominated by empirical studies in adults, due to the enduring and stable features of personality symptomatology, a quantitative synthesis of the current evidence is expected to not only provide a more reliable assessment of the risk of antisocial behaviors among personality disordered adults but also informative for personality disordered adolescents.

In sum, the first major aim of this dissertation is to assess associations between personality and problem behaviors. Specifically, Chapter 2 will examine the psychometric characteristics of Carver and White's BIS/BAS personality scales in adolescent and mother samples and links of the BIS/BAS with both internalizing and externalizing problem behaviors. Chapter 3 will synthesize the current evidence on the risks of antisocial behaviors in individuals with personality disorders.

1.4 PERSONALITY, FRIENDSHIPS, AND ROMANTIC RELATIONSHIPS

Maintaining and developing satisfactory friendships and romantic relationships are important tasks for youths, as these two relationships become increasingly salient from adolescence to young adulthood. Mastering these tasks requires a wide array of skills including affect expression, cognitive understanding, and behavior regulation (Denham, 1998; Rubin, Bukowski, & Parker, 1998) and personality, which represents a persistent pattern of feeling, thinking, and acting, is likely to be related to both maintenance skills and the quality of these interpersonal relationships (Shiner, Masten, & Roberts, 2003). Youths may interpret, react to, and evoke the behaviors of their interpersonal partners in personality-correlated ways. For example, youths with high approach tendency might overreact with aggression to conflict in friendships, which might evoke friends' aggressive responses that may in turn be interpreted by the youths themselves as a sign of low relationship quality. Furthermore, individuals bring histories to relationships, and these histories are correlated with stable personality traits (Epstein, 1991). Therefore, individuals may transfer their personality-correlated anticipation and affective response developed in the context of previous friendships to later romantic relationships (Andersen & Baum, 1994).

Personality and Conflict Resolution in Friendships

Conflict or disagreement in friendships is inevitable and not necessarily negative, rather it is the strategies used to handle these conflicts that contribute significantly to the maintenance of friendships (Laursen, 1998). During adolescence, friendships become increasingly more intimate, equal, and reciprocal (De Goede, Branje, & Meeus, 2009; Furman & Buhrmester, 1992; Hartup, 1993). These developments may lead to changes in how adolescents experience and resolve conflicts with their friends. Meanwhile, personality could affect an individual's manner of handling conflict through various motivational, cognitive, and affective processes (Park & Antonioni, 2007). Among the three personality types, overcontrollers tend to inhibit, for example by keeping their thoughts and feelings to themselves, whereas undercontrollers

are lacking control of their emotional and behavioral impulses. During conflict, overcontrollers may be more likely to use gentle resolution strategies, such as accommodating others' needs, and avoiding and withdrawing from direct conflict, whereas undercontrollers may be more likely to demonstrate aggressive and coercive behaviors. Resilients, who are more flexible and able to adjust their avoidance and approach tendencies, might be more likely to use constructive strategies, such as positive problem solving and collaboration. As the current evidence regarding the association between personality types and conflict behaviors in adolescents' friendship is rather limited and based predominantly on cross-sectional comparisons, this dissertation will examine personality differences in developmental pattern of adolescents' conflict frequency and conflict resolution with their best friends using a longitudinal design.

Personality and Quality of Adolescent Friendships and Young Adult Romantic Relationships

Not all adolescents develop and experience optimal and satisfactory relationships. Personality is related to individuals' friendship and romantic relationship quality. Generally, adolescents with a resilient personality tend to have both better friendships in adolescence and better romantic relationships in young adulthood (e.g., Caspi, 2000; Meeus, Van de Schoot, Klimstra, & Branje, 2011; Shiner et al., 2003; Van Aken & Dubas, 2004). However, it is unknown whether personality types predict later romantic relationship quality through the development of earlier friendship quality, although the developmental spillover between friendships and romantic relationships is plausible. From an attachment perspective, youths may develop expectancies for interpersonal relationships based on their earlier close relationships (Furman, Simon, Shaffer, & Bouchey, 2002; Hazan & Shaver 1987). These expectancies obtained in earlier friendships form mental representations (working models) of the self and relationship partners and might guide interaction patterns in their later romantic relationships (Kenny, 1994; Roisman, Collins, Sroufe, & Egeland, 2005). According to social learning models, friendships, which are usually the first voluntary and egalitarian relationships, may offer an important training ground for later romantic relationships, since the specific characteristics of voluntary and equal relationships with friends resemble those of romantic relationships (Collins, Welsh, & Furman, 2009; Furman, Simon, Shaffer, & Bouchey, 2002; Sullivan, 1953; Hazan & Shaver 1987). Chapter 5 of this dissertation attempts to examine whether personality differences relate to the spillover effects between earlier friendships and later romantic relationships.

In sum, the second major aim of this dissertation is to assess the longitudinal association of adolescents' personality with their conflict resolution strategies with friends and the quality of their best friendships (Chapters 4 and 5). As adolescent friendships have been shown to predict quality of romantic relationships in adulthood, Chapter 5 attempts to test whether personality predicts young adulthood romantic relationship quality through adolescent friendship quality.

1.5 PERSONALITY AND SOCIAL RELATIONSHIPS: PATTERNS OF DIFFERENTIAL SUSCEPTIBILITIES

The interactionist perspective proposes that individuals' developmental outcomes depend on an interactive interplay between innate characteristics and environmental influences (Magnusson & Stattin, 2006). Moreover, the differential susceptibility hypothesis (Belsky, 1997) posits that individuals vary in the degree in which they are affected by the environment they are exposed to. These differential susceptibilities might be due to individuals' personality characteristics. It is assumed that adolescents with a difficult personality may be especially susceptible to environmental influence, both to the negative effects of risky environments and to the beneficial effects of supportive environments (Belsky, 2004; Belsky et al., 2007). This dissertation attempts to examine youths' various developmental outcomes by examining interaction effects between individuals' characteristics (i.e., personality) and environmental influences (best friend' delinquency, romantic relationship dissolutions, and perceived romantic relationship quality).

Personality and Susceptibility to Influence of Best Friends' Delinquency

Adolescents' delinquency is strongly associated with the delinquency of their friends (Haynie & Osgood, 2005; Sutherland, 1947). This similarity in delinquent behaviors may be caused by a process in which friends influence each other to engage in similar behaviors (Burk, Steglich, & Snijders, 2007). However, not all adolescents may be equally affected by, or be able to affect, their peers. Some adolescents might be more vulnerable to their peers' delinquency, whereas others might have a stronger influence on their peers' delinquency. Although research on the moderators of peer influence has been a rapidly growing area in the past decade (Cohen & Prinstein, 2006; Brechwald & Prinstein, 2011), the study of personality type as a potential moderator remains relatively rare. During adolescence, youths gradually are more able to resist peer influences due to psychological maturation (Sumter, Bokhorst, Steinberg, & Westenberg, 2009). Individuals with different personality types differ in their maturity. Thus, adolescents with a more mature personality type might be more able to resist influence of their best friend's delinquency. Meanwhile, peer delinquency may be attractive to adolescents because it may be a way to evidence maturation (Moffits, 1993). It is not clear, therefore, whether individuals with higher delinquency and a less mature personality are more or less susceptible to their best friends' delinquent behaviors. Chapter 6 of this dissertation aims to examine how adolescents' personality types moderate the ways in which adolescents and their best friends influence each other's delinquency.

Personality and Differential Effects of Romantic Relationship Dissolutions on Relationship Quality

Romantic relationship involvement is common during adolescence, and has been linked to both negative and positive developmental outcomes such as depression, delinquency, and self-esteem (Furman & Collins, 2009; Zimmer-Gembeck, Siebenbruner, & Collins, 2001). A recent study showed that adolescents who dated fewer romantic partners during mid-adolescence had better romantic relationship quality in young adulthood (Madsen & Collins, 2011), suggesting that romantic relationship dissolutions may have adverse effects on later relationship satisfaction. However, the effects of negative life events such as romantic dissolutions might have different effects on adolescents with different individual characteristics. For instance, dissolutions of romantic relationships might have more negative effects for individuals who are less able to build a good relationship, as their hope for a future high-quality relationship might erode along with the romantic dissolutions. This dissertation tests whether individuals with a less resilient personality type are more negatively influenced by their romantic relationship dissolutions.

Personality and Differential Effects of Romantic Relationship Quality on Anxiety and Delinquency

When individuals enter into adulthood, romantic relationships become even more salient (Collins & Van Dulmen, 2006; Meeus, Branje, Van der Valk, & De Wied, 2007). A significant body of literature suggests that a high-quality romantic relationship may play a positive role in decreases in problem behaviors (e.g., La Greca & Harrison, 2005; Meeus et al., 2007; Roisman, Masten, Coatsworth, & Tellegen, 2004). However, there might be significant personality differences in developmental changes. That is, not all young adults are equally sensitive to the influence of romantic relationship on their problem behaviors. It is plausible that the combination of personality and the quality of romantic relationships may be related to individuals' problem behavior pathways, as proposed by the personality-social relationship interaction perspective (e.g., Barber, 1992; Caspi, 2000; Magnusson & Stattin, 2006). Chapter 8 of the dissertation examines the interaction effects between adolescent personality type and young adulthood romantic relationship quality on young adults' changes in delinquency and anxiety.

Thus, the third major aim of this dissertation is to examine whether adolescent personality interacts with environmental influences (i.e., best friend's delinquency, romantic relationship dissolutions, and perceived romantic relationship quality) on behavioral and relationship developmental outcomes (i.e., anxiety, delinquency, and relationship quality).

1.6 SAMPLE AND STUDY DESIGN

Six out of seven empirical studies of this dissertation employ data from two longitudinal projects: CONflict And Management of Relationships (CONAMORE) (Chapters 4, 5, 7, and 8), and Research on Adolescent Development And Relationships (RADAR) (Chapters 2 and 6). For Chapter 3, data were collected by searching in bibliographic databases.

CONAMORE Sample and Design

CONAMORE is an ongoing longitudinal study tracking psychosocial development in Dutch adolescents. In total, it consists of 1313 participants divided into two age cohorts, which have been followed for ten years: from age 12 onwards ($n = 923$) for the younger cohort and from age 16 onwards ($n = 390$) for the older cohort. The focus of the study is on personality, problem behaviours, and relationships with parents, friends, and romantic partners. Most of the participants identified themselves as Dutch (89.3%). The other 10.7% participants indicated that they belonged to ethnic minorities (e.g., Surinamese, Moroccan, or Turkish).

RADAR Young Sample and Design

RADAR Young is an ongoing longitudinal study focusing on development of problem behaviors, personality, and social relationships. The study consists of 497 Dutch early adolescents (283 boys), with a mean age of 13.0 years at the first measurement. Of the adolescents, 95.2% identified themselves as being Dutch. 10.8% came from low SES families (i.e., both parents unemployed and held an elementary job; Statistics-Netherlands, 1993). The target adolescents were recruited from various Dutch elementary schools. The target adolescents were asked to invite their best friend to participate. Adolescents and best friends filled out various questionnaires during the annual home visits with one-year intervals.

Quantitative Systematic Review Data Collection

For chapter 3, data were collected by searching published and unpublished sources (including theses) using 6 bibliographic databases (Medline, Embase, PsycInfo, CINAHL, US National Criminal Justice Reference System, and Web of Science). No language limit was set for searched articles. Search strategies were tailored to the individual database.

1.7 OUTLINE OF DISSERTATION

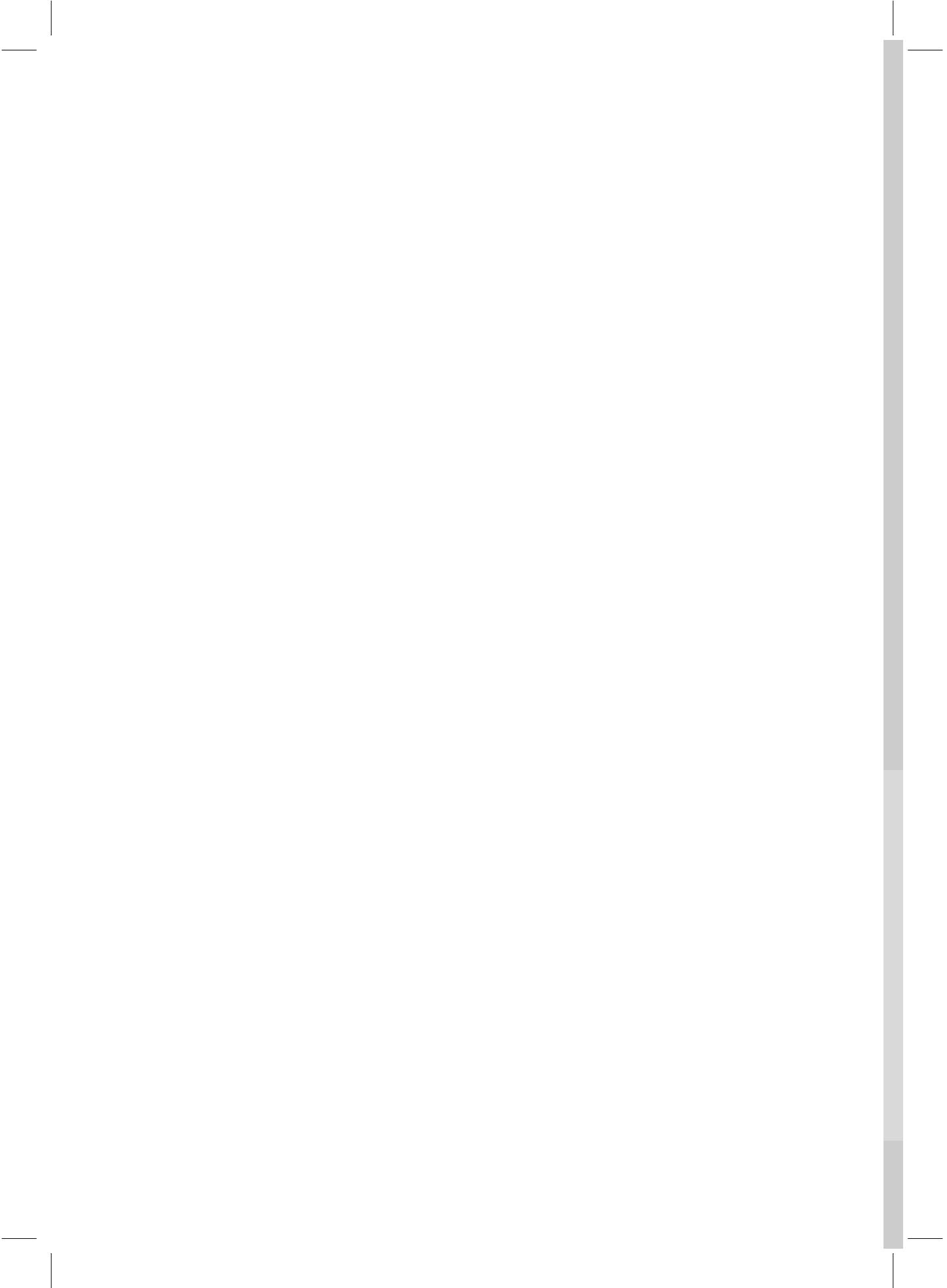
In the next seven chapters, seven empirical studies addressing the key issues of this dissertation are presented.

- Chapter 2 examined the factor structure of Carver and White's (1994) BIS/BAS scales and tested the associations between the BIS/BAS and various internalizing and externalizing problem behaviours in Dutch adolescents.
- Chapter 3 synthesized the current evidence on the risk of antisocial behaviors and recidivism in individuals with personality disorders.
- Chapter 4 tested longitudinal associations between adolescent personality types and conflict resolution strategies in best friendships from early to middle adolescence.
- Chapter 5 examined the longitudinal associations between adolescent personality and best friendship quality throughout adolescence and the indirect link between adolescent personality and romantic relationship quality in young adulthood, via friendship quality development in adolescence.
- Chapter 6 explored the potential moderating role of personality on the longitudinal associations between adolescents' and their best friends' delinquency.
- Chapter 7 investigated whether adolescents' personality moderated the link between romantic relationship dissolutions and later romantic relationship quality.
- Chapter 8 focused on the interaction effect between adolescent personality and young adulthood romantic relationship quality on young adults' anxiety and delinquency.
- The final chapter of this dissertation (Chapter 9) contains a summary of the results from the seven empirical studies and a general discussion of these results.

Table 1.1 presents an overview of the concepts used in this dissertation.

Table 1.1 Overview of Concepts in This Dissertation

	Personality	Problem behaviors	Friendship	Romantic relationship
Chapter 2	Behavioral inhibition Behavioral activation	Aggression/ Delinquency Anxiety Depression		
Chapter 3	Personality disorders	Antisocial behavior Recidivism		
Chapter 4	Overcontrollers Undercontrollers Resilients		Conflict frequency Conflict resolution style	
Chapter 5	Overcontrollers Undercontrollers Resilients		Support Negative interaction Dominance	Support Negative interaction Dominance
Chapter 6	Overcontrollers Undercontrollers Resilients	Delinquency	Best friends' delinquency	
Chapter 7	Overcontrollers Undercontrollers Resilients			Relationship- dissolution Commitment Exploration Reconsideration
Chapter 8	Overcontrollers Undercontrollers Resilients	Delinquency Anxiety		Support Negative interaction





CHAPTER 2

Psychometric Characteristics of Carver and White's BIS/BAS Scales in Dutch Adolescents and Their Mothers¹

¹ Yu, R., Branje, S., Keijsers, L., & Meeus, W. (2011). Psychometric characteristics of Carver and White's BIS/BAS scales in Dutch adolescents and their mothers. *Journal of Personality Assessment*, 93, 500-507.

ABSTRACT

The psychometric characteristics of Carver and White's (1994) BIS/BAS scales were examined in two groups of Dutch adolescents (497 early adolescents and 237 middle adolescents, $M_{Age} = 13.0$ years and 16.4 years, respectively) and their middle-aged mothers ($M_{Age} = 45.2$ years; $N = 734$). Confirmatory factor analyses (CFA) revealed an acceptably fitting two-factor model for adapted BIS/BAS scales in all three groups, reflecting separate BIS and BAS factors. Reliabilities of the two scales were satisfactory. The results supported the convergent validity of BIS and BAS scales. BIS was positively correlated with internalizing problem behaviors and neuroticism. BAS was positively correlated with externalizing problem behaviors and extraversion. The discriminant validity of the BIS/BAS scales received mixed support in our data. BIS was negatively correlated with extraversion, and BAS was not correlated with depression. However, BIS was also found to be correlated with externalizing problem behaviors, and BAS was positively correlated with neuroticism. In sum, the scales are suitable for use in research settings, but caution is advocated in application for clinical practice.

Keywords: BIS, BAS, CFA, problem behaviors, personality, adolescents, mothers

2.1 INTRODUCTION

Gray's Reinforcement Sensitivity Theory (Gray, 1987) has received increasing attention over the past decades, and is now one of the most influential biological personality theories. This theory posits that two main brain systems regulate approach and withdrawal behaviors in response to environmental stimuli. The behavioral inhibition system (BIS) is an aversive motivational system in response to novel or threatening cues. It is thought to alert individuals to the possibility of punishment or frustrative non-reward. The activation of this system causes inhibition of movement toward an intended goal. Parallel to the BIS is the behavioral activation system (BAS). This is an appetitive motivational system in response to signals of impending reward or non-punishment. The activation of this system provokes approach behavior toward desired goals.

Carver and White (1994) developed the BIS/BAS scales to measure these constructs. The BIS/BAS scales are considered to be the most successful contribution measuring the fundamental components of Gray's theory (Smillie, Jackson, & Dalgleish, 2006). The psychometric properties of the BIS/BAS scales have been tested in a considerable number of studies, predominantly among young college students. These studies have yielded mixed findings using different techniques.

Exploratory factor analyses (EFA) in college students have shown a relatively consistent picture across studies. An EFA by Carver and White (1994) supported a four-factor structure among undergraduate students, including one BIS factor and three BAS factors, labeled Reward Responsiveness, Drive, and Fun Seeking. This four-factor structure was replicated among college students through EFA, both with the original version of the scales (Heubeck, Wilkinson, & Cologon, 1998; Ross, Millis, Bonebright, & Bailley, 2002) and translated versions in Dutch and Polish (Franken, Muris, & Rassin, 2005; Müller & Wytykowska, 2005), as well as with a Russian version in which some items were deleted (Knyazev, Slobodskaya, & Wilson, 2004).

Confirmatory Factor Analyses (CFA) using undergraduate student samples have shown less consistent support for a four-factor structure, however. While some studies have found that a four-factor model provides a better fit to the data than a two-factor model, namely BIS and BAS (Cooper, Gomez, & Aucote, 2007; Leone, Perugini, Bagozzi, Pierro, & Mannetti, 2001; Ross et al., 2002; Sava & Sperneac, 2006), others have found an adequately fitting four-factor model only when some items were removed from the scale (Cogswell, Alloy, Van Dulmen, & Fresco, 2006). In addition, one study reported that its' four-factor model fits poorly on the data. The comparative fit index (CFI) was .82 (Caci, Deschaus, & Bayle, 2007). Moreover, two studies claimed that their data adequately or marginally fit the four-factor model, however the CFIs were .83 and .80 (Franken et al., 2005; Heubeck et al., 1998).

Furthermore, studies drawing upon adult samples have revealed mixed findings. In

particular, EFAs on a community sample and among company employees have indicated that a two-factor solution (i.e., BIS and BAS) was more appropriate than a four-factor solution (Jorm, Henderson, Jacomb, Korten, & Rodgers, 1999; Van der Linden, Beckers, & Taris, 2007), leading some authors to suggest that the three BAS-scales actually tap into the same underlying construct (Van der Linden et al., 2007). Overall, there is thus contradictory evidence regarding the inherent structure of the BIS/BAS scales. Caution is already warranted by some researchers in the continued use of the scales on the psychometric grounds (Cogswell et al., 2006). Thus, further investigation of the BIS/BAS scales is urgently needed.

Although the relevance of Gray's theory to children and adolescents has become apparent in recent years, only a few studies have investigated the factor structure of the scales in these groups. One EFA study among Dutch children, aged 10 years old, found support for a two-factor structure reflecting separate BIS and BAS scales, but not for a four-factor structure (Muris, Meesters, De Kanter, & Timmerman, 2005). The other study on Norwegian children, aged 11 to 12, reported three factors with two BAS scales and one BIS scale (Bjornebekk, 2009). Among 12-16 year-old adolescents in Australia (Cooper et al., 2007), a four-factor structure was obtained from CFA, similar to the structure attained among college students included in the same study. To our best knowledge, however, the latter study is the only one on adolescents, and also the only study that has tested the similarity of the factor structure among different age groups. No CFA studies have yet assessed the factorial structure of the BIS/BAS scales among non-English speaking adolescents (such as the Netherlands). Additionally, no study has compared the factor structure between different stages of adolescence, nor between adolescents and their mothers. Since adolescents are in the period of salient development (Lerner & Steinberg, 2004), these comparisons may help to gain more insight into whether the BIS/BAS scales could be applied to longitudinal studies assessing different stages of adolescence and to intergeneration transmission research on adolescents and middle-aged adults.

Besides the factor structure of the BIS/BAS scales, their external validity is important to consider. Previous studies have found that the BIS scale correlated highly with neuroticism, whereas the BAS scales correlated with extraversion in both clinical and normal samples (Carver & White, 1994; Heubeck et al., 1998; Smits, & Boeck, 2006; Van der Linden et al., 2007). BAS scales were also found to be correlated with impulsivity (Knyazev et al., 2004). Further, BIS and BAS were associated with different types of problem behaviors in early adult and child samples (Johnson, Turner, & Iwata, 2003; Campbell-Sills et al., 2004; Jorm et al., 1999). In particular, BIS was positively related to internalizing problem behaviors, such as depression and anxiety, whereas the BAS scales were positively correlated with externalizing problem behaviors, such as drug use or aggression (Johnson et al., 2003; Muris et al., 2005), although in one study, BIS's correlation with aggression was higher than BAS's correlation with aggression (Muris et al., 2005). In order to examine whether the BIS/BAS scales have satisfactory validity

in other samples, such as adolescents and middle-aged adults, it is necessary to replicate these previous findings.

The present study held two main objectives. The first was to test the factor structure of Carver and White's BIS/BAS scales in two groups of Dutch adolescents and their mothers. The factorial similarity between different age groups was also tested. The second aim was to examine the convergent and discriminant validity of these scales, by examining how the BIS/BAS scales correlate with particular problem behaviors and personality traits.

2

2.2 METHOD

Participants

Participants came from an ongoing longitudinal study, Research on Adolescent Development And Relationships (RADAR), containing two cohorts. RADAR Young included 497 Dutch early adolescents (57% boys), with a mean age of 13.0 years ($SD = 0.52$). RADAR Old included participants from a group of 237 Dutch middle adolescents (46% boys), with a mean age of 16.4 years ($SD = 0.73$). RADAR Young and RADAR Old were recruited from various, randomly-selected, Dutch elementary schools and high schools, respectively. Mothers of these two adolescent groups also participated in the studies, with a mean age of 45.2 years ($SD = 4.57$; $N = 734$). Because these studies were both designed to assess full families (i.e., both parents, adolescents and a sibling), families were not eligible for participation when they only had one child.

Procedure

A description of the study was sent to adolescents and their parents. Confidentiality and anonymity for participating in the studies were assured. After receiving informed consent, adolescents and mothers completed various questionnaires. Both of them received €15 as a reward for their participation.

Measures

BIS and BAS. The BIS/BAS scales (Carver & White, 1994) comprise a 20-item self-report questionnaire. A Dutch version of the scales was employed, translated from English to Dutch and then back-translated to English without reference to the original text. The back-translated version was compared to the original scales to assure consistency. Seven BIS items assess people's emotional responses to impending punishing events (e.g., 'I feel pretty worried or upset when I think or know somebody is angry at me'). Thirteen BAS items tap individuals' emotional and behavioral responses to potentially rewarding events (e.g., 'When I see

something I want, I feel excited right away'; 'If I see a chance to get something I want, I move on it right away'). Both adolescents and mothers were asked to respond to the items, with reference to themselves, using four-point Likert scales that ranged from 1 (*strongly disagree*) to 4 (*strongly agree*). Detailed information regarding reliabilities and validities of these scales in our sample is provided in the results section.

Adolescent externalizing behaviors. Externalizing problems were measured both through mother-reports of their child's behaviors and through adolescents' self-reports. Mothers filled in the Child Behavior Check List (CBCL; Achenbach, 1991) consisting of 118 items addressing youths' problem behaviors. In this study, 33 items of this scale were used to assess adolescents' externalizing problem behaviors including delinquency (13 items; e.g., 'Sets fires') and aggression (20 items; e.g., 'Fights a lot') during the last six months, with a three-point scale (0 = *not true*; 1 = *sometimes true*; 2 = *true*). The validity and reliability of this measure has been shown to be adequate (Achenbach, 1991). Cronbach's alphas for this scale were .91 and .89 among early and middle adolescents, respectively.

Adolescents filled out the Youth Self Report (YSR; Verhulst, Van der Ende, & Koot, 1997), which is the self-report version of the CBCL. This scale consists of 102 items, of which 30 items were employed to assess externalizing problem behaviors including delinquency (11 items; e.g., 'I set fires') and aggression (19 items; e.g., 'I fight a lot'). Participants responded to the questions on a three-point Likert scale (0 = *never*; 1 = *sometimes*; 2 = *often*). Good validity and test-retest reliability have been established in other studies (Verhulst et al., 1997). Cronbach's alphas were .89 and .85 among early and middle adolescents, respectively.

Depression. To assess adolescents' depressive symptoms, we used Reynolds' (2002) Adolescent Depression Scale-2nd edition (RADS-2). This self-report measure consists of 30 items (e.g., 'I am sad'). Youths answered these questions using a four-point scale (1 = *almost never*; 4 = *usually*). A previous study has shown that this scale has good reliability and validity (Reynolds, 2002). In the current study, Cronbach's alphas were .89 for early adolescents and .88 for middle adolescents.

Anxiety. To measure adolescents' anxiety symptoms, we used the Screen for Child Anxiety Related Emotional Disorder (SCARED; Birmaher, Khetarpal, Brent, Cully, Balach, Kaufman, & McKenzie, 1997), which is a 38-item self-report questionnaire (e.g., 'I am nervous'). Adolescents rated how frequently they had experienced each symptom on a three-point scale (0 = *almost never*; 1 = *sometimes*; 2 = *often*). A previous study has demonstrated good reliability and validity among Dutch adolescents (Hale, Raaijmakers, Muris, & Meeus, 2005). In the present study, Cronbach's alpha was .92 among both early and middle adolescents.

Mothers' problem behaviors. The Adult Self Report (Achenbach & Rescorla, 2003) including 74 items on various problem behaviors was used to tap mothers' problem behaviors. This study employed 33 of the 74 items, including an 18-item anxious/depressed scale (e.g.,

'I feel lonely') and a 15-item aggression scale (e.g., 'I blame others for my problem'). Mothers used a three point scale (0 = *never* to 2 = *often/mostly true*) to rate the extent to which a series of statements described their behavior over the past six months. A prior study has established good psychometric properties of this scale (Achenbach & Rescorla, 2003). In the current study, Cronbach's alphas for mothers were .85 for the anxious/depressed scale, and .80 for the aggression scale, respectively.

Personality traits. A shortened Dutch version of Goldberg's Big Five questionnaire (Gerris, Houtmans, Kwaaitaal-Roosen, Schipper, Vermulst, & Janssens, 1998; Goldberg, 1992) assessed the personality dimensions Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience of adolescents and their mothers. Both adolescents and mothers rated their own personality on a scale ranging from 1 (*completely untrue*) to 7 (*completely true*). Prior studies using the same translated scale indicate that it has acceptable reliability and validity in the estimation of adolescents' personality traits (Branje, Van Lieshout, & Gerris, 2007). The present study employed the subscales for Extraversion (6 items; e.g., 'Talkative') and Neuroticism (6 items; e.g., 'Irritable'). Reliabilities in all samples were acceptable, ranging from .79 to .91 for extraversion, and from .82 to .87 for neuroticism.

2

2.3 RESULTS

To answer our first research question, we ran CFA in *Mplus* (Muthén & Muthén, 2007) to test the two-factor model, including BIS and BAS, against the four-factor model that included BIS, BAS-Reward Responsiveness, BAS-Drive, and BAS-Fun Seeking. Robust Maximum Likelihood Estimation was used (Satorra & Bentler, 1994). All latent factors were allowed to correlate. The goodness of fit of the models was assessed through multiple criteria: CFI, Root Mean Squared Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). CFI values of .90 and above, and RMSEA and SRMR values of less than .08 are considered as acceptable fit (Hu & Bentler, 1999; Kline, 2005). Additionally, we assessed the reliability of each scale in CFA (Raykov, 2004).

The initial two-factor and four-factor models did not meet a common fit standard (i.e., CFI < .90). In particular, in early adolescents, model fit for the two-factor model was: χ^2 (N = 497, 169) = 487.91, CFI = .77, RMSEA (CI) = .06 (.06, .07), SRMR = .07, Bayesian Information Criterion (BIC) = 21806.82, for the four-factor model the fit was: χ^2 (N = 497, 164) = 425.40, CFI = .80, RMSEA (CI) = .06 (.05, .06), SRMR = .07, BIC = 21944.80. In middle adolescents, model fit for the two-factor model was: χ^2 (N = 497, 169) = 502.97, CFI = .71, RMSEA (CI) = .09 (.08, .10), SRMR = .10, BIC = 10263.84, and for the four-factor model the fit was: χ^2 (N = 497, 164) = 412.25, CFI = .78, RMSEA (CI) = .08 (.07, .09), SRMR = .08, BIC = 10190.66. In mothers, model fit for the

two-factor model was: χ^2 (N = 497, 169) = 886.45, CFI = .77, RMSEA (CI) = .08 (.07, .08), SRMR = .08, BIC = 32398.19, and for the four-factor model the fit was: χ^2 (N = 497, 164) = 777.87, CFI = .80, RMSEA (CI) = .07 (.07, .08), SRMR = .07, BIC = 32309.14.

To improve the model fit, first we looked at the factor loading of each item. We designated an item as “poor” if it failed to achieve a loading of at least .30 on its hypothesized factor. CFA revealed that the two reverse-coded items consistently did not load adequately on the hypothesized factor BIS. The magnitudes of factor loadings for item 12 (“Even if something awful is about to happen for me, I rarely experience fear or nervousness”) and item 18 (“Compared to my friends, I have very few fears”) were small. In particular, for early adolescents, in both the two-factor and the four-factor models, the factor loadings of items 12 and 18 were .18 and .07, respectively. Factor loadings for all the other items were higher than .30, ranging from .31 to .68 in the two-factor model, and ranging from .34 to .65 in the four-factor model. Additionally, previous studies have also removed these two items along with some other items because of noticeably low factor loadings (Campbell-Sills et al., 2004; Cogswell et al., 2006), and one study has suggested that these two reversed items were too difficult for young children therefore they simplified or changed these two items in their study (Muris et al., 2005). Therefore, these two items were removed from subsequent analyses. The correlations between factor scores with these two items included and with these two items deleted were .996 in early adolescents, .993 in middle adolescents, and .988 in the mother group.

Two- and Four-factor Models on the Adapted Scales

After deletion of these two items, the two-factor and four-factor models still did not meet a common fit standard (i.e., CFI < .90). Specifically, in early adolescents, model fit for the two-factor model was: χ^2 (N = 497, 134) = 359.91, CFI = .82, RMSEA (CI) = .06 (.05, .07), SRMR = .06, BIC = 19498.35, for the four-factor model the fit was: χ^2 (N = 497, 129) = 315.56, CFI = .85, RMSEA (CI) = .06 (.05, .06), SRMR = .06, BIC = 19475.08. In middle adolescents, model fit for the two-factor model was: χ^2 (N = 497, 134) = 384.58, CFI = .75, RMSEA (CI) = .09 (.08, .10), SRMR = .09, BIC = 9137.80, and for the four-factor model the fit was: χ^2 (N = 497, 129) = 296.63, CFI = .83, RMSEA (CI) = .07 (.06, .09), SRMR = .07, BIC = 9067.11. In mothers, model fit for the two-factor model was: χ^2 (N = 497, 134) = 709.98, CFI = .80, RMSEA (CI) = .08 (.07, .08), SRMR = .07, BIC = 28883.25, and for the four-factor model the fit was: χ^2 (N = 497, 129) = 608.09, CFI = .83, RMSEA (CI) = .07 (.07, .08), SRMR = .06, BIC = 28800.92. We therefore pursued modified models, in which we allowed the error covariance between items within latent factors to correlate if modification indices implied that adding the correlations would significantly decrease the chi-square value.

Modifications were made simultaneously. To improve the model fits for the two-factor models, error terms between items (See the content of the items in the Appendix 1.1) 3 and

11, 3 and 20, 6 and 19, and 10 and 19 were correlated in both early and middle adolescents. Additionally, in early adolescents, error terms between items 7 and 8, 10 and 8; 10 and 11, and 16 and 1 were also allowed to be correlated. In middle adolescents, error terms between items 3 and 10, 3 and 19, 14 and 6, and 14 and 13 were allowed to be correlated. In the mother group, all the modifications listed above except error terms between items 8 and 10 were applied. In addition, error terms between items 1 and 2, 2 and 9, 4 and 8, 6 and 7, 6 and 10, 7 and 13, 8 and 15, 2 and 16, 7 and 17, 11 and 19, 6 and 20, and 11 and 20 were also allowed to be correlated in the mother group.

We also applied modifications to improve the model fit of the four-factor models. In early adolescents, error terms between items 1 and 16, 6 and 19, and 3 and 20 were allowed to be correlated. In middle adolescents, error terms between items 6 and 19, and 3 and 20 were allowed to be correlated. In the mother group, all modifications used in early and middle adolescents were also applied. Additionally, we allowed five other pairs of error terms to be correlated, namely error terms between items 1 and 2, 2 and 9, 6 and 11, 2 and 16, and 11 and 19.

The fit indices were presented in Table 2.1. The modified four-factor models did not achieve adequate fit in all three groups. Also, reliabilities of the BAS scales were low, as no Cronbach's alpha was higher than .70 (the threshold for acceptable reliability according to Nunnally & Bernstein, 1994). Given the inadequate fit and low reliabilities, we considered a four-factor solution to be inappropriate.

The fit indices of the modified two-factor models were more acceptable than those of the four-factor models in early adolescents and mothers for all fits. The indices of the two-factor model and the four-factor model were comparable in middle adolescents. However, the two-factor model was more parsimonious, and the reliabilities of the separate BIS and BAS scales were acceptable in all groups. Therefore, the two-factor model was preferred over the more complex, and slightly worse-fitting four-factor model (Kline, 2005).

Group Invariance

Subsequently, the factor structure was compared between early and middle adolescents, and between adolescents and mothers. We tested four levels of group invariance, including configural, metric, factor variance, and factor covariance invariance. Firstly, a test of configural invariance examines whether the same subsets of items load on the same construct (i.e., latent factor) in different groups. That is, we tested whether the factor structure held across groups. This was tested by examining whether the unconstrained model (baseline model M0) had a good model fit, in which factor loadings, intercepts, and residual variances were set free (Cheung & Rensvold, 2002). Secondly, to test metric invariance, and thus whether the strength of the associations between items and their underlying constructs (i.e., the factor loadings)

Table 2.1 Fits Indices of Modified Two-factor and Four-factor Models and Reliabilities for BIS/BAS Scales in Adolescents and Mothers

Group	Model	χ^2	<i>df</i>	CFI	RMSEA (CI)	SRMR	BIC	α (BS)	α (BAS)	α (Reward)	α (Drive)	α
Early adolescents (N = 497)	Two factors	246.66	126	.90	.04 (.04, .05)	.06	19408.32	.75	.76			
	Four factors	278.20	126	.88	.05 (.04, .06)	.05	19448.40	.73		.63	.53	.53
Middle adolescents (N = 237)	Two factors	243.71	126	.88	.06 (.05, .08)	.08	9031.09	.82	.77			
	Four factor	248.39	127	.88	.06 (.05, .08)	.07	9030.49	.82		.68	.57	.57
Mothers of adolescents (N = 734)	Two factors	336.01	110	.92	.05 (.05, .06)	.05	28619.83	.78	.79			
	Four factors	481.63	121	.87	.06 (.06, .07)	.05	28710.81	.75		.65	.63	.57

Note. BIC = Bayesian information criterion; CFI = comparative fit index; RMSEA = root mean squared error of approximation; SRMR = standardized root mean square residual.

were similar for different groups, we compared the baseline model (M0) with a model in which factor loadings of the items upon the latent factors were constrained across groups (M1) (Cheung & Rensvold, 2002). Thirdly and fourthly, we tested whether the variances of the factors and the covariances between the factors were similar across groups. The invariance of these factor variances and covariances were tested by comparing the metric model (M1) with models in which factor variances (M2) and factor covariances (M3), respectively, were constrained across groups. In these model comparisons, non-significant differences in chi-square model fit between the unconstrained and constrained models were considered as supporting group invariance.

Group invariance between early and middle adolescents. Table 2.2 shows the results of invariance tests across the two adolescent samples. M0 had an adequate model fit, which supported configural invariance. That is, in the early and middle adolescent samples, the same subsets of items were associated with the same constructs (i.e., BIS or BAS). There was no significant difference in model fit between this M0 and the full metric invariance model (M1), indicating that the factor loadings were similar across groups. There was a significant difference between M1 and the model in which factor variance was constrained across groups (M2), indicating that the range of responses on the BIS and/or BAS were significantly different across groups. Follow-up analyses, in which only BIS was constrained, revealed a significant difference (M2.1). When only BAS was constrained, however, there was no significant difference (M2.2).

Table 2.2 Test of Invariance for the BIS/BAS Scales across Early and Middle Adolescents

Model	χ^2	df	CFI	RMSEA	SRMR	Delta Model	p
M0. Configural invariance	460.10	242	.91	.05	.06	---	---
M1. Full metric invariance (M0 with all factor loadings constrained equal)	474.04	258	.91	.05	.07	M1-M0	.60
M2. Factor variances invariance (M1 with all factor variances constrained equal)	483.03	260	.90	.05	.07	M2.1-M1	.01
M2.1. Factor variances invariance (M1 with only BIS constrained equal)	482.55	259	.90	.05	.07	M2.2-M1	.00
M2.2. Factor variances invariance (M1 with only BAS variances constrained equal)	474.20	259	.91	.05	.07	M2.2-M1	.69
M3. Factor covariance invariance (M1 with all factor covariance constrained equal)	476.37	259	.91	.05	.07	M3-M1	.13

This implies that ranges of response to BAS were similar across samples, whereas they were different to BIS. There was also no significant difference between M1 and the model in which factor covariances were constrained (M3), indicating that the relationships among BIS and BAS were similar across these two groups. Thus, except for the BIS factor variance, the 2-factor model did not differ between early and middle adolescents.

Group Invariance between adolescents and mothers. We also tested the invariance of the model for adolescents and mothers. Two adolescent groups were combined in this analysis, as the two-factor models did not differ between them. The results supported configural invariance across adolescents and mothers. The fit indices for the configural model (M0) were: χ^2 ($N = 1468, 214$) = 562.82, $p < .001$, CFI = .93, RMSEA = .05, SRMR = .05, which indicated that adolescents and mothers decompose into the same number of factors, with the same items associated with BIS and BAS, respectively. Metric invariance did not hold, as the configural model and full metric model differed significantly ($\Delta\chi^2$ [$N = 1468$] = 48.06; $\Delta df = 16$; $p = .00$). Criteria for partial invariance were also not met. Hence, the strength of the relationship between each BIS/BAS item and the BIS/BAS factors (i.e., the factor loadings) was different for adolescents and mothers. Since the metric varied between adolescents and their mothers, the subsequent analyses for factor variance and covariance invariance were not conducted (Chen, 2002).

Means and Correlations among BIS and BAS

The mean scores of BIS and BAS were similar across groups, ranging from 12.16 ($SD = 3.48$) to 13.38 ($SD = 3.09$) in BIS, and for BAS from 38.21 ($SD = 5.81$) to 39.88 ($SD = 5.10$). Mean scores and standard deviation of problem behaviors and personality traits are presented in Table 2.3. The correlations between BIS and BAS were .37 ($p = .00$) in the early adolescent group, .42 ($p = .00$) in the middle adolescent group, and .30 ($p = .00$) in the mother group.

Convergent and Discriminant Validity

Finally, we ran tests to assess the convergent and discriminant validity of the BIS/BAS scales. To examine convergent validity, we estimated correlations of BIS with internalizing problem behaviors and neuroticism, and correlations of BAS with externalizing problem behaviors and extraversion. Significant and positive correlations were considered as support for convergent validity, as these correlations would be hypothesized. We assessed the discriminant validity by examining the correlations of BIS with externalizing problem behaviors and extraversion, and of BAS with internalizing problem behaviors and neuroticism. Absence of these correlations was an indication of good discriminant validity, given that these correlations were not theoretically proposed. We also compared the differential magnitude of the correlations of BIS/BAS factors

Table 2.3 Descriptive Statistics for Problem Behaviors of Adolescents and Their Mothers

Group	BIS <i>M (SD)</i>	BAS <i>M (SD)</i>	Anxiety' <i>M (SD)</i>	Depression <i>M (SD)</i>	Aggression/ delinquency" (self-report) <i>M (SD)</i>	Aggression/ delinquency" (mother-report) <i>M (SD)</i>	Neuroticism <i>M (SD)</i>	Extraversion <i>M (SD)</i>
Early adolescents (<i>N</i> = 497)	12.23 (2.90)	39.88 (5.10)	51.06 (9.50)	49.05 (11.97)	10.60 (7.15)	8.97 (7.84)	26.42 (6.61)	30.46 (6.23)
Middle adolescents (<i>N</i> = 237)	12.16 (3.48)	35.54 (4.92)	47.72 (9.28)	47.98 (11.95)	9.02 (6.33)	5.90 (6.27)	27.69 (7.01)	30.24 (6.99)
Mothers of adolescents (<i>N</i> = 734)	13.38 (3.09)	38.21 (5.81)	4.45 (4.61)		2.32 (2.74)		24.96 (7.03)	26.88 (8.11)

Note. Adolescents' and mothers' personalities were assessed by Dutch version of Goldberg's Big Five questionnaire. Mothers' problem behaviors were measured by ASR. Adolescents' anxiety and depression were assessed by SCARED and RADS-2, respectively. Adolescents' externalizing problem behaviors were measured by both self-report on YSR and mothers' report on CBCL.

¹For mothers, this refers to the combination of anxiety/depression symptoms. ²For mothers, this refers only to aggression.

Table 2.4 Differential Relations of BIS/BAS Scales with Problem Behaviors in Adolescents and Mothers

Group	BIS/BAS Factor	Anxiety' (self-report)	Depression (self-report)	Aggression/delinquency" (self-report)	Aggression/delinquency" (mother-report)	Neuroticism	Extraversion
Early adolescents (<i>N</i> = 497)	BIS	.50** ^a	.37** ^b	.24** ^c	.14* ^d	.54** ¹	-.20** ²
	BAS	.03 ^b	.03 ^b	.20** ^a	.17** ^a	.13** ¹	.08** ¹
Middle adolescents (<i>N</i> = 237)	BIS	.61** ^a	.52** ^a	.17** ^b	-.02 ^c	-.34** ²	.70** ¹
	BAS	.19* ^a	.03 ^b	.16* ^a	.12* ^a	.35** ¹	.11* ²
Mothers of adolescents (<i>N</i> = 734)	BIS	.38** ^a	.01 ^b	.30** ^b	.30** ^a	.38** ¹	-.16** ²
	BAS			.09** ^b	.09** ^a	.09* ¹	.05 ¹

Note. Parameters in the same row but with different subscripts differ significantly in magnitude of relations with problem behaviors. Adolescents and mothers' personality were assessed by Dutch version of Goldberg's Big Five questionnaire. Mothers' problem behaviors were measured by ASR. Adolescents' anxiety and depression were assessed by SCARED and RADS-2, respectively.

¹For mothers, this refers to the combination of anxiety/depression symptoms. ²For mothers, this refers only to aggression.

* $p < .05$; ** $p < .01$.

with problem behavior and personality traits through a z -test. The z -test is a generalization of Fisher's z transformation procedure, which examines the differences between correlations of several concepts with a common variable (Meng, Rosenthal, & Rubin, 1992). In our study, we compared the correlations of internalizing versus externalizing problem behaviors with the common variables BIS/BAS, and the correlations of neuroticism versus extraversion, with the common variables BIS or BAS.

Correlations are presented in Table 2.4. The results supported convergent validity, as BIS was positively correlated with internalizing problem behaviors and neuroticism. These correlations were significantly higher than the correlations of BIS with externalizing problem behaviors and extraversion, respectively. There was less support for the discriminant validity of BIS, as BIS was also positively associated with externalizing problem behaviors. These correlations were significantly lower than correlations between BIS and internalizing problem behaviors, however. There was support for BAS's convergent validity, as BAS was significantly but weakly correlated with externalizing problem behaviors and extraversion. There was also some support for the discriminant validity of BAS, considering it generally had non-significant correlations with internalizing problem behaviors. Moreover, BAS was significantly more strongly correlated with externalizing problem behaviors than with internalizing problem behaviors. Contrary to predictions, however, BAS was also positively correlated with neuroticism in all groups and positively correlated with anxiety in middle adolescents. Further, the magnitudes of correlations between BIS and externalizing behaviors were comparable to correlations between BAS and externalizing problem behaviors in early and middle adolescents, and significantly higher than correlations between BAS and externalizing problem behaviors in the mother group.

2.4 DISCUSSION

In this study, the factor structure of Carver and White's (1994) BIS/BAS scales was tested among Dutch early and middle adolescents and their mothers. Two items were deleted because of low factor loadings. Poor fit statistics were obtained in both initial two-factor and four-factor models. After modifications, the four-factor models did not meet the conventional standards of model fit and reliabilities, but two-factor models were found to fit the data within acceptable ranges. The factor structure was comparable for early and middle adolescents, and also consistent with the structure found among mothers. The scales possessed satisfactory reliabilities across groups. This study also provided support for the convergent validity of BIS and BAS, indicated by their positive correlations with internalizing problem behaviors or externalizing problem behaviors, respectively. Limited support was also obtained for

discriminant validity of the scales.

Our finding that a two-factor model was superior to a four-factor model contradicts some previous studies (Cooper et al., 2007; Leone et al., 2001; Muris et al., 2005; Ross et al., 2002; Sava & Sperneac, 2006). One reason for these conflicting findings may lie in the samples used. Studies supporting the four-factor model have predominantly utilized college samples, and most of prior studies on non-college samples from the normal population have favored a two-factor model (Jorm et al., 1999; Van der Linden et al., 2007). Our results are consistent with findings from this latter collection of research. Additionally, our findings may reflect cultural differences. Although the number of Dutch studies is limited, existing evidence is in favor of a two-factor model. In addition to the aforementioned studies on Dutch children and company employees reporting a two-factor model (Muris et al., 2005; Van der Linden et al., 2007), one studies assessing Dutch college students reported a four-factor model. However, the model fit did not meet conventional standards ($CFI = .84$) (Franken et al., 2005). Further studies on more heterogeneous samples are needed to examine these possibilities. For instance, research comparing college and adult samples in the same study could be used to test the similarity in patterns of item endorsement between groups.

In addition, different methodological approaches have been used between studies in order to investigate the factor structure. For instance, some studies have used item parceling instead of item-based CFA to investigate the factor structure of BIS/BAS scale (Leone et al., 2001; Smits & Boeck, 2006). Different methods preclude direct comparisons across studies, however, a previous study comparing item parceling and item-based CFA found that results with these two methods were similar (Hau & Marsh, 2004). In our study, we investigated a trimmed scale (i.e., with items removed) on CFA. The high correlations between factor scores with two items included and with two items deleted implied that it was appropriate to compare our study to those using full BIS/BAS scales.

We removed two items, namely item "Even if something awful is about to happen for me, I rarely experience fear or nervousness", and item "Compared to my friends, I have very few fears" in our study. This is consistent with previous studies which removed these two items along with some other items because of remarkable low factor loadings (Campbell-Sills et al., 2004; Cogswell et al., 2006). Further, one study on children has suggested that these two reversed items were too difficult for their participants therefore they were simplified or changed (Muris et al., 2005).

Our study demonstrated differential magnitudes of correlation between the BIS/BAS scales and different types of problem behaviors. Gray's theory hypothesizes that activation of BIS is more strongly associated with anxiety or depression (Gray, 1987). Consistent with this assumption, and with prior studies (Carver & White, 1994; Jorm et al., 1999), we found strong correlations between BIS and these internalizing problem behaviors. Gray's theory also

proposes that activation of BAS is related to “behavioral excess, in the sense of doing things that potentially lead to trouble” (Fowles, 1988). Our study confirmed that BAS is significantly, albeit weakly, correlated with externalizing problem behaviors, namely delinquency and aggression. These findings provide further evidence for convergent validity of the scales. The discriminant validity of the BIS/BAS scales also received some support in our data. For instance, BIS was negatively correlated with extraversion across all groups, and BAS was not correlated with depression across all samples and also not associated with anxiety in early adolescents and mothers. However, BIS was also positively correlated with externalizing problem behaviors, and the magnitudes were similar to that of correlations between BAS and externalizing behaviors. This association has also been observed in an earlier study with Dutch children, however. It was reported that the correlations between BIS and aggression was higher than the correlations between BAS and aggression (i.e., $r = .29$ vs. $.13$). The authors suggested that BIS consists not only of sadness and fear, but also includes emotions such as anger and frustration that may contribute to aggression or delinquency (Muris et al., 2005). This is consistent with studies reporting comorbidity of internalizing and externalizing problem behaviors (Gjone & Stevenson, 1997). In sum, the discriminant validity of the BIS/BAS scales needs further investigation.

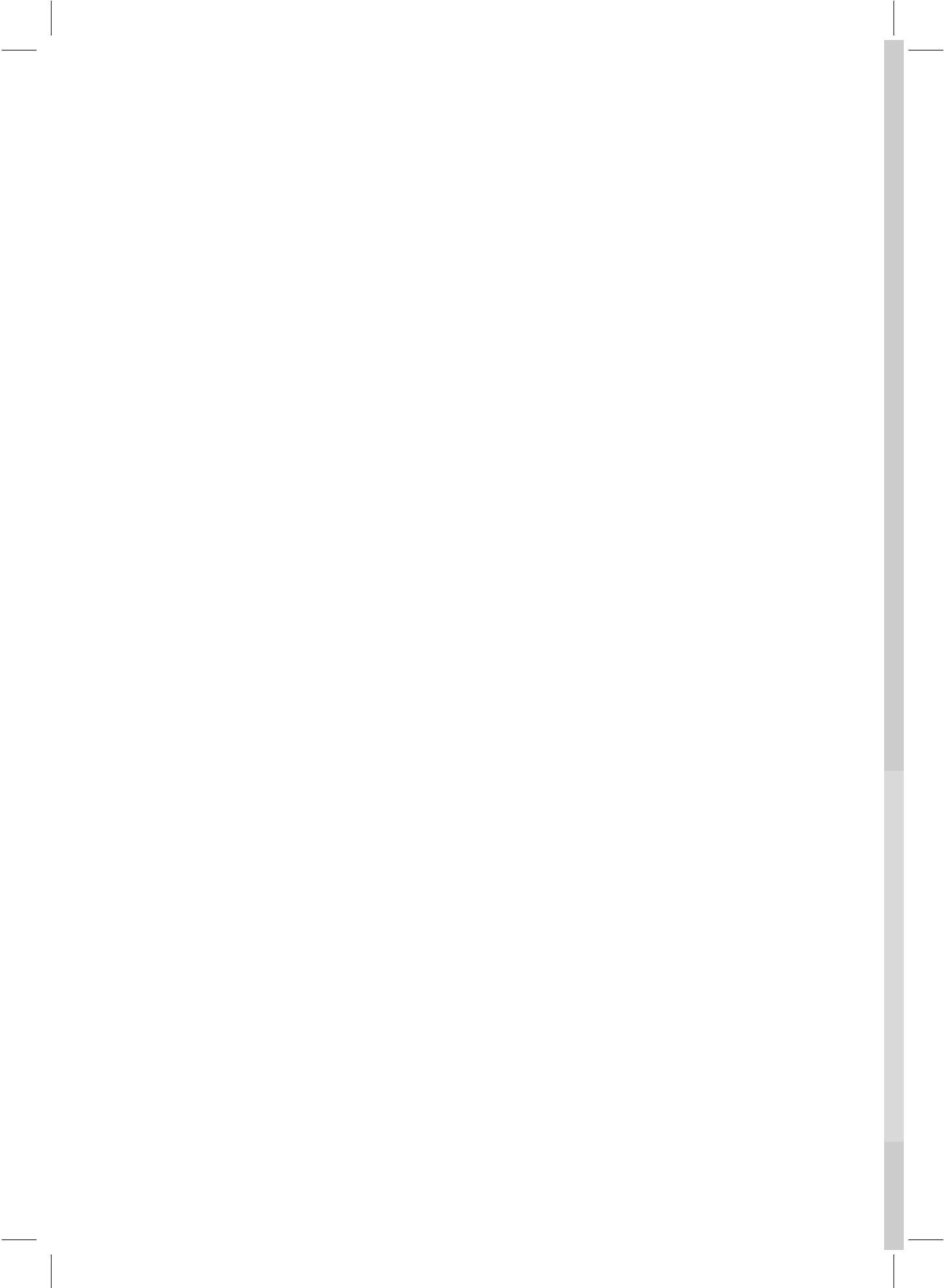
The results of this study supported group invariance across early and middle adolescents. Not only were the number of latent factors equal across groups, but the factor loadings and covariance between BIS and BAS were also similar across early and middle adolescents. The results also supported configural invariance between adolescents and mothers, implying that the factorial structure of BIS/BAS scales are comparable across these two groups. These results, combined with results from testing of convergent and discriminant validity, implying that the revised BIS/BAS scales could be used, however with caution, for future longitudinal studies of adolescents and also in research on intergenerational transmission between adolescents and their parents.

Despite the fact that we used multiple samples, in order to prevent sample-dependent solutions, there are some limitations of the current study. One limitation is the cross-sectional design, which prevented us from exploring stability of the factor solution over time and from examining causal relations between BIS/BAS scales and problem behaviors. Longitudinal studies are needed to gain more insight into the direction of effects between these variables. The other limitation is that, since our samples were drawn from a normal population, the use of the revised version in a clinical sample requires further research.

In conclusion, our study revealed that a two-factor model fits the data acceptably. Together with the evidence of satisfactory convergent validities and reliabilities, this research indicated that our adapted BIS/BAS scales possess acceptable psychometric characteristics. However, there was limited support for the discriminant validity.

APPENDIX 1.1

BIS/BAS	
Name instrument	BIS/BAS Scales
Construct	Strength of the Behavioral Inhibition System and the Behavioral Activation System
Item number	20
Scales instrument	BIS no subscales (7 items: 1, 2, 5, 9, 12, 16, 18). BAS (13) with 3 subscales: BAS-reward (5 items: 6, 11, 15, 17, 19), BAS-drive (4 items: 3, 7, 14, 20), BAS-fun seeking (4 items: 4, 8, 10, 13).
Scale type	Range BIS: 7-28; range BAS: 13-52 (Reward Responsiveness: 5-20; Drive and Fun Seeking both: 4-16)
Instruction/items	
<p>On the next pages you will find a number of assertions. You have to read these assertions and affirm whether they are applicable to you. Next to each assertion there are four answer possibilities that vary from "totally disagree" to "totally agree". The intention is that you have to indicate with a cross in one of the boxes to what extent these assertions are applicable to you. Don't leave any question unanswered and limit yourself to the given answer possibilities.</p> <p>Take your time, but don't think <i>too long</i> about a question.</p>	2
<ol style="list-style-type: none"> 1. When I think that something unpleasantly will happen, I usually get pretty "wrought up". 2. I am worried about making mistakes. 3. When I want something, I usually completely go for it. 4. Most of the time I do things for no other reason than that it could be fun. 5. Critic or a reprimand strike me highly. 6. When I get something I want, I feel excited and charged. 7. I give great effort to get things I want. 8. I strongly desire excitement and new sensations. 9. I feel highly upset when I think or know that somebody's angry at me. 10. I am always ready to try something new if I think that it's going to be fun. 11. When I do something good, I want to continue it. 12. Even if something awful is about to happen for me, I rarely experience fear or nervousness. 13. I usually act the way the moment inspires me to do so. 14. When I see a chance to get something I want, I immediately go for it. 15. When something good happens to me, it affects me deeply. 16. I feel worried when I think that I've performed badly on something. 17. I would be excited to win a competition. 18. Compared to my friends I have very few fears. 19. If I see an opportunity to get something I like, I immediately get excited. 20. When I make work from something, I give my full self into it. 	





CHAPTER 3

Personality Disorders, Violence, and Antisocial Behaviors: A Systematic Review and Meta-Regression Analysis¹

¹ Yu, R., Geddes, J., & Fazel, S. (2012). Personality disorders and antisocial behavior: A systematic review and meta-regression analysis. *Journal of Personality Disorders*, 26, 775-792.

ABSTRACT

Background

The risk of antisocial outcomes in individuals with personality disorder (PD) remains uncertain.

Aims

To synthesize the current evidence on the risks of antisocial behavior, violence, and repeat offending in PD, and explore sources of heterogeneity in risk estimates.

Method

Systematic review and meta-regression analysis of observational studies comparing antisocial outcomes in personality disordered individuals with controls groups.

Results

Fourteen studies examined risk of antisocial and violent behavior in 10,007 individuals with PD, compared with over 12 million general population controls. There was a substantially increased risk of violent outcomes in studies with all PDs (random-effects pooled odds ratio [OR] = 3.0, 95% CI = 2.6 to 3.5). Meta-regression revealed that antisocial PD and gender were associated with higher risk ($p = .01$ and $.07$, respectively). The odds of all antisocial outcomes were also evaluated. Twenty-five studies reported the risk of repeat offending in PD compared with other offenders. The risk of a repeat offence was also increased (fixed-effects pooled OR = 2.4, 95% CI = 2.2 to 2.7) in offenders with PD.

Conclusion

Although PD is associated with antisocial outcomes and repeat offending, the risk appears to differ by PD category, gender, and whether individuals are offenders or not.

Keywords: personality disorders, violence, crime, criminal recidivism, review, meta-analysis

3.1 INTRODUCTION

The prevalence of personality disorder (PD) in the general population ranges from 4 to 13% (Coid, Yang, Tyrer, Roberts, & Ullrich, 2006b; Samuels, Eaton, Bienvenu, Brown, Costa, & Nestadt, 2002; Torgersen, Kringlen, & Cramer, 2001). Around a fifth of people with PD are seen by health services due to the severity of their symptoms, comorbidity with other mental disorders, or the risks they pose to themselves and other people (Andrews, Issakidis, & Carter, 2001). In relation to these risks, individuals with PD are at increased risk of suicide, and it is estimated that 30-50% of individuals who die from suicide have personality disorders (Foster, Gillespie, & McClelland, 1997; Hawton & Van Heeringen, 2009). The degree of risk to others, however, is uncertain, and estimates are likely to be confounded by background socio-demographic factors and comorbidity with substance abuse (Alwin, Blackburn, Davidson, Hilton, Logan, & Shine, 2006). Narrative reviews have suggested an increased risk of violence in personality disorder (Duggan & Howard, 2009; Fountoulakis, Leucht, & Kaprinis, 2008), but, to our knowledge, a quantitative synthesis of the primary studies has not been conducted. Thus, the extent of the increased violence risk, and how this compares with other psychiatric disorders, is unknown. In this report, we aimed to synthesize the evidence on PD as a risk factor for violence, criminality, and antisocial behavior. We sought to build on previous research by using quantitative methods and explore sources of heterogeneity. We distinguished between two related questions. First, we examined the association between personality disorder and antisocial behavior compared with the general population. Second, we investigated whether this association differed in offenders – in other words, what is the risk of repeat offending in individuals with PD compared with offender controls?

3.2 METHOD

Inclusion Criteria

Studies were included if: 1) PDs were diagnosed by clinical and/or semi-structured interviews using explicit criteria (e.g. DSM, ICD); and 2) they were case-control studies (including cross-sectional surveys) and cohort studies that reported the risk of antisocial behavior in individuals with PD compared with controls without PD in the general population (first study) or risk of repeat offending in PD compared with other offenders without PD (second study); and 3) studies provided sufficient information to allow for the calculation of odds ratios (ORs). We chose to use a broad and inclusive definition of antisocial behavior, that of any chronic violation of social rules and norms that could lead to both violent and nonviolent manifestations (Hinshaw & Zupan, 1997).

Exclusion Criteria

Studies were excluded if: 1) the presence of PD was assessed using self-report questionnaires. These studies were excluded as self-report instruments are likely to overestimate prevalence rates (Zimmerman & Coryell, 1990); or 2) studies restricted to one type of antisocial behavior, such as homicide (Putkonen, Komulainen, Virkkunen, Eronen, & Lonnqvist, 2003; Tiihonen & Hakola, 1994), or sexual offending (Langstrom, Sjostedt, & Grann, 2004); or 3) there were no appropriate comparison data (Grann, Langstrom, Tengstrom, & Kullgren, 1999; Tikanen, Holi, Lindberg, & Virkkunen, 2007). We also excluded one further study as it did not include antisocial PD in an adult sample (Pulay, Dawson, Hasin, Goldstein, Ruan, Pickering, Huang, Chou, & Grant, 2008).

Search Strategy

We searched published and unpublished sources (including theses) using 6 bibliographic databases (Medline, Embase, PsycInfo, CINAHL, US National Criminal Justice Reference System, and Web of Science) from January 1, 1966 to July 31, 2009. No language limit was set for searched articles. Search strategies were tailored to the individual database. Search terms for PD were: personality disorder*, personality pathology, axis II, personality dysfunction, personality abnormality, and abnormal personality. Terms for antisocial behavior were: viol*, offen*, aggress*, assault*, antisocial, anti-social, dangerous*, crim*, delinquen*, and unlawful*. The terms used for repeat offending were: recidi*, reoffend*, repeated offend*, rearrest, reconvict*, reincarcerat*, revoke*, and recur*. Terms for antisocial behavior and recidivism of antisocial behavior were combined with terms for PDs in the search process. In order to increase the sensitivity of the search, the terms mental disorder*, mental illness*, and psychiatric disorder* were also used, combined with the search terms for antisocial behavior or recidivism. Reference lists were additionally searched. Where raw data could not be extracted or derived, original authors were contacted. Non-English publications were translated.

Procedure

Identification of studies. In the initial screening, titles and abstracts were examined. 2460 papers for the first review and 208 papers for the second review were screened. A final decision to include studies identified on initial screening was made by two of the authors independently (RY and SF). Any discrepancies were resolved by further review and correspondence with authors. We avoided duplication of data by checking for overlapping samples, and using the most complete data available when multiple papers of the same dataset were published. If a study reported two outcomes (i.e., violent crime and all criminality), both were extracted.

Data extraction. A standardized extraction sheet was used, and data was extracted by

one of the authors (RY) with discussion with another (SF) if queries arose. The numbers of participants with or without PD cross-classified by antisocial behavior, violence or repeat offending were drawn up for each paper, either by direct extraction from published tables and text or derived from summary percentages. The resultant 2 by 2 tables were cross-checked against all information within each published paper (counts, percentages, summary statistics, and test statistics) and any inconsistencies resolved by discussion with the author of the primary study if possible. The following information was also recorded: study size (e.g. 1-100 cases, 101-1000 cases, more than 1000 cases), study design (e.g. cohort, case-control, cross sectional), study period (before 1990 vs. after 1990), study location, diagnostic tool (e.g. ICD, DSM), comparison group, diagnosis (e.g. all PDs, only antisocial PD [ASPD], and PD not including ASPD), method of ascertainment of outcome (register [police or other crime registers] and self-report), and descriptive statistics of the sample (e.g. age [30 years or younger vs. older than 30 years] and sex distribution). In addition, risk estimates with and without adjustment were recorded. These were variables such as gender, age, or socio-economic status that were controlled statistically in individual studies or matched between cases and controls in study designs.

Statistical Analyses

Meta-analyses of risk of antisocial and recidivism outcomes were done producing pooled odds ratios (ORs) with 95% confidence intervals (CI). Since different characteristics between studies might contribute to variation in effect sizes, simply focusing on overall pooled outcomes could be misleading especially if the included individual studies were not clinically similar. Thus, we investigated sources of between study heterogeneity as recommended in reviews of observational data (Egger, Schneider, & Smith, 1998; Lau, Ioannidis, & Schmid, 1998).

Heterogeneity between studies was estimated using Cochran's Q (reported with a χ^2 -value and p value) and I^2 statistic. The latter describes the percentage variation across studies due to heterogeneity rather than chance. I^2 , unlike Q, does not inherently depend on the number of studies considered. For I^2 , the values of 25%, 50%, and 75% indicate low, moderate, and high levels of heterogeneity, respectively (Higgins & Thompson, 2002).

In both studies, fixed-effects models, which average the summary statistics, weighting them according to a measure of the quantity of information they contain, were used when heterogeneity was considered low to moderate based on I^2 values. Random-effects models, which incorporate an estimate of between study heterogeneity into the calculation of the common effect, were used when the heterogeneity between studies was high (Deeks, Altman, & Bradburn, 2001). Random-effect estimates give relatively similar weight to studies of different size. In contrast, fixed-effect estimates are weighted by study size (Deeks, Altman, & Bradburn, 2001).

We explored factors associated with observed heterogeneity using subgroup analyses and meta-regression. To compare the risk estimates of different groups, subgroup analyses were performed by gender, age, diagnosis, size of study, study origin, study region, adjustment, comparison group, diagnostic criteria, and ascertainment of outcome. All subgroup analyses involved non-overlapping data. Meta-regression was conducted to estimate the extent to which one or more measured covariates (the same variables as used in the subgroup analysis) explained the observed heterogeneity in risk estimates (Higgins & Thompson, 2002). All factors were entered individually and in combination to test for possible associations. The influence of individual studies on the summary effect were explored using an influence analysis, in which meta-analytic estimates were computed omitting one study at a time (Deeks et al., 2001). Publication bias was tested by funnel plot asymmetry using the rank correlation method (Begg & Mazumdar, 1994) and weighted regression approach (Egger, Smith, Schneider, & Minder, 1997). Analyses were performed in STATA version 10.0 (StataCorp, 2007).

To investigate the population impact on criminality, we also calculated population attributable risk fractions. We used the number of convicted individuals for this analysis, as the number of criminal convictions was not available in studies included in our review. Therefore the base rate r was defined as the number of criminal individuals per 1,000 patients with PD. r_0 was defined as the number of criminal individuals per 1,000 individuals who had not been patients with PD. We then calculated the population-attributable risk as the difference in $r-r_0$ and the population attributable risk fraction as population attributable risk/ r .

In addition, for offenders with PD, we examined the number needed to detain. The number needed to detain is the number of individuals who would need to be treated and detained to prevent one adverse event (Fleminger, 1997). It can be derived from the base rate of violence in a population by the sensitivity and specificity of the prediction method. It is the ratio of true positives plus false positives to true positives, and equals the inverse of positive predictive value.

3.3 RESULTS

Study 1: Risk of Violence and Antisocial Behavior in Personality Disorder

We identified 14 studies from 11 publications that reported on risk of antisocial behavior in individuals with PD (Appendix Table 3.1). The total number of individuals with PD in these studies was 10,007, of whom 1,362 (13.6%) were involved in antisocial behavior (including violence) at a median follow up of 4.5 years (with a range of 19 weeks to 60 years). These were compared with 12,742,916 individuals from the general population, of whom 442,057 (3.5%) reported antisocial behavior. Studies were conducted in the US, Denmark, England,

Switzerland, Canada, Finland and Israel. All studies were conducted after 1977.

Of the 14 studies included, 10 studies investigated violent outcomes (reported in eight publications), including violent crime (Elonheimo, Niemela, Parkkola, Multimaki, Helenius, Nuutila, & Sourander, 2007; Hodgins, Mednick, Brennan, Schulsinger, & Engberg, 1996; Ortmann, 1981) and other outcome measures (including self and informant report) (Coid, Yang, Roberts, Ullrich, Moran, Bebbington, Brugha, Jenkins, Farrell, Lewis, & Singleton, 2006a; Johnson, Cohen, Smailes, Kasen, Oldham, Skodol, & Brook, 2000; Monahan & Appelbaum, 2000; Stueve & Link, 1997; Swanson, Bland, & Newman, 1994). Three investigations reported in two publications provided data for both violent and any antisocial behavior (Elonheimo et al., 2007; Hodgins et al., 1996). In the studies with violence outcomes, there were 9,578 persons with PD, of whom 1,024 (10.7%) were violent. They were compared with 327,293 persons from the general population, of whom 3,841 (1.2%) were violent.

There was a significant association between PD and violence. In studies that sampled all PDs (including ASPD), the overall fixed-effects pooled OR was 3.0 (95% CI = 2.6 to 3.5) with low heterogeneity between the studies ($\chi^2_5 = 4.8$, $p = 0.3$, $I^2 = 16.6\%$; see Figure 3.1). Three studies, reported in two publications (Coid et al., 2006a; Johnson et al., 2000), examined the risk of violence in PDs excluding ASPD, leading to an OR of 2.3 (95% CI = 1.8 to 2.9).

Studies of any antisocial behavior (including violence) in all PDs reported an overall random-effects pooled OR of 6.8 (95% CI = 5.8 to 7.9) with moderate to high heterogeneity between the investigations ($\chi^2_4 = 9.5$, $p = 0.01$, $I^2 = 62.7\%$; see Figure 3.2).

Antisocial personality disorder (ASPD). We investigated those samples with only ASPD individuals, and found a greater association with violent outcomes (random-effects OR = 12.8 [95% CI = 7.9 to 20.7]), with high heterogeneity between studies ($\chi^2_5 = 35.3$, $p < 0.01$, $I^2 = 88.7\%$). When one outlier (Swanson et al., 1994) was excluded from the analysis, the OR was 10.4 (95% CI = 7.3 to 14.0) with high heterogeneity between studies ($\chi^2_4 = 10.4$, $p = 0.02$, $I^2 = 71.2\%$). The positive predictive value of a diagnosis of ASPD on violence was 14% - that is, 14% of those with ASPD were violent. This was the equivalent of needing to detain 7 individuals with ASPD to prevent one violent act assuming a base rate of 7.5%.

Gender. Higher risk estimates were found in women with ASPD compared with men with ASPD, when violent outcomes were investigated. There was no significant difference in risk estimates by gender in studies with all PD sample or between studies investigating any antisocial behavior. Specifically, when violent outcomes were examined, in studies with ASPD samples, the OR was 13.1 (95% CI = 9.4 to 18.3) in women, which was significantly higher than an OR of 7.9 (95% CI = 7.1 to 9.0) in men. In studies with all PDs, the OR was 3.6 (95% CI = 2.7 to 4.9) in women compared with an OR of 3.0 (95% CI = 2.1 to 4.4) in men. When any antisocial outcomes were examined, in studies with all PD samples, the OR was 6.4 (95% CI = 3.9 to 10.5) in women compared with an OR of 6.3 (95% CI = 3.1 to 12.8) in men. In studies with ASPD

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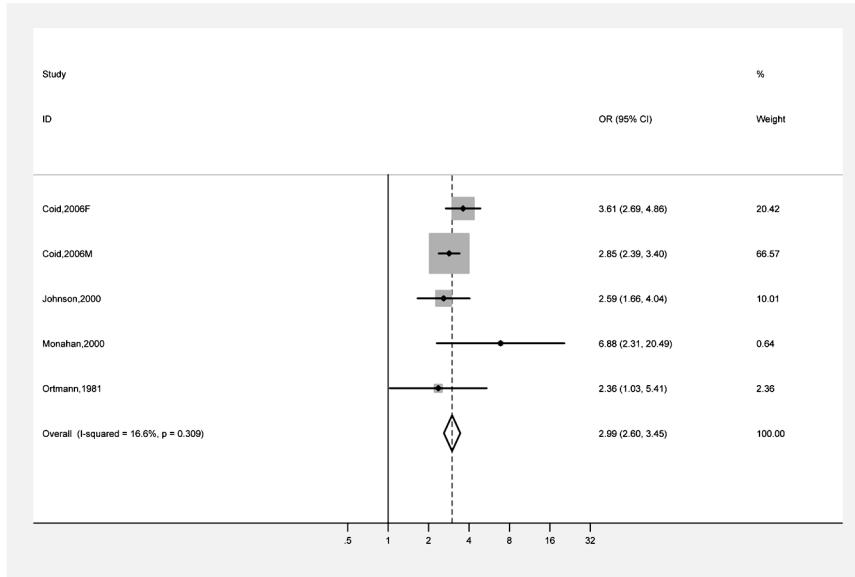


Figure 3.1 Risk Estimate for Violent Outcomes in All Personality Disorders Samples Compared with General Population Controls.

Note. Weights are from fixed-effect models; OR = odd ratio.

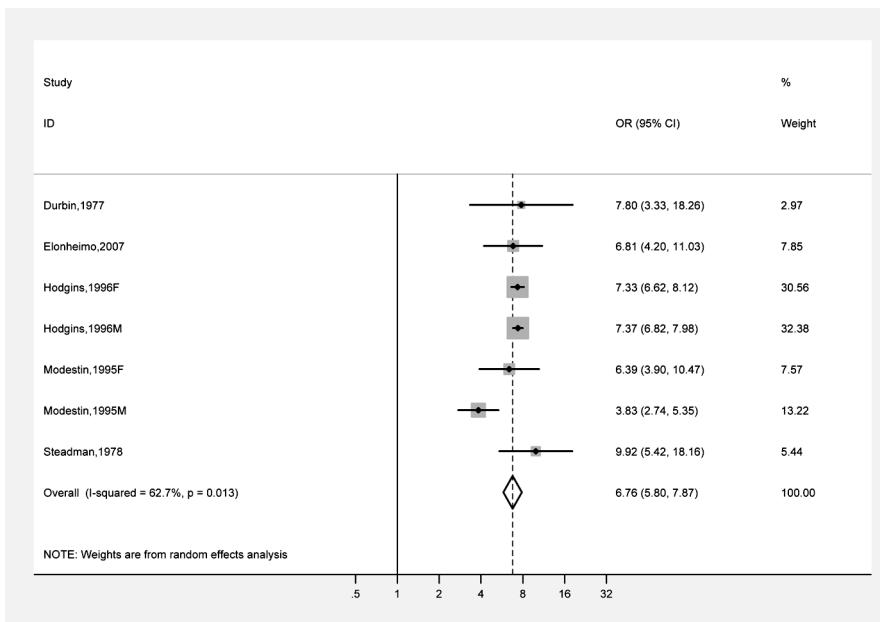


Figure 3.2 Risk Estimate for Any Antisocial Behavior in All Personality Disorders Samples Compared with General Population Controls.

Note. OR = odds ratio.

samples, the OR was 7.3 (95% CI = 6.6 to 8.1) in women compared with an OR of 7.4 (95% CI = 6.8 to 8.0) in men.

Other characteristics. There were no significant differences in risk estimates by other characteristics, including age, study period, region, study type, adjustment, comparison group, diagnostic criteria, and ascertainment of outcome (see Table 3.1 for details).

Meta-regression. When investigating violent outcomes, meta-regression indicated that overall heterogeneity in risk estimates was partly due to the proportion with ASPD diagnoses (studies with ASPD-only samples reported higher risk estimates; $\beta = -0.89$, $SE[\beta] = 0.31$; $p = 0.01$). In addition, gender partly explained this heterogeneity (studies with females reported higher risk estimates; $\beta = 0.43$, $SE[\beta] = 0.22$; $p = 0.07$).

Publication bias. There was no clear evidence of publication bias in studies of violent outcomes when using either the weighted regression method ($t = -.76$, $p = 0.48$) or the rank correlation method (Kendall tau = 0.13, $p = 0.88$). Similarly, there was no clear evidence of publication bias when any antisocial behavior was the outcome.

Population attributable risk. The population attributable risk was 3 per 1000 population. In other words, there would be three less violent persons per 1000 general population if all those with PD were detained indefinitely. The population attributable risk fraction for PD on violence was estimated at 18.8% (i.e., 19% of societal violence could be attributed to individuals with PD assuming there is a causal relationship).

Study 2: Risk of Repeat Offending in Personality Disorders

In investigations of repeat offending (or recidivism), 25 studies from 21 publications were included (Appendix Table 3.2). Four publications reported findings on multiple samples (Coid, Hickey, Kahtan, Zhang, & Yang, 2007; Ganzer & Sarason, 1973; Rice, Harris, Lang, & Bell, 1990; Singleton, Meltzer, & Gatward, 1998). The total number of offenders with PD in the included studies was 5,087. Of these, 2,428 (47.7%) were repeated offending during a median follow up of 6 years (with a range of 20 months to 22 years). These were compared with offenders with other psychiatric disorders ($n = 4,402$) or non-mentally disordered offenders ($n = 168$), of whom 1,242 (27.2%) were recidivists. These studies were conducted in the United States, England and Wales, Brazil, Sweden, Italy, Germany, and France. Criminal recidivism data were obtained from register-based sources in all studies. All reports were conducted after 1974.

The overall fixed-effects pooled OR was 2.4 (95% CI = 2.2 to 2.7), with low to moderate heterogeneity between studies ($\chi^2_{25} = 34.6$, $p = 0.07$, $I^2 = 30.7\%$).

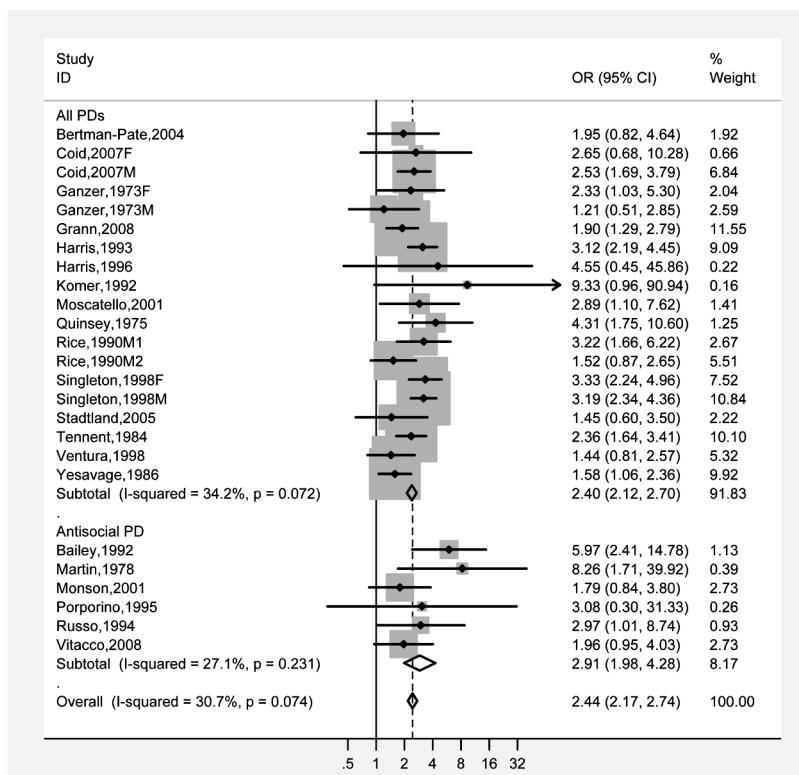
Risk estimate by comparison groups. Of the included investigations, 23 compared the risk of criminal recidivism in PDs with offenders with other psychiatric disorders (Figure 3.3). There were three studies that provided comparison data from non-mentally disordered offenders (Grann, Danesh, & Fazel, 2008; Porporino & Motiuk, 1995; Stadtland & Nedopil, 2005). No

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Table 3.1 Risk Estimates for Antisocial Behavior in Personality Disorders by Sample or Study Characteristics

Sample or Study Characteristics	Number of Studies	Number of Cases with Personality Disorder	OR (95% CI)
Data from all studies			
Study period			
Study conducted in and before 1990	8	7290	7.4 (5.8 to 9.5)
Study conducted after 1990	6	2717	4.7 (3.0 to 7.4)
Study region			
USA	4	208	5.9 (2.7 to 12.8)
Scandinavia	6	7174	6.2 (5.1 to 7.4)
The rest of the world	4	2625	8.0 (3.1 to 20.7)
Design			
Case-control	12	9931	5.9 (4.4 to 7.9)
Cohort	2	76	9.1 (5.4 to 15.5)
Adjustment			
With adjustment	6	2969	6.7 (3.6 to 12.5)
Without adjustment	8	7038	6.2 (5.0 to 7.6)
Comparison group			
General population	8	791	6.3 (3.4 to 11.8)
General population without psychiatric disorders	6	9216	5.9 (4.1 to 8.4)
Age ^a			
30 years or younger	4	360	5.0 (2.2 to 11.1)
Older than 30 years	6	7126	8.0 (6.2 to 10.3)
Number of cases			
< 100 cases	5	227	8.9 (6.7 to 11.9)
100-1000 cases	5	686	5.5 (2.3 to 13.1)
> 1000 cases	4	14629	4.9 (3.2 to 7.5)
Data from studies of violent outcomes			
Diagnostic criteria ^b			
DSM criteria	5	2699	5.5 (2.6 to 11.5)
ICD criteria	4	6830	7.7 (5.0 to 11.9)
Data resource			
Register ^c	4	6830	7.7 (5.0 to 11.9)
Self-report	4	2625	8.0 (3.1 to 20.6)
Combination of sources	2	123	3.7 (1.5 to 9.4)

Notes. ^a Number of studies and cases differ in this analysis because five studies (Coid et al., 2006a; Durbin, Pasewark, & Albers, 1977; Monahan & Appelbaum, 2000) did not provide information on age. ^b Number of studies and cases differ in this analysis because one study (Stueve & Link, 1997) did not provide information on diagnostic criteria. ^c Register = police or other crime registers.



3

Figure 3.3 Risk Estimates for Repeat Offending in Offenders with Personality Disorder Stratified by PD Category.

Note. Weights are from fixed-effect models; OR = odds ratio.

significant differences in risk estimates were found between reports using different comparison groups: the OR was 2.5 (95% CI = 2.1 to 2.9) when comparison group was offenders with other psychiatric disorders and the OR was 1.9 (95% CI = 1.3 to 2.8) when comparison group was non-mentally disordered offenders. All subgroup analyses used fixed effects models.

Antisocial personality disorder. Subgroup analysis of samples revealed no significant differences in risk estimates in those with only ASPD (OR = 2.9, 95% CI = 2.0 to 4.3) compared with all PDs (OR = 2.4, 95% CI = 2.1 to 2.7).

Other characteristics. Subgroup analysis revealed that there was no significant difference in risk estimates by gender (including for only ASPD samples) or other tested characteristics: studies conducted in the US vs. the rest of the world, studies conducted in and before 1990 vs. after, studies using DSM vs. ICD criteria, studies with mean age of 30 and less vs. older, and sample size of less than 100 vs. more than 100 (data not shown).

Meta-regression and publication bias. On meta-regression, no tested factor significantly

was associated with heterogeneity, neither when entered individually nor simultaneously. In addition, there was no clear evidence of publication bias when using Egger (weighted regression) method ($t = -1.43, p = 0.17$) or the Begg test (rank correlation method; Kendall Tau = .20, $p = 0.30$).

Population attributable risk. The population attributable risk was 108 per 1000 population (i.e., there would be a reduction of 108 persons convicted of repeat crime per 1000 population if all offenders with PD were indefinitely detained). The population attributable risk fraction for PD on repeat offending was estimated to be 29%. The positive predictive value for PD on reoffending is 66% - that was, 66% of those offenders with PD were criminal recidivists. This is the equivalent of needing to detain 1.5 offenders with PD to prevent one repeat offence in the community.

3.4 DISCUSSION

Main Findings

We have reported two related systematic reviews and meta-analyses that examine the association of PD and antisocial behavior, violence, and repeat offending. In the first, we investigated the association between PD and antisocial outcomes compared with the general population, and identified 14 studies. There were two main findings. First, there was threefold increase in the odds of violent outcomes in individuals with all PDs compared with general population controls. Unsurprisingly, the risk in antisocial PD was substantially higher (reported as an odds ratio of 12.8). Second, there were high levels of heterogeneity in overall risk estimates which was partly explained by higher risk estimates in samples with more female participants. Our second review focused on risk of repeat offending in PD offenders compared with other offenders, and 25 studies were included. We found that offenders with PD had two to three times higher odds of being repeat offenders than mentally or non-mentally disordered offenders. In addition, we found that, unlike the situation with non-offenders, a diagnosis of ASPD or gender did not materially alter risk estimates.

The risk of violence in people with any PD appears to be similar to individuals with schizophrenia (Fazel, Långström, Hjern, Grann, & Lichtenstein, 2009), bipolar disorder (Fazel, Lichtenstein, Grann, Goodwin, & Långström, 2010) or head injury (Fazel, Philipson, Gardiner, Merritt, & Grann, 2009). However, in those with ASPD, risk estimates are more similar to those for those with drug and alcohol abuse (where it varies between 4 and 12 in a recent systematic review (Fazel, Gulati, Linsell, Geddes, & Grann, 2009)). In relation to offenders, our findings are consistent with a meta-analysis published over a decade ago that found ASPD was a strong predictor of repeat offending (Bonta, Law, & Hanson, 1998). Other psychiatric diagnoses do

not appear to be as strongly as related to repeat offending (Grann et al., 2008). For example, a recent review reported increased odds in the form of an OR of 1.5 for psychosis on repeat offending (Fazel & Yu, 2011) whereas the OR for repeat offending in PD is reported as 2.4 in the current review.

Implications

The relationship of PD with violence and the quantification of the risk are important from public health and policy perspectives. Mental health legislation over the last decade in some countries, such as that for Dangerous and Severe Personality Disorder (DSPD) in England and Wales (Farnham & James, 2001; Buchanan, & Leese, 2001), and proposals for detaining sexual offenders in secure hospitals in the US (La Fond, 2008), Australia (Zdenkowski, 1997), France (Bénézech, Pham, & Le Bihan, 2009), and other countries, assume that PD is a significant risk factor for serious offending and that treatment in secure hospitals will provide some benefits. What this review highlights is that the relationship is not straightforward and varies by PD category substantially and possibly by gender. Although this supports the view interventions that reduce violence in PD could potentially make a significant impact, it suggests that legislation might be more effective if tailored to subgroups. Although government initiatives aimed at the treatment of offenders and high risk individuals with PD have been strongly criticized by some in the research community, such as the UK's DSPD Programme (Eastman, 1999; Farnham & James, 2001), this review implies that, in principle, if the link between PD and offending was modifiable, it could provide one approach to reduce crime. As the evidence to date suggests that it is at most weakly modifiable (NICE, 2009), and the risk estimates in ASPD were found to be similar to alcohol and drug abuse, the particular emphasis on severe PD as a means of crime reduction could be questioned. Furthermore, there is evidence of the efficacy of treatment for substance abuse (Brunette, Mueser, & Drake, 2004).

One unexpected finding in the review that bears on this issue is that offenders with ASPD were not associated with a higher risk of repeat offending in offenders compared with offenders with any PD. This may be because the studies of repeat offending examined risk of all crime (rather than violent offending), and any association with ASPD may be specific to violence. This was in contrast to ASPD being associated with high risk of violence in non-offenders compared with the general population. Nevertheless, the positive predictive value of a diagnosis of ASPD for violence was 14% (in other words, typically 14% of those with a diagnosis of ASPD will commit violent acts), suggesting that targeting this high risk group is unlikely to be an effective strategy in general psychiatry for violence risk reduction.

Further, our meta-regression did not find young age as a risk factor for violence unlike studies of general population samples (Loeber, Lacourse, & Homish, 2005). This may be due to the enduring and stable features of PD symptomatology over time (Lenzenweger, 1999).

One other implication is that the potential utility of the risk management of personality disordered individuals in forensic settings, including prison and secure hospitals, is underscored by our results. Women with personality disorder may benefit from such risk management more than men and research developing risk assessment and management in women with personality disorder is one area of worthwhile future research.

Limitations

There are a number of limitations in this report. The primary studies reported few potential confounders and so risk estimates could not take these into account. The most significant confounder is likely to be the comorbidity with other psychiatric disorders (Maier, Minges, Lichtermann, & Heun, 1995), particularly between substance use disorders and ASPD (Swanson et al., 2002). None of the studies included in the reviews reported the rate of antisocial behavior for PDs with and without substance use disorder separately. Therefore, it is likely that the ORs overestimate the association between PD and antisocial outcomes as they have not fully adjusted for confounding.

Second, more research on the association between different PD categories and types of antisocial behavior is required. In the current review, outcome data included both any antisocial behavior (which included violent and non-violent outcomes) and violence. Subgroup analysis revealed that there was little difference in risk estimates between these two outcomes. As these are overlapping, it would be preferable to compare violent with non-violent outcomes, but this was not possible using the current data. It was not surprising that ASPD was associated with the highest risk estimates, as the criteria include antisocial acts. Only two studies (Coid et al., 2006a; Johnson et al., 2000), estimated risk in PDs excluding ASPD, with ORs lower than the others. Further research on risk estimates in non-ASPD samples would be helpful as most individuals with PDs are not involved in antisocial behavior and feel unfairly stigmatized by the association with antisocial behavior (Blackburn, 1993; Stalker, Ferguson, & Barclay, 2005).

Third, the research base was of mixed quality. Further work that examines antisocial behavior in the general population with prospective cohort designs, investigations of criminal recidivism using non-mentally disordered comparisons, violent outcomes in repeat offenders, and studies in non-western countries is needed. Of note, of the 14 studies included in the first review, only two investigations used a cohort design (Monahan & Appelbaum, 2000; Steadman, Cocozza, & Melick, 1978), one of which was prospective (Monahan & Appelbaum, 2000). A major advantage of longitudinal designs is that they can demonstrate a temporal sequence between disorder and outcome.

SUMMARY

We found higher risks of violence and criminality for individuals with PD than for general population controls, and for offenders with PD compared with other offenders. The utility of risk assessment and management may differ by PD category and gender.

3

Chapter 3

Appendix Table 3.1 Characteristics of Included Studies on Risk of Antisocial Behavior in PDs

Study	Country	Study Type	PDs (N)	Controls (N)	Cases	Comparison Group
Durbin, 1977	USA	Cross-sectional	29	93818	All PDs	GP
Steadman, 1978	USA	Cohort	56	12320540	All PDs	GP
Ortmann, 1981	Denmark	Nested case-control	135	10974	All PDs	GP
Swanson, 1994	Canada	Cross-sectional	104	3154	ASPD	GP
Modestin, 1995M	Switzerland	Cross-sectional	203	687	All PDs	GP
Modestin, 1995F	Switzerland	Cross-sectional	141	578	All PDs	GP
Hodgins, 1996M	Denmark	Cross-sectional	3069	155580	ASPD without comorbidity of major mental disorders	GP without psychiatric disorders
Hodgins, 1996F	Denmark	Cross-sectional	3553	147367	ASPD without comorbidity of major mental disorders	GP without psychiatric disorders
Stueve, 1997	Israel	Cross-sectional	49	1688	Only ASPD	GP without psychiatric disorders
Monahan, 2000	USA	Cohort	20	519	All PDs without comorbidity of other psychiatric disorders	GP
Johnson, 2000	USA	Nested case-control	103	614	All PDs (not including ASPD)	GP
Coid, 2006aM	UK	Cross-sectional	1337	2365	All PDs	GP without psychiatric disorders
Coid, 2006aF	UK	Cross-sectional	1135	2603	All PDs	GP without psychiatric disorders
Elonheimo, 2007	Finland	Nested case-control	73	2429	ASPD	GP without psychiatric disorders

Notes. GP = General Population; F = female; M = male; (AS)PD = (antisocial) personality disorder; Register = police or other crime registers; NA = information not available.

Personality Disorders, Violence, and Antisocial Behavior

Gender	Mean Age	Diagnostic Criteria	Ascertainment of Outcomes	Adjustment	Definition of Antisocial Behavior
Male	18-64	NA	Register	No	All crimes: public intoxication, drunk driving offence, gambling, vagrancy, disorderly conduct, traffic violations, and suspicion.
Male	35	NA	Register	No	Arrest
Male	25	ICD-8	Register	No	Violent offences excluding sexual offences
Mixed	NA	DSM-III	Self-report	Yes: adjusted for household size, age, and sex distribution	Physical violence
Male	39.4	ICD-9	Register	Yes: matched sex, age, marital status, social class, and size of the community	All crimes
Female	43.8	ICD-9	Register	Yes: matched sex, age, marital status, social class, and size of the community	All crimes
Male	>35	ICD-8	Register	No	All crimes: violent offenses, theft, fraud, vandalism, traffic offenses included in the criminal code, drug-related offenses, and all 'other' criminal offenses.
Female	>35	ICD-8	Register	No	All crimes: violent offenses, theft, fraud, vandalism, traffic offenses included in the criminal code, drug-related offenses, and all 'other' criminal offenses.
Mixed	24-33	NA	Self-report	Yes: adjust for gender, age, ethnicity, education, and social desirability response	Violent behavior: recent fighting and weapon use in five-year period
Male	18-40	DSM-III-R	Register, self-report, and collateral report	No	Violent behavior: kick/bite/choke/hit/beat up and weapon use/ threat and acts that were coded as other aggressive acts were primarily throw objects/push/grab/shove
Mixed	22	DSM-IV	Self-report and parental report	No	Violent acts: arson, assault, breaking and entering, mugging, robbery, starting serious physical fights, threats to injure others, and vandalism
Male	16-74	DSM-IV	Self-report	Yes: adjusted for sex, age social classes III-V, marital status, employment, any affective/anxiety disorder, alcohol dependence, drug dependence, and psychosis-positive screen	Violent behavior: fight and weapon use
Female	16-74	DSM-IV	Self-report	Yes: adjusted for sex, age social classes III-V, marital status, employment, any affective/anxiety disorder, alcohol dependence, drug dependence, and psychosis-positive screen	Violent behavior: fight and weapon use
Male	18-23	ICD-10	Register	No	All crimes: drug, violent, property, traffic, and drunk driving offence

3

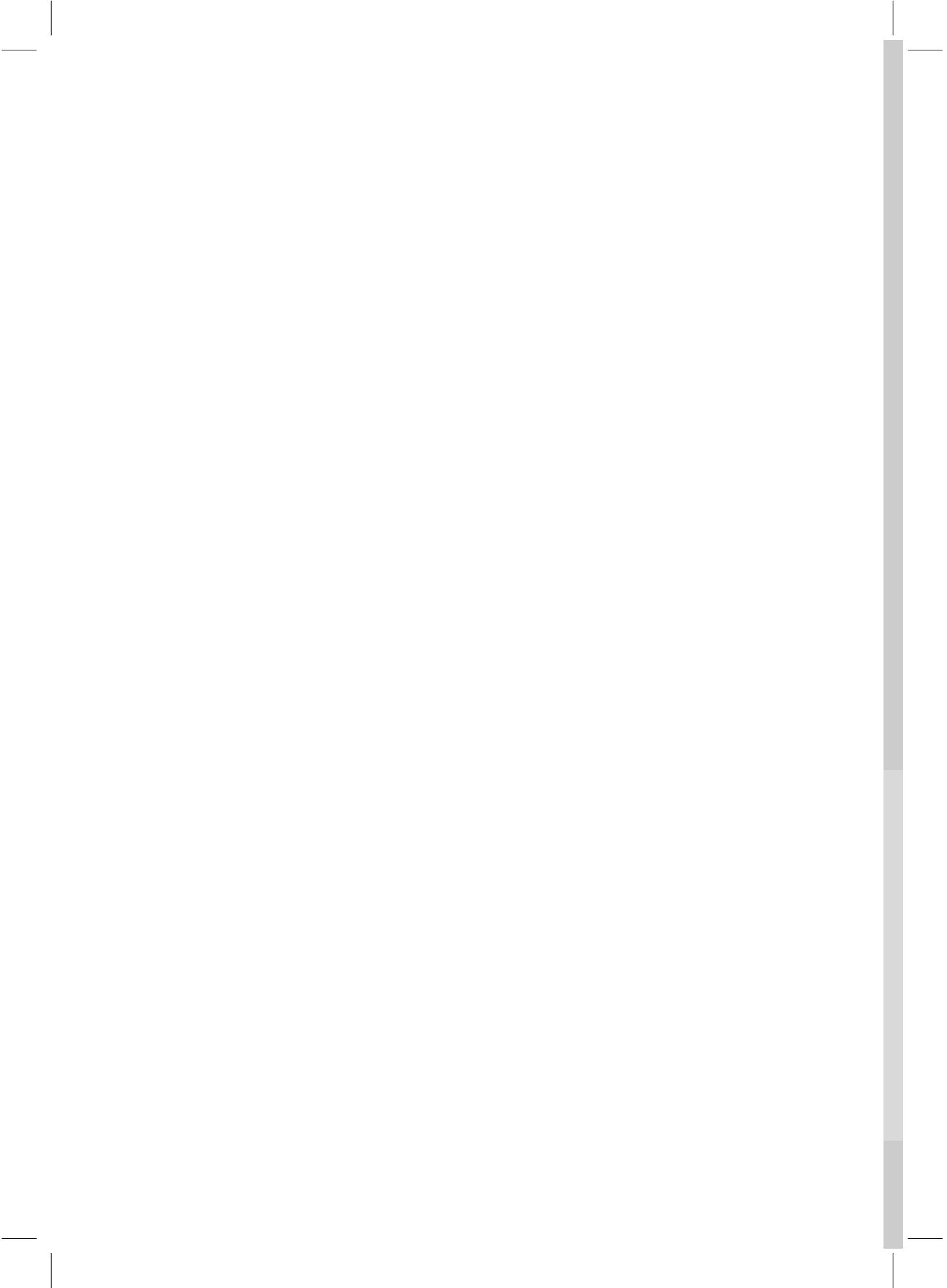
Chapter 3

Appendix Table 3.2 Characteristics of the Included Studies Reporting on Risk of Recidivism in PDs

Study Name	Region	Study Type	PDs (N)	Controls (N)	Cases
Ganzer, 1973M	USA	Case-control	70	30	All PDs
Ganzer, 1973F	USA	Case-control	60	40	All PDs
Quinsey, 1975	Canada	Cohort	44	47	All PDs
Martin, 1978	USA	Cohort	42	22	ASPD
Tennent, 1984	UK	Cohort	226	262	All PDs
Yesavage, 1986	France	Cohort	340	756	All PDs
Rice, 1990a	Canada	Cohort	47	206	All PDs
Rice, 1990b	Canada	Cohort	84	131	All PDs
Komer, 1992	Canada	Cohort	15	15	All PDs
Bailey, 1992	UK	Cohort	62	50	ASPD
Harris, 1993	Canada	Cohort	225	393	All PDs
Russo, 1994	Italy	Cohort	22	70	ASPD
Porporino, 1995	Canada	Cohort	18	9	ASPD
Harris, 1996	USA	Cohort	6	21	All PDs
Ventura, 1998	USA	Cohort	94	167	All PDs
Singleton, 1998M	UK	Cohort	810	296	All PDs
Singleton, 1998F	UK	Cohort	416	153	All PDs
Monson, 2001	USA	Cohort	41	84	All PDs
Moscatello, 2001	Brazil	Cross-sectional	29	71	All PDs
Bertman-Pate, 2004	USA	Cohort	28	91	All PDs
Stadtland, 2005	Germany	Case-control	28	75	All PDs
Coid, 2007M	UK	Cohort	132	980	All PDs
Coid, 2007F	UK	Cohort	56	112	All PDs
Grann, 2008	Sweden	Cohort	2159	159	All PDs
Vitacco, 2008	USA	Cohort	33	330	ASPD

Notes. M = male; F = female; NA = information not available; DSM: Diagnostic and Statistical Manual of Mental Disorders; ICD: International Classification of Diseases. Recidivism refers to any criminal recidivism unless otherwise stated.

Comparison Group	Diagnostic Criteria	Mean Age	Gender	Definition of Outcome
Other psychiatric disorders	NA	15.3	Male	Recidivism
Other psychiatric disorders	NA	14.7	Female	Recidivism
Other psychiatric disorders	NA	32	Male	Recidivism
Other psychiatric disorders	NA	NA	Female	Recidivism
Other psychiatric disorders	NA	NA	Male	Recidivism
Other psychiatric disorders	DSM-III	NA	Mixed	Recidivism
Other psychiatric disorders	DSM-III	30	Male	Recidivism
Other psychiatric disorders	DSM-III	29.6	Male	Recidivism
Other psychiatric disorders	NA	28.4	Mixed	Recidivism
Other psychiatric disorders	DSM-III-R	NA	Male	Recidivism
Other psychiatric disorders	DSM-III	27	Male	Violent recidivism
Other psychiatric disorders	NA	40	Male	Recidivism
No psychiatric disorders	DSM-III	33.6	Male	Recidivism
Other psychiatric disorders	NA	NA	Mixed	Recidivism
Other psychiatric disorders	DSM-III-R	28.7	Mixed	Recidivism
Other psychiatric disorders	DSM-IV	NA	Male	Recidivism
Other psychiatric disorders	DSM-IV	NA	Male	Recidivism
Other psychiatric disorders	NA	37.7	Mixed	Recidivism
Other psychiatric disorders	ICD-10	38.9	Male	Recidivism
Other psychiatric disorders	DSM-IV	38	Mixed	Recidivism
Other psychiatric disorders	ICD-10	NA	Mixed	Recidivism
Other psychiatric disorders	DSM-III-R	31.6	Male	Recidivism
Other psychiatric disorders	DSM-III-R	31.6	Female	Recidivism
No psychiatric disorders	DSM-III	35.7	Mixed	Violent recidivism
Other psychiatric disorders	DSM-IV	41	Mixed	Recidivism





CHAPTER 4

Personality Types and Development of Adolescents' Conflict with Friends¹

¹ Yu, R., Branje, S., Keijsers, L., & Meeus, W. (2014). Personality and developmental changes in adolescents' conflict with friends. *European Journal of Personality*, 28, 156-167.

ABSTRACT

This study examined the development of adolescents' conflict frequency and conflict resolution with their best friends, and tested whether adolescents with different personality types differed in these developmental changes from early to middle adolescence. Dutch adolescents ($N = 922$, 468 boys; $M_{age} = 12.4$ years at first wave) annually filled in questionnaires for five consecutive years. Growth modeling revealed that, whereas adolescents' conflict frequency and hostile conflict resolution did not change, positive problem solving, withdrawal, and compliance during conflict with best friends increased from age 12 to 16. Adolescents with different personality types differed in the mean levels of conflict frequency and conflict resolution strategies. That is, resilients had less conflict with friends than undercontrollers and overcontrollers. During conflict, resilients used the least hostile conflict resolution and compliance, and employed the most positive problem solving. Undercontrollers adopted the least positive problem solving, and overcontrollers complied and withdrew the most. Using a person-centered approach, three developmental conflict resolution types were identified based on different constellations of the four conflict resolution strategies over time. Adolescents with different personality types had different distributions on the conflict resolution types.

Keywords: conflict resolution, conflict frequency, development, personality types, best friends

4.1 INTRODUCTION

During adolescence, friendships become increasingly more intimate, equal, and reciprocal (De Goede, Branje, & Meeus, 2009; Furman & Buhrmester, 1992; Hartup, 1993). Additionally, adolescent friends are increasingly able to show mutual respect for each other's' individuality (Selfhout, Branje, & Meeus, 2009; Shulman & Knafo, 1997). These developments may lead to changes in how adolescents experience and resolve conflicts with their friends. Current evidence on age-related changes in conflicts among friends, such as conflict frequency and conflict resolution, is based predominantly on cross-sectional comparisons, however. Moreover, there might be heterogeneity in the development of conflict frequency and conflict resolution with friends, depending on individuals' personality. Indeed, others have suggested that personality could affect an individual's manner of handling conflict through various motivational, cognitive, and affective processes (Park & Antonioni, 2007). This study aimed to examine the developmental pattern of adolescents' conflict frequency and conflict resolution with their best friends, and differences in these developmental changes between individuals with different personality types.

Conflict frequency entails the number of disagreements or quarrels in a certain period of time, and conflict resolution involves the strategy an individual uses to handle such disputes (Laursen, 1998). Theoretically speaking, various conflict resolution strategies have been distinguished. According to the Dual Concern model (Pruitt & Carnevale, 1993), individuals' utilization of conflict resolution depends on the level of concern for oneself versus others. Specifically, collaboration occurs when there is high concern for both oneself and others. This strategy is characterized by positive conflict resolution behaviors such as negotiation and compromise. Accommodation takes place when there is high concern for others, but low concern for oneself. This strategy is characterized by high levels of compliance. A controlling resolution strategy reflects a high concern for oneself and low concern for others, and is characterized by negative affect, hostility, or coercive behavior. In addition, a nonconfrontational strategy, which involves reducing the importance of conflict and attempting to suppress thinking about conflict, represents a low concern for both oneself and others. This strategy is characterized by avoidant and withdrawing behaviors. These four conflict resolution strategies are widely recognized in the adolescent-friend literature (Laursen, Finkelstein, & Betts, 2001).

Development of Conflict Frequency and Conflict Resolution with Best Friends

Friendships undergo essential developmental changes during adolescence that may have important implications for adolescents' conflict frequency and conflict resolution with friends. In particular, closeness and intimacy in adolescents' friendships increase (De Goede et al., 2009; Hartup, 1993), and adolescents are progressively more able to balance closeness and

individuality with friends (Laursen et al., 2001; Selfhout et al., 2009; Shulman & Knafo, 1997). Further, friends become important interpersonal resources during adolescence (Brown, 2004; Laursen & Pursell, 2008). These developmental changes spur the understanding and consideration of others' needs, and permit self-interest to be subordinated to the interests of others (Laursen et al., 2001; Selfhout et al., 2009). These advances also increasingly motivate adolescents to avoid harming their friendships, which are vulnerable to disruption due to their voluntary and egalitarian nature (Laursen, 1998; Laursen & Pursell, 2008). As a result, adolescents are likely to be gradually more adept at taking the perspective of others, and at being aware of the potential disruption that conflict can pose to their friendship. These changes may result in a decline of conflict frequency with friends over time. When conflicts do occur, adolescents might decreasingly use hostile conflict resolution behaviors focused only on self needs, which might lead to a breakup of the friendship. Instead, they may increasingly adopt strategies that reflect others' needs and/or avoid friendship disruption, such as positive problem solving, compliance, and withdrawal (Bowker, 2004; Laursen, 1998). Indeed, with the gradual development of social cognitive abilities, adolescents employ more positive problem solving during conflict (Dunn, 1993; Sandy & Cochran, 2000).

Cross-sectional research has offered some suggestions regarding the development of conflict frequency and conflict resolution in friendships during adolescence. Some research has shown that conflict frequency did not differ among cohorts with different mean ages from late childhood to early adolescence (i.e., from 8 to 14 years; Berndt & Perry, 1986). In contrast, another study found lower conflict frequency with friends in adolescents aged 15 and 19 years than in younger children and adolescents with mean ages of 9 and 12 years (Furman & Buhrmester, 1992). For conflict resolution strategies, a systematic meta-analytic review comparing studies among cohorts of children, adolescents, and young adults revealed that older cohorts use higher levels of positive problem solving and withdrawal, and lower levels of hostile conflict resolution (Laursen et al., 2001). Longitudinal studies examining developmental changes of conflict frequency and conflict resolution in adolescent friendships are lacking, however.

Taking together the aforementioned theoretical ideas and cross-sectional findings, conflict frequency with friends should decline during adolescence. Additionally, adolescents should use less hostile conflict resolution and more positive problem solving, withdrawal, and compliance as they age. Longitudinal studies are clearly needed to confirm these assumptions.

Conflict resolution types. Different conflict resolution strategies are not used in isolation, but instead can be combined to form particular patterns. In other words, different persons may use different combinations of conflict resolution strategies, which distinguish them from one another (Branje, Van Doorn, Van der Valk, & Meeus, 2009). For instance, it has been found that when in conflict with parents, some adolescents typically used a positive

conflict resolution strategy, and seldom used withdraw or hostile conflict resolution strategy, whereas some adolescents adopted mainly hostile conflict resolution strategy, withdraw, or compliance, and some adolescents tended to not use any conflict resolution strategies. More interestingly, the combination of styles may determine the effect of individual styles. For instance, when withdrawal was the only strategy used to resolve conflicts with parents, conflict frequency was more strongly related to delinquency, but when withdrawal was used in combination with hostile conflict resolution, conflict frequency was more strongly related to depression (Branje et al., 2009). In this study, we therefore, by using a person-centered approach, attempted to identify whether different groups of adolescents had different constellations of conflict resolution strategies with their best friends, in terms of mean levels and developmental changes. Subsequently, we explored whether adolescents with different configurations of conflict resolution strategies differed in levels and developmental changes of conflict frequency.

4

Personality Characteristics and Conflict

Conflict frequency and conflict resolution may vary as a function of personality. People with different personality characteristics have different motivations in interpersonal relations, perceive the same conflict situation differently, or experience different affects when engaging in similar behaviors. As a result, they might rely on different conflict resolution strategies (Garaziano, Jensen-Campbell, & Hair, 1996; Moskowitz & Coté, 1995; Park & Antonioni, 2007).

Prior studies investigating relations between personality characteristics and adolescents' conflict resolution strategies predominantly employed a variable-centered approach, with which relations between a certain personality dimension and conflict resolution strategies were examined across persons in a specific population. An important and necessary complement to the variable-centered approach is a person-centered approach, especially in studies involving personality (Donnellan & Robins, 2010; Meeus, Van de Schoot, Klimstra, & Branje, 2011). With a person-centered approach, the common within-person structure of personality is examined (Mervielde & Asendorpf, 2000). Thus, in our study, we examined whether adolescents with different personality types, or with different configuration of personality traits, differed in the development of adolescents conflict frequency and conflict resolution strategies.

The most commonly used person-centered approach to personality was proposed by Block and Block (1980). Three major personality types: overcontrollers, undercontrollers, and resilients are consistently identified by using different methods such as Q factor analysis, cluster analysis, and latent class (growth) analysis on data from different informants ranging from caregivers reporting, to self-reporting, and to behavioural ratings. Moreover, these three personality types emerged in samples cross childhood to adulthood from various countries such as Italy, Germany, the Netherlands, Spain, and the United States (Block & Block, 1980;

Caspi & Silva, 1995; Hart et al., 1997, Robins et al., 1996; Asendorpf et al., 2001; Klimstra et al., 2010; Meeus, et al., 2011). In addition, studies using cluster analysis of questionnaires assessing Big Five personality traits have shown that a three-cluster solution proved to be the most replicable (Asendorpf & Van Aken, 1999). Namely, these three personality types were reliably distinguished in Big Five personality traits. Specifically, undercontrollers are characterized by low conscientiousness and agreeableness, resilients have generally high scores on all five dimensions, and overcontrollers typically have low emotional stability, low extraversion, and are comparably agreeable as resilients (Klimstra et al., 2010; Robins et al., 1996). No research has investigated whether individuals with different personality types differ in levels of or developmental changes in conflict frequency and conflict resolution with friends, although there is some indirect evidence suggesting differences.

In terms of conflict frequency, studies have found that both undercontrollers and overcontrollers are more likely to be involved in conflict with household members (i.e., common residents in the same house) in early adulthood. They are also more likely to be fired due to conflictual interpersonal relationships in the work place (Caspi, 2000; Newman, Caspi, Moffitt, & Silva, 1997). In light of these results, we expect undercontrolling and overcontrolling adolescents to report more conflict in friendships than resilient adolescents.

Adolescents with different personality types may also vary in levels and development of conflict resolution behaviors with friends. A personality factor closely related to conflict resolution is agreeableness, as it entails motives for maintaining positive interpersonal relationships (Jensen-Campbell & Graziano, 2001). More agreeable persons can better regulate their anger, approach conflicts with less negative affect, and are more likely to use positive problem solving strategies (Garaziano et al., 1996; Jensen-Campbell, Graziano, & Hair, 1996; Park & Antonioni, 2007). Thus, undercontrollers' low agreeableness might promote them to use more hostile conflict resolution and less positive problem solving than overcontrollers and resilients. In line with this expectation, undercontrollers appear to be more coercive and aggressive in social situations than overcontrollers and resilients (Denissen, Asendorpf, & Van Aken, 2007). Although undercontrollers are expected to use most hostile conflict resolution, overcontrollers' low emotional stability may make them react to stressful events like conflict with more maladaptive strategies (e.g., hostile strategies) than resilients (Gunthert, Cohen, & Armeli, 1999).

Several findings suggest that overcontrollers may be most likely to show withdrawal and compliance in conflicts with friends. Overcontrollers often keep thoughts and feelings to themselves (Hart, Hoffman, Edelstein, & Keller, 1997), and their social withdrawal level is higher than that of undercontrollers and resilients (Scholte, Van Lieshout, De Wit, & Van Aken, 2005). They are often described as compliant and indecisive, and tend to give in during conflicts (Asendorpf & Van Aken, 1999; Hart et al., 1997). In contrast, resilients are particularly forceful

and assertive, and are more likely to take up leadership roles (Caspi & Silva, 1995). Although more agreeable persons have been found to also use more withdrawal and compliance in conflicts (Garaziano et al., 1996; Jensen-Campbell, Graziano, & Hair, 1996; Park & Antonioni, 2007), which would suggest lower levels of compliance and withdrawal for undercontrollers than for resilients and overcontrollers, we also expect that overcontrollers withdraw and comply more than undercontrollers and resilients.

In addition to the differences between personality types in the level of conflict frequency and conflict resolution, we also explored the differences between types in the development in conflict frequency and conflict resolution. Further, we explored the relation between the typology of conflict resolution and the personality types.

The Current Study

In the present study, we followed a group of adolescents from early to middle adolescence in order to address the following research questions: 1) How do conflict frequency and conflict resolution with best friends develop during this period? 2) Are there different developmental types of conflict resolution with friends? 3) Whether adolescents with different personality types differed in the development of adolescents' conflict frequency and conflict resolution? 4) Is adolescents' conflict resolution type related to their personality type?

4.2 METHOD

Participants

Participants in this study were 922 adolescents (468 boys; $M_{age} = 12.4$ years [$SD = .58$] at first measurement) from the young adolescent cohort participating in CONAMORE (CONflict And Management Of RElationships, Meeus et al., 2006) longitudinal study. Participants were recruited from various randomly selected high schools in the province of Utrecht, The Netherlands. The sample covered a broad range of education levels. Most of the participants in the current study identified themselves as Dutch (83.4%). The other 16.6% participants indicated that they belonged to ethnic minorities (e.g., Surinamese, Moroccan, or Turkish). Dutch youth were slightly over-represented in this sample, since ethnic minorities compose 21% of the general Dutch adolescent population (Statistics Netherlands, 2008).

The 922 participants came from the original sample of 923 adolescents. One case could not be included in the analyses, because this adolescent reported to have no friend in all waves and therefore had completely missing data on conflict frequency and conflict resolution across waves. Sample attrition in the original sample was very low: over the five measurement waves, the number of participants in wave 1, 2, 3, 4, and 5 was 923, 923, 923, 923, and 913,

respectively. For personality, across five waves 5.2% of the data was missing, and these missing data were estimated using Expectation Maximization imputation in SPSS (SPSS Inc., Chicago, Illinois, USA). For conflict frequency and conflict resolution strategies, a maximum of 4.7% of the cases was missing per variable. Little's Missing Completely at Random (MCAR) test (Little, 1988) on all variables used in this study (i.e., personality types, gender, conflict frequency, and conflict resolution strategies) indicated that the pattern of missing values was completely at random ($\chi^2 [N = 922, 718] = 692.77, p = .74$). Thus, we included respondents with missing values in our analyses using a Full Information Maximum Likelihood procedure (Enders & Bandalo, 2001), within the program Mplus 6 (Muthén & Muthén, 2010). Robust maximum likelihood (MLR) was used in the estimation.

Procedure

An invitation letter and a description of the study were sent to adolescents' home addresses. Both adolescents and their parents provided informed consent for the adolescents' participation. Less than 1.0% of the contacted subjects decided not to participate. Adolescents annually filled in various questionnaires at school after school hours. Trained research assistants gave verbal instructions about filling out the questionnaire besides written instructions along with the questionnaires. Confidentiality was assured explicitly before participation. Participants received €10 as a reward for their participation in each wave.

Measures

Conflict frequency. Conflict frequency was assessed with the Dutch translation of the Interpersonal Conflict Questionnaire (LCQ; Laursen, 1993). It has 35 items covering potential conflict topics with a 5-point Likert scale, ranging from 1 (*never*) to 5 (*often*). Adolescents reported on how often they had conflicts, disagreements, or quarrels with their best friends regarding a specific topic during the last week. Sample items are "Sex, intimacy and relationships" and "Criticism towards friends with whom you associate". Average conflict scores were obtained by averaging the scores across these 35 items. Adequate validity has been reported for this scale (Laursen, 1993). In the current study, Cronbach's alphas ranged from .96 to .98 across waves, indicating good reliability.

Conflict resolution. Conflict resolution of adolescents with their best friends was assessed with a Dutch adaptation of Kurdek's Conflict Resolution Style Inventory (CRSI; Kurdek, 1994; Van Doorn, Branje, & Meeus, 2007). This inventory measures four conflict resolution strategies, including conflict engagement (indicating hostile conflict resolution), positive problem solving, withdrawal, and compliance. Each conflict resolution strategy was measured by 5 items. Sample items were, for hostile conflict resolution: "attacking him or her personally", for positive

problem solving: "negotiating and trying to find a solution that is mutually acceptable", for withdrawal: "keep my mouth shut for a long time", and for compliance: "not defending my opinion". Adolescents reported their conflict resolution on a 5-point Likert scale ranging from 1 (*never*) to 5 (*always*). Studies have indicated that the CRSI has a good internal consistency, a good one-year stability, and moderate convergent, concurrent, and predictive validity (Kurdek, 1994). Across five waves, Cronbach's alphas in this study ranged from .79 to .80 for hostile conflict resolution, .82 to .91 for positive problem solving, .82 to .84 for withdrawal, and .68 to .77 for compliance.

Adolescents' personality types. Adolescents' personality was assessed annually for five years with the Quick Big Five questionnaire (Goldberg, 1992; Vermulst & Gerris, 2005). Thirty personality makers were used to assess five personality dimensions (each with 6 items): Extraversion (e.g., "talkative"), Agreeableness (e.g., "sympathetic"), Conscientiousness (e.g., "systematic"), Neuroticism (e.g., "worried", reverse-scored), and Openness to experience (e.g., "creative"). Adolescents rated their personality on a 7-point Likert scale ranging from 1 (*very untrue*) to 7 (*very true*). Studies have reported adequate reliability and validity of this scale (e.g., Branje, Van Lieshout, & Gerris, 2007). Cronbach's alphas ranged from .76 to .88 across the five waves in this study.

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Early studies have shown that Block and Block's (1980) three personality types (i.e., overcontrollers, undercontrollers, and resilients) can be constructed directly from the Big Five dimensions (Robins et al., 1996). We used this classification of personality types, which was established in a prior study (Klimstra et al., 2010) that used a 99.9% identical sample (i.e., 923 instead of 922 cases) and the same five measurement waves as the current study. To incorporate the normative developmental changes in personality during adolescence, this prior study applied Latent Class Growth Analysis (LCGA; Nagin, 2005) to constitute the three developmental personality types. Specifically, with this developmental approach, among 923 adolescents, 382 (41.39%) were classified as overcontrollers, 228 (24.70%) as undercontrollers, and 313 (33.91%) as resilients. Resilients scored moderate to high on all Big Five dimensions, overcontrollers scored particularly low on extraversion and emotional stability, and undercontrollers had low conscientiousness and agreeableness (For details of the mean scores of Big Five personality traits for these three personality types, please see Klimstra et al., 2010). This classification of personality types, taking into account the normative development of personality, was also used for the current study, with one less resilients than the original sample.

Strategy of Analyses

First, to examine developmental changes of adolescents' conflict with friends, Latent Growth Modeling (LGM; Duncan, Duncan, Strycker, Li, & Alpert, 1999) in *Mplus* 6 (Muthén & Muthén, 2010) was conducted for conflict frequency and each of the four conflict resolution strategies, separately. Both linear and quadratic models were tested and compared with Bayesian Information Criterion (BIC). A model with lower BIC value was preferred since a lower BIC indicates that the model has a better fit to the data (Raftery, 1993). To evaluate the goodness of model fit, we used multiple criteria: Comparative fit index (CFI), root mean squared error of approximation (RMSEA), and standard root mean square residual (SRMR). For CFIs, values of .95 indicate good fit (Hu & Bentler, 1999). RMSEA and SRMR values up to .08 represent an acceptable fit (Bollen, 1989; Kline, 2005).

Second, to investigate whether there were different groups of adolescents who used distinct constellations of conflict resolution strategies, a LCGA was conducted. LCGA is a technique that identifies the smallest number of classes capturing the most variance among individuals in initial level (i.e., intercept) and change rate (i.e., slope) on a certain set of variables. To determine the model with the optimal number of latent classes, we employed multiple criteria. First, we used the Sample Size Adjusted Bayesian Information Criterion (SSA-BIC; Schwarz, 1978) and the Lo-Mendell-Rubin Likelihood Ratio Test (LMR-LRT; Lo, Mendell, & Rubin, 2001). The optimal model has the lowest SSA-BIC, while a significant LMR-LRT indicates that a model with k classes is better than a model with $k-1$ classes. Second, the theoretical meaningfulness of a class should be acceptable. That is, if an additional class is only a slight variation of a previously extracted class, the most parsimonious solution should be chosen (Muthén & Muthén, 2000). In addition, we checked whether the model had adequate entropy, which indicates classification accuracy. It ranges from .00 to 1.00, with higher figures indicating a more accurate classification (Hix-Small, Duncan, Duncan, & Okut, 2004). Subsequently, we estimated whether adolescents with different conflict resolution types differed in conflict frequency by regressing the intercept and slope of conflict frequency on the conflict resolution typology, while controlling for gender.

Third, we tested the role of personality types in the levels of and developmental changes in conflict frequency and conflict resolution with best friends. That is, we tested whether adolescents' with different personality types differed in the levels or the development of conflict frequency and conflict resolution. For that purpose, the intercepts and slopes of conflict frequency and each conflict resolution strategy were regressed on the personality types. We used dummy variables for personality types. First, to compare the effect of undercontrollers versus resilients and the effect of overcontrollers versus resilients, we included the three personality types as two dummy variables with the resilient personality type as a reference category. In addition, to test the difference between overcontrollers and

undercontrollers, we repeated the analyses with a second set of dummy variables, in which we coded the overcontrollers as the reference category. We also controlled for gender by regressing the intercepts and slopes of conflict frequency and each conflict resolution strategy on adolescents' gender.

Fourth, we used chi-square tests to examine whether adolescents with different personality types had different conflict resolution types. If the chi-square test indicated a significant difference in distribution, the adjusted residual value (Z_{adj}) was calculated to determine which cells of the chi-square contingency table contributed to the significant effect. Z_{adj} of higher than 2 or less than -2 indicates that the observed count of a variable in one cell of the chi-square contingency table is significantly higher or lower than the expected count, respectively (Haberman, 1973).

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4.3 RESULTS

Descriptive Statistics and Development of Conflict Frequency and Conflict Resolution Strategies

The means and standard deviations of conflict frequency and the four conflict resolution strategies across five annual waves are shown in Table 4.1.

To investigate the developmental changes in conflict frequency and in the four conflict resolution strategies, we conducted univariate LGAs. All linear models provided an acceptable fit to our data (i.e., CFI_s were higher than .95, and RMSEA and SRMR were lower than .08). Moreover, for conflict frequency and three out of four conflict resolution strategies (i.e., hostile conflict resolution, positive problem solving, and compliance), the BICs for linear models were lower than those for the quadratic models (i.e., BIC differences ranged from 1.00 to 22.00). The BIC of the linear model for withdrawal was two points higher than that of quadratic model. To facilitate the comparability between models across strategies, we chose linear models as our final models for the four conflict resolution strategies. The estimated mean levels (i.e., intercepts) and developmental changes (i.e., slopes) in adolescents' conflict frequency and conflict resolution strategies are presented in Table 4.2. Generally, we found that adolescents' conflict frequency with their best friends did not change across years. Moreover, from early to middle adolescence, adolescents increased significantly in the use of positive problem solving, withdrawal, and compliance, whereas the use of hostile conflict resolution did not change.

Typology of Conflict Resolution

We subsequently examined whether we could distinguish adolescents with different constellations of conflict resolution strategies. By using a LCGA, we found a three-class solution

Table 4.1 Means and Standard Deviations of Conflict Frequency and Conflict Resolution Strategies in Adolescent-friend Relationships

Variable	Time 1 <i>M (SD)</i>	Time 2 <i>M (SD)</i>	Time 3 <i>M (SD)</i>	Time 4 <i>M (SD)</i>	Time 5 <i>M (SD)</i>
Conflict Frequency	1.33 (0.50)	1.35 (0.47)	1.32 (0.45)	1.32 (0.44)	1.31 (0.43)
Hostile Conflict Resolution	1.31 (0.52)	1.29 (0.50)	1.32 (0.53)	1.29 (0.49)	1.27 (0.46)
Positive Problem Solving	2.51 (1.21)	2.92 (1.08)	2.94 (1.09)	3.19 (1.04)	3.30 (1.02)
Withdrawal	1.49 (0.67)	1.54 (0.64)	1.64 (0.71)	1.61 (0.69)	1.60 (0.64)
Compliance	1.48 (0.56)	1.57 (0.54)	1.60 (0.60)	1.60 (0.60)	1.61 (0.56)

Note. *M (SD)* = mean (standard deviation)

Table 4.2 Estimated Developmental Changes in Adolescents' Conflict Frequency and Conflict Resolution Strategies with Best Friends

Growth Model	Intercept				Linear Slope			
	<i>M</i>	95% CI	<i>SE</i>	σ^2	<i>M</i>	95% CI	<i>SE</i>	σ^2
Conflict Frequency	1.34***	1.31-1.37	0.02	.13***	-.00	-.01-.00	0.00	.01***
Hostile Conflict Resolution	1.31***	1.28-1.34	0.02	.12***	-.01	-.02-.00	0.01	.01***
Positive Problem Solving	2.63***	2.56-2.70	0.04	.65***	.17***	.15-.19	0.01	.02***
Withdrawal	1.52***	1.48-1.56	0.02	.18***	.03***	.01-.04	0.01	.01***
Compliance	1.51***	1.48-1.55	0.02	.11***	.03***	.02-.04	0.01	.01***

Note. CI = Confidence Interval. *** $p < .001$. σ^2 = variance around the means.

to best fit our data. In particular, the SSA-BICs for the models with 1-4 classes were 36428.99, 34120.11, 33180.74, and 32659.54. Although the SSA-BIC figure for the model with a 4-class solution was lower than the SSA-BIC value for the model with a 3-class solution, the LMR-LRT test indicated that adding a forth class did not result in an improvement of the model ($p = .39$). In addition, the 4-class model added a class that was highly comparable to one of the three classes indicated in the three-class model. Moreover, the model for the three-class solution had high entropy (i.e., .85), indicating high classification accuracy. Entropies for models with 2 to 4 classes were .92, .85, and .85, respectively. Therefore, we chose the three-class solution as the final classification.

Table 4.3 presents the results of this 3-class model, with the intercepts (i.e., mean levels) and slopes (i.e., change rates) of the conflict resolution strategies for the three resulting conflict resolution types. The latent classes varied in terms of mean levels of the conflict resolution strategies, but not in terms of the developmental changes. The first latent class scored high on hostile conflict resolution, withdrawal, and compliance, and moderate on positive

Table 4.3 Intercepts and Slopes of Four Conflict Resolution Strategies across Three Conflict Resolution Types

Estimated Growth Factors for Conflict Resolution Strategies	Conflict Resolution Types		
	Ambivalent Conflict Resolution Type	No-resolution Type	Positive Conflict Resolution Type
	M (95% CI)	M (95% CI)	M (95% CI)
Intercept			
Hostile Conflict Resolution	1.84*** ^a (1.69, 1.99)	1.19** ^b (1.15, 1.23)	1.18*** ^b (1.15, 1.22)
Positive Problem Solving	2.54*** ^b (2.38, 2.70)	1.92** ^c (1.82, 2.02)	3.35*** ^a (3.22, 3.48)
Withdrawal	2.12*** ^a (1.96, 2.29)	1.35** ^b (1.29, 1.40)	1.41*** ^b (1.34, 1.47)
Compliance	1.87*** ^a (1.74, 1.99)	1.28** ^c (1.24, 1.32)	1.57*** ^b (1.52, 1.62)
Slope			
Hostile Conflict Resolution	.01 ^a (-0.04, 0.06)	-.00 ^a (-0.02, 0.01)	-.02** ^a (-0.03, -0.01)
Positive Problem Solving	.11*** ^{bc} (0.06, 0.16)	.22*** ^a (0.18, 0.26)	.16*** ^{ab} (0.12, 0.20)
Withdrawal	.03 ^a (-0.02, 0.09)	.04** ^a (0.02, 0.07)	.02 ^a (-0.01, 0.04)
Compliance	.05* ^a (0.00, 0.09)	.03** ^a (0.01, 0.05)	.02* ^a (0.00, 0.04)

Note. Different superscripts within the same row indicate significant differences ($p < .05$) between different conflict resolution types in different conflict resolution strategies. * $p < .05$; ** $p < .01$; *** $p < .001$.

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problem solving. Hence, this type was labeled as the *ambivalent conflict resolution type*, since individuals in this class adopted an aggressive as well as a withdrawing and compliant conflict resolution style. About 19.00% ($n = 175$) adolescents belonged to this type. The second latent class scored low in all four conflict resolution strategies. Therefore, this type was called the *no-resolution type* (39.70% [$n = 366$] adolescents were grouped in this type). The third latent class scored high on positive problem solving, low on hostile conflict resolution and withdrawal, and moderate on compliance. Thus, this type was marked as the *positive conflict resolution type* (41.30% [$n = 381$] adolescents were classified in this type). There were gender differences in the prevalence of the three conflict resolution types. In particular, girls were more likely than boys to belong to the positive conflict resolution type ($\chi^2 [N = 922, 1] = 33.70, p = .00, \phi = .19$), and less likely to be grouped in the no-resolution type ($\chi^2 [N = 922, 1] = 14.44, p = .00, \phi = .13$) or the ambivalent conflict resolution type ($\chi^2 [N = 922, 1] = 6.50, p = .01, \phi = .08$).

Conflict resolution types and conflict frequency. We then estimated whether adolescents with different conflict resolution types differed in conflict frequency, by regressing intercept and slope of conflict frequency on the conflict resolution types. We controlled for gender in this model. Our analyses revealed that adolescents with an ambivalent conflict resolution type showed a significantly higher intercept of conflict frequency than those with a no-resolution ($B [CI] = 0.41 [0.31, 0.51], \beta = .57, p = .00$) or positive conflict resolution type ($B [CI] = 0.38$

[0.28, 0.48], $\beta = .53$, $p = .00$). However, no significant differences were found in the intercepts of conflict frequency between no-resolution and positive conflict resolution types, or in the slopes among the different conflict resolution types. No gender effects existed.

Role of Personality Types on Conflict Frequency and Conflict Resolution

We tested whether levels and developmental changes of conflict frequency and conflict resolution strategies would differ for adolescents with different personality types. To this end, we regressed the intercept and slope of conflict frequency and each of the conflict resolution strategies on personality types, while controlling for the effects of gender. Table 4.4 and Figures 4.1 to 4.5 display these results.

Personality types and conflict frequency. Personality type had a significant effect on conflict frequency. Namely, overcontrollers and undercontrollers reported significantly higher levels of conflict frequency than resilients. However, no significant differences existed in developmental changes in conflict frequency by personality types, nor were there gender effects.

Personality types and conflict resolution strategies. Individuals with different personality types differed in the mean levels of conflict resolution strategies with friends, but not in the developmental changes. In particular, resilients reported significantly less hostile conflict resolution with friends than overcontrollers or undercontrollers, between whom there was no significant difference. Resilient adolescents revealed the highest use of positive problem solving, followed by overcontrollers and finally by undercontrollers. In addition, overcontrollers were significantly more likely to withdraw and comply than both resilients and undercontrollers. There were no significant differences in withdrawal among the latter two types, but undercontrollers reported more compliance than resilients. In addition, there were effects of gender upon mean levels of hostile conflict resolution and positive problem solving, but not for withdrawal and compliance. Boys reported higher levels of hostile conflict resolution and lower levels of positive problem solving, compared to girls. No gender differences existed in change rates of the conflict resolution strategies.

Personality types and conflict resolution types. We subsequently used chi-square tests to examine whether adolescents with different personality types had different conflict resolution types. Table 4.5 displays the distribution of adolescents with different personality types on each conflict resolution type. Chi-square tests revealed an overall difference in conflict resolution types among personality types ($\chi^2 [N = 922, 4] = 81.92$, $p = .00$, $\phi = .30$). Specifically, overcontrollers were significantly more likely to belong to the ambivalent conflict resolution type ($Z_{adj} = 4.01$, $p = .00$), but less likely to be grouped in the no-solution type ($Z_{adj} = -2.68$, $p = .01$). Undercontrollers were more likely to be classified in the no-solution type ($Z_{adj} = 4.60$,

Table 4.4 Regression of Development in Conflict Resolution Strategies on Personality Types, Controlled for Gender

	Conflict Frequency		Hostile Conflict Resolution		Positive Problem Solving		Withdrawal		Compliance		
	B (CI)	β	B (CI)	β	B (CI)	β	B (CI)	β	B (CI)	β	
Personality											
O vs. R	0.14 (0.08, 0.20)	.19***	0.12 (0.05, 0.18)	.17***	-0.26 (-0.42, -0.11)	-.16**	0.19 (0.11, 0.28)	.22***	0.22 (0.15, 0.29)	.32***	
IC	U vs. R	0.07 (0.00, 0.14)	.09*	0.08 (0.01, 0.16)	.10*	-0.59 (-0.77, -0.41)	-.32***	0.09 (-0.01, 0.18)	.09	0.09 (0.01, 0.16)	.11*
U vs. O	-0.07 (-0.14, 0.01)	-.08	-0.03 (-0.12, 0.05)	-.04	-0.33 (-0.50, -0.16)	-.18***	-0.11 (-0.21, 0.00)	-.11*	-0.13 (-0.22, -0.05)	-.17**	
O vs. R	-0.00 (-0.02, 0.02)	-.01	0.01 (-0.01, 0.03)	.05	-0.03 (-0.08, 0.02)	-.07	0.02 (-0.01, 0.05)	.08	0.00 (-0.02, 0.03)	.02	
SL	U vs. R	0.02 (-0.00, 0.04)	.11	0.02 (0.00, 0.05)	.12	-0.01 (-0.07, 0.05)	-.02	0.01 (-0.03, 0.04)	.03	0.00 (-0.03, 0.03)	.01
U vs. O	0.02 (-0.00, 0.04)	.12	0.02 (-0.01, 0.04)	.07	0.02 (-0.04, 0.07)	.04	-0.01 (-0.05, 0.02)	-.04	-0.00 (-0.03, 0.03)	-.01	
Gender											
IC	B vs. G	-0.03 (-0.09, 0.02)	-.05	-0.12 (-0.18, -0.06)	-.18***	0.38 (0.24, 0.52)	.24***	0.06 (-0.01, 0.14)	.07	0.02 (-0.04, 0.09)	.03
SL	B vs. G	-0.01 (-0.03, 0.00)	-.07	0.01 (-0.01, 0.03)	.05	-0.02 (-0.06, 0.02)	-.05	-0.01 (-0.03, 0.02)	-.02	-0.00 (-0.02, 0.02)	-.01

Note. CI = 95% Confidence Interval. IC = Intercept. SL = Slope. O = Slope. U = Undercontrollers. R = Overcontrollers. B = Boys. G = Girls. All models had good model fit, with CFI higher than .95, RMSEA and SRMR lower or equal to .05. * $p < .05$; ** $p < .01$; *** $p < .001$.

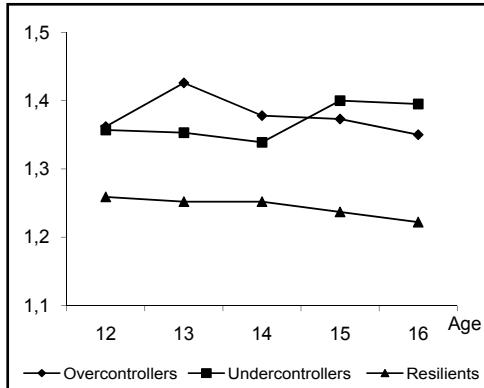


Figure 4.1 Observed Scores of Developmental Changes in Adolescent Conflict Frequency

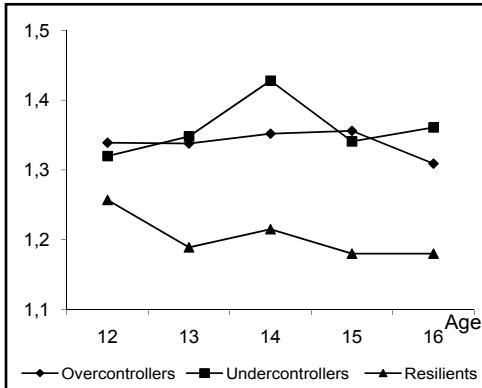


Figure 4.2 Observed Scores of Developmental Changes in Adolescent Hostile Conflict Resolution

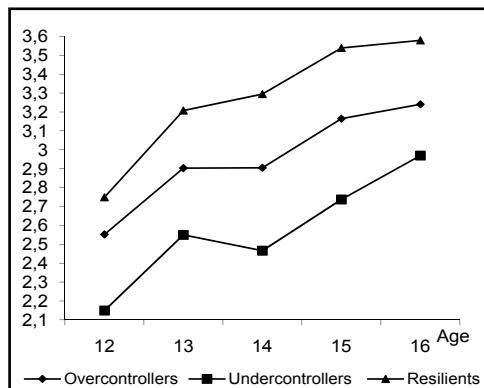


Figure 4.3 Observed Scores of Developmental Changes in Adolescent Positive Problem Solving

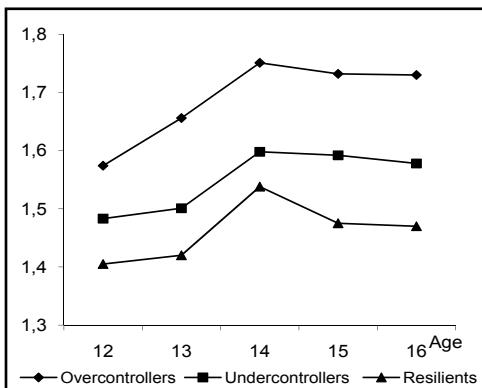


Figure 4.4 Observed Scores of Developmental Changes in Adolescent Withdrawal

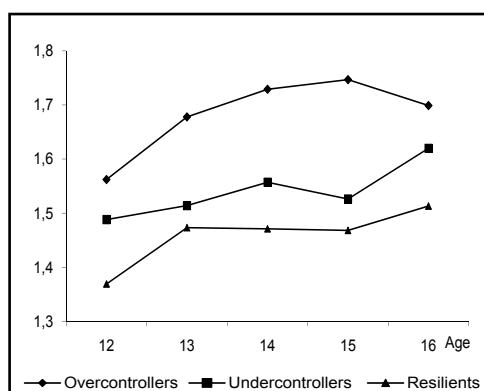


Figure 4.5 Observed Scores of Developmental Changes in Adolescent Compliance

Note. The y-axis scale represented mean item of compliance. Item scale ranged from 1 to 5.

Table 4.5 Distribution of Adolescents with Different Personality Types in Different Conflict Resolution Types

		Conflict Resolution Types			
		Ambivalent Conflict Resolution Type	No-Resolution Type	Positive Conflict Resolution Type	Total
Personality					
O	Count (% of Total)	96 (10.41)	132 (14.32)	154 (16.70)	382 (41.43)
	Expected count	72.51	151.64	157.85	
	Adjusted residual	4.01	-2.68	-0.52	
U	Count (% of Total)	56 (6.07)	120 (13.02)	52 (5.64)	228 (24.73)
	Expected count	43.28	90.51	94.22	
	Adjusted residual	2.48	4.60	-6.54	
R	Count (% of Total)	23 (2.49)	114 (12.36)	175 (18.98)	312 (33.84)
	Expected count	59.22	123.85	128.93	
	Adjusted residual	-6.43	-1.40	6.51	
Total	Count (% of Total)	176 (18.98)	366 (39.70)	381 (41.32)	922 (100)

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Note. O = Overcontrollers. U = Undercontrollers. R = Resilients.

$p = .00$), or the ambivalent conflict resolution type ($Z_{adj} = 2.48, p = .01$), and less likely to be grouped in the positive conflict resolution type ($Z_{adj} = -6.54, p = .00$). Resilients were more likely to be categorized in the positive conflict resolution type ($Z_{adj} = 6.51, p = .00$) and less likely to be classified in the ambivalent conflict resolution type ($Z_{adj} = -6.43, p = .00$).

4.4 DISCUSSION

In this study, we examined the development of adolescents' conflict frequency and conflict resolution strategies with their best friends from early to middle adolescence. We also investigated whether adolescents could be distinguished by different constellations of conflict resolution strategies. We further examined whether adolescents with different personality types differed in the mean levels and the developmental changes of conflict resolution strategies with best friends. In general, we found that adolescents' conflict frequency and hostile conflict resolution with their best friends did not change, whereas their use of positive problem solving, withdrawal, and compliance increased across the years. We identified three conflict resolution types based on constellations of the four conflict resolution strategies, which we labeled the no-resolution type, ambivalent conflict resolution type, and positive conflict resolution type. Moreover, we found that adolescents with different personality types differed in the levels of conflict resolution strategies with best friends, and also were distinct

on the distribution on the three conflict resolution types.

Development of Adolescents' Conflict Frequency and Conflict Resolution

Adolescents' use of positive problem solving, withdrawal, and compliance increased from early to middle adolescence. These results are in accordance with theoretical ideas that, due to the increasing salience and growing intimacy of friendship, as well as advanced cognitive ability during adolescence, youths' conflict resolution behavior should increasingly reflect consideration of others' needs or careful awareness of potential friendship disruptions (Laursen et al., 2001; Laursen & Pursell, 2008; Selfhout et al., 2009). Findings are also in line with cross-sectional results indicating age-related increases in the use of positive problem solving and withdrawal (Laursen et al., 2001).

Unexpectedly, adolescents' conflict frequency and hostile conflict resolution remained stable from early to middle adolescence. These results are inconsistent with the theoretical notion that adolescents should have less conflict or use less hostile conflict resolution, which potentially threaten developing relationships (Laursen, 1998; Laursen & Pursell, 2008). Our finding regarding hostile conflict resolution is also inconsistent with a previous meta-analytic review which compared cohorts of young adults, adolescents, and children, and suggested that there is lower use of this strategy in older cohorts (Laursen et al., 2001). The reason we found stable conflict frequency and hostile conflict resolution in this longitudinal study might be attributable to a floor effect, as the levels for these two aspects were already very low among our sample. It might also be that the decrease occurs already in earlier ages, such as childhood, or that the age range in our study of adolescents was not sufficiently large to detect the changes.

Conflict Resolution Typology

Through a person-centered approach, we identified three conflict resolution types based on the constellations of different conflict resolution strategies. These findings indicate that different conflict resolution strategies are not used in isolation, but instead are combined to form certain patterns. For instance, we found that utilizations of hostile conflict resolution, withdrawal, and compliance were likely to go hand-in-hand. The simultaneously low or high levels of these three conflict resolution strategies help to distinguish adolescents with an ambivalent conflict resolution type from those with no-resolution and positive conflict resolution types. These latter types were further differentiated by low versus high levels of positive problem solving, respectively.

Further, adolescents with different conflict resolution types reflected different combinations of concern for self and others (Pruitt & Carnevale, 1993). Adolescents with a positive conflict resolution type adopted mainly positive problem solving which reflects a high

and balanced concern of both self and other. Adolescents with a no-resolution conflict type scored low in all conflict resolution strategies, indicating a low concern for both self and others. Adolescents belonging to the ambivalent conflict resolution type used intermediate levels of positive problem solving, and scored highest on hostile conflict resolution, compliance, and withdrawal. This pattern suggests imbalance and vacillation in concerns for self and others, in which youths switch between expressing high concern for themselves and low concern for the other versus high concern for the other and low concern for themselves. Adolescents belonging to the ambivalent type may have difficulties with establishing a balance between interdependence and individuality, which is a crucial developmental task in adolescent friendships (Selman, 1990; Sullivan, 1953). These youths may resemble the disengaged friendship type distinguished by Shulman and Laursen (2002), which is characterized by low levels of interdependence and low levels of individuality. In contrast, adolescents classified within the positive conflict resolution type may resemble interdependent friendships, which have high and balanced concern for self and others and use more positive conflict resolution with friends during conflict (Selfhout et al., 2009). However, future studies are needed to test this assumption.

In this study, the majority of adolescents belonged either to the no-resolution or the positive conflict resolution types, within which they employed strategies aimed at mitigating conflict intensity. In addition, we did not find adolescents with conflict resolution types reflecting high concern for self and low concern for others. Namely, when adolescents in conflict with their best friends, they typically did not use hostile conflict resolution strategy alone. These findings may reflect adolescents' appreciation that it is important to preserve interpersonal bonds, and their sensitivity to potential costs of conflict in voluntary and potentially unstable relationships such as friendships. These features might promote their endeavor to minimize negative conflict outcomes and resolve conflict in a non-aggressive manner. They try to handle conflict with a minimum use of hostile conflict resolution strategy, or avoid the use of a hostile conflict resolution strategy alone (Laursen et al., 2001; Laursen, Hartup, & Koplas, 1996). Moreover, there was no conflict resolution type reflecting high concern for others and low concern for self. In another word, adolescents did not predominantly adopt compliance as a conflict resolution strategy in conflict with their best friends. The reason might be that although compliance belongs to one of the non-aggressive conflict resolution strategies which would not end a relationship in a short term, using compliance alone during conflict might not be beneficial for the maintenance of a friendship, because using too much compliance is not in agreement with the increasing equality in adolescent friendships (De Goede et al., 2009).

Role of Personality Types in Adolescents' Conflict Resolution

This study provided support for our hypothesis regarding the association between personality

types and conflict resolution with friends, by showing that individuals with different personality types differed both in the levels of conflict resolution strategies and in their differential distributions on conflict resolution types. During conflict with best friends, resilients used the most positive problem solving, the least hostile conflict resolution and compliance, and also had low withdrawal. This is in agreement with resilients' typical characteristics, such as high agreeableness, emotional stability, and social potency (e.g., assertive, leadership ability), and low social withdrawal (Asendorpf & Van Aken, 1999; Caspi & Silva, 1995; Klimstra et al., 2010). Undercontrollers endorsed the least positive problem solving, had low withdrawal and high hostile conflict resolution, and had median levels of compliance. These results are partly in line with our expectations, given undercontrollers' lower agreeableness, and withdrawal, and their higher aggressiveness (Asendorpf & Van Aken, 1999; Klimstra et al., 2010). Their compliant behavior, which was unexpected, might be attributable to their lower social skills, which could preclude them from persuading their friends in conflict and eventually lead to compliance (Caspi & Silva, 1995). In addition, overcontrollers used the most withdrawal and compliance, but surprisingly, had high levels of hostile conflict resolution that were comparable to undercontrollers. Their withdrawal behavior and "follower" position during conflict concurs with overcontrollers' characteristics such as keeping thoughts and feelings to themselves, and being obedient in social situations (Asendorpf & Van Aken, 1999; Hart et al., 1997). Although prior research has suggested that highly agreeable individuals are less likely to employ a hostile conflict resolution (Gunthert et al., 1999), overcontrollers' higher levels of hostile conflict resolution strategy could be explained by their relatively lower emotional stability (Klimstra et al., 2010), which might provoke negative strategies (e.g., hostility) during conflict (Gunthert et al., 1999).

The differential levels of conflict resolution strategies among adolescents with different personality types have some implications in practice. Overcontrollers' and undercontrollers' higher compliance and/or withdrawal behaviors and lower positive problem solving strategies than resilients might imply that interventions aiming at improving overcontrollers' and undercontrollers' positive problem solving strategies might help to decrease their withdrawing and compliant behaviors during conflict with their best friends.

Further, findings revealed that adolescents with different personality types differed in the distribution on conflict resolution types. In addition, conflict frequency with best friends was distinguishable both by personality types and conflict resolution types. In particular, both overcontrollers and undercontrollers had more conflict with their best friends than resilients, and both groups were more likely than expected to belong to the ambivalent conflict resolution type. Resilients, on the other hand, had the least conflict with their best friends, and were under-represented within the ambivalent conflict resolution type, but over-represented within the positive conflict resolution type. In addition, adolescents belonging to the ambivalent

conflict resolution type had more conflict than did the other two types across the years. Together, these findings suggest that adolescents' personality types might underlie their use of particular conflict resolution behaviors (Wilmot & Hocker, 2001). Additionally, the results imply that the ambivalent conflict resolution type might play a role in high conflict frequency within friendships, or vice versa.

In addition, although overcontrollers and undercontrollers consistently have a higher conflict frequency than resilients, they all scored relatively low. Across early to middle adolescence, adolescents with different personality types had about one conflict with best friends per week. This finding further confirms previous studies' proposal that adolescents generally try to avoid conflict in order to maintain their friendship (Collins & Sternberg, 2006; Van Doorn, Branje, Hox, & Meeus, 2009).

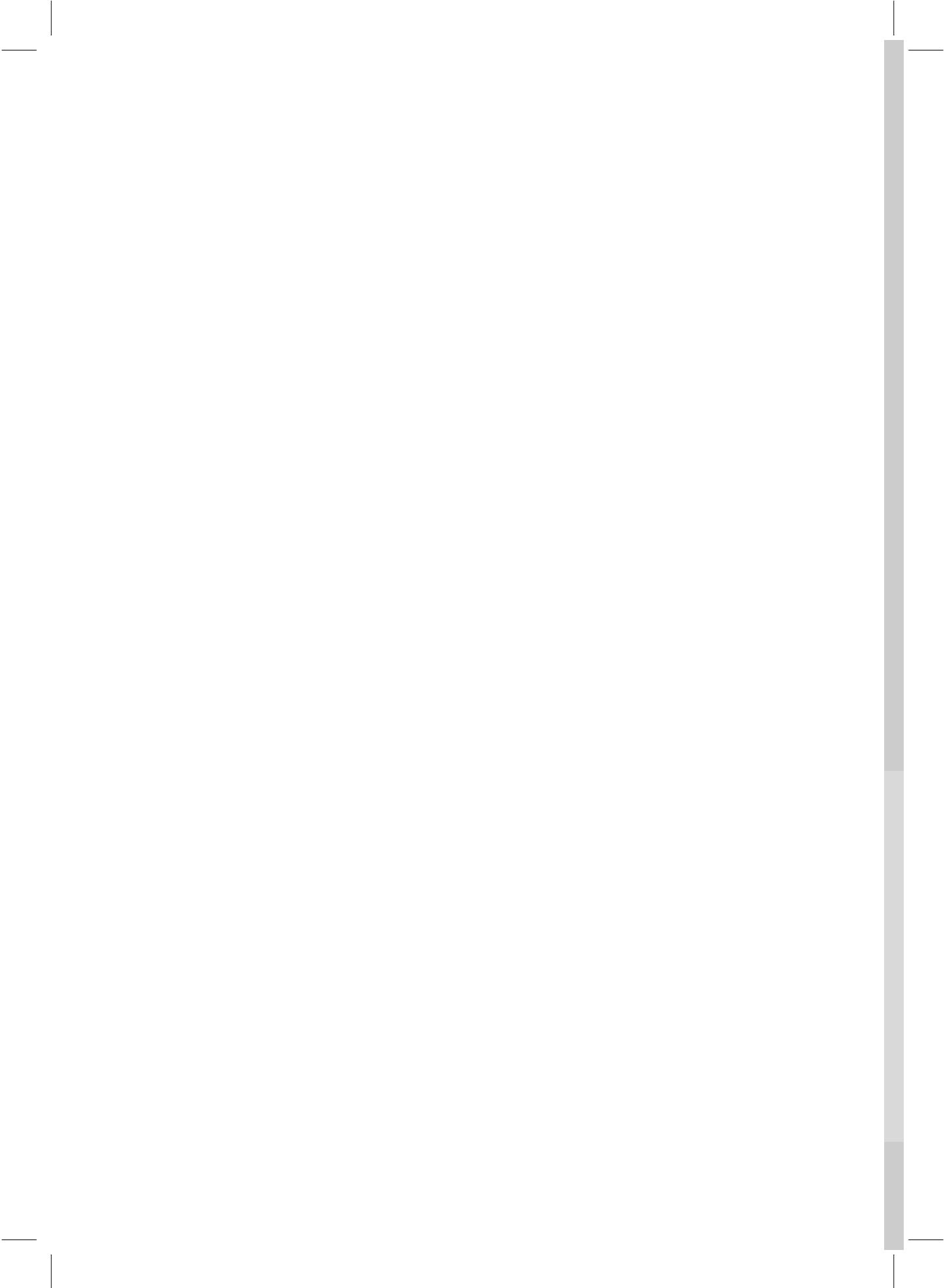
Limitations, Strengths, and Future Research Directions

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Some limitations of this study need to be recognized. First, we focused on a restricted age range of participants, from early to middle adolescence. It would be more informative to also include data from late adolescence, so that we could have a picture of developmental changes for the whole of adolescence. Second, data were derived from adolescents' self-reports, and prior studies suggest that results from self-reported data are discrepant from observational data; Positive problem solving tends to be higher in self-reports, especially when the participants are relatively young (Laursen et al., 2001). Another limitation lies in the use of single-informant data, which might introduce reporter bias, since conflicts are dyadic interactions during which the other person's behavior is an important factor to consider (Park & Antonioni, 2007). These limitations, to some extent, restrict the generalizability of our findings. Future work should aim to use a combination of self-reports, observational approaches, and multiple informants, as well as assess longer periods of adolescence.

Despite these limitations, this study is the first attempt to examine the developmental changes in adolescents' conflict frequency and conflict resolution with friends, and thus contributes to a more comprehensive understanding of age-related shifts in these behaviors. In addition, the current study is the first to document that adolescents with different personality types differed in their conflict frequency and conflict resolution with friends.

In conclusion, this study showed developmental changes in adolescents' conflict frequency and conflict resolution from early to middle adolescence. Across this period, adolescents develop an increasingly mature manner in conflict resolution with best friends. Moreover, both variable-centered and person-centered approaches confirmed a link between conflict resolution and personality types.





CHAPTER 5

Personality Effects on Romantic Relationship Quality through Friendship Quality: A Ten-Year Longitudinal Study in Youths¹

¹ Yu, R., Branje, S., Keijsers, L., & Meeus, W. (In Press). Personality effects on romantic relationship through friendship: A ten-year longitudinal study in youths. *PLOS ONE*.

ABSTRACT

This study examined whether individuals with different personality types (i.e., overcontrollers, undercontrollers, resilients) had different friendship quality development throughout adolescence. It also investigated whether personality types were indirectly related to romantic relationship quality in young adulthood, via friendship quality development in adolescence. The study employed six waves of longitudinal questionnaire data from Dutch youths who had a romantic relationship when they were young adults. Two age cohorts were followed, from 12 to 21 years and from 16 to 25 years, respectively. Findings showed that resilients reported higher mean levels of friendship quality during adolescence (i.e., more support from, less negative interaction with and less dominance from their best friend) than both overcontrollers and undercontrollers. Through the mean levels of friendship quality throughout adolescence, resilients indirectly experienced higher romantic relationship quality during young adulthood than both overcontrollers and undercontrollers. Thus, results provide support for a developmental model in which adolescent friendship quality is a mechanism linking personality types with young adulthood romantic relationship quality.

Keywords: overcontrollers, undercontrollers, resilients, friendship quality, romantic relationship quality

5.1 INTRODUCTION

Friendships and romantic relationships are both important for psychosocial development in adolescence and young adulthood (Havighurst, 1972; Masten & Cicchetti, 2010). Both of these social relationships are voluntary and reciprocal, and thus have important characteristics in common. Friendships and romantic relationships also vary in the developmental significance over the life course, however. Whereas friendships are often the first voluntary and reciprocal relationship in a persons' life, and fulfill important developmental needs during childhood and adolescence, romantic relationships typically become more salient during emerging adulthood (Meeus, Branje, Van der Valk, & De Wied, 2007; Roisman, Collins, Sroufe, & Egeland, 2005). As such, friendships may serve as a learning ground for later romantic relationships (Furman & Wehner, 1994; Sullivan, 1953). In other words, success in friendships is likely to affect the mastery of romantic relationships.

Not all adolescents and young adults develop optimal and satisfactory relationships. For instance, it has been proposed and empirically demonstrated that personality affects both individuals' friendships and romantic relationships (Asendorpf & Van Aken, 1999; Meeus et al., 2007; Shiner, Masten, & Roberts, 2003). Generally, adolescents with a resilient personality tend to have both better friendships in adolescence and better romantic relationships in young adulthood (Caspi, 2000; Van Aken & Dubas, 2004). However, there are some gaps in our understanding of how these differences arise over the course of adolescence and emerging adulthood. Firstly, although prior research has shown linkages between personality and friendship quality, findings are inconclusive, mainly due to the fact that linkages have been studied across limited developmental periods. Secondly, to our best knowledge, it is unknown whether personality affects later romantic relationship quality through earlier friendship quality development, despite the fact that developmental spill-over between friendships and romantic relationships is plausible. The present study attempted to fill these gaps by drawing on insights from the individual personality differences and developmental-relational perspectives together.

Personality Types and Quality of Social Relationships

Both friendship and romantic relationship quality might vary as a function of personality. People with different personality traits can differ in their motivations, as well as their interactions in and perceptions of social relationships (Holland & Roisman, 2008; Park & Antonioni, 2007). For instance, agreeable persons tend to have stronger motives for maintaining positive social relationships and try to minimize interpersonal disputes by being less aggressive, and therefore experience higher relationship quality (Asendorpf & Van Aken, 2003; Graziano, Jensen-Campbell, & Hair, 1996). Additionally, people who are low in emotional stability

are more likely to interpret ambiguous relationship scenarios in a more negative way, and to experience lower relationship quality (Finn, Mitte, & Neyer, 2013). Hence, there are clear empirical indications that personality is indeed linked to the quality of social relationships. However, variable-centered studies can only partially address this issue. Such an approach cannot unravel differences in social relationship quality for people who are both agreeable and emotionally unstable, for instance. Since separate dimensions of personality do not describe the person as a whole, there is a growing recognition of the need for a person-centered approach to understand personality and its associations with individuals' relational outcomes (Donnellan & Robins, 2010; Meeus, Van de Schoot, Klimstra, & Branje, 2011).

Personality types. One of the most often applied person-centered approaches to personality was based on Block and Block' (1980) theory on ego-control and ego-resilience. Ego-control refers to the tendency to contain versus express motivational impulses, and ego-resiliency refers to the tendency to respond flexibly to environmental demands. Studies have suggested that three personality types—resilients, undercontrollers, and overcontrollers—could be constructed as specific combinations of ego-control and ego-resilience (Asendorpf & Van Aken, 2003; Robins, John, Caspi, Moffitt, & Stouthamer-Loeber, 1996). Specifically, resilients are characterized by a high level of ego-resiliency and a medium level of ego-control. Overcontrollers and undercontrollers both have a low level of ego-resiliency, but differ on ego-control. Overcontrollers have a high level of ego-control and undercontrollers have a low level of ego-control (Meeus et al., 2011; Robins et al., 1996). Several studies have revealed that these three personality types can be reliably constructed using Big Five personality traits in adolescents (Dubas, Gerris, Janssens, & Vermulst, 2002; Klimstra, Hale, Raaijmakers, Branje, & Meeus, 2010). Resilients generally have higher scores on all five dimensions: extraversion, agreeableness, conscientiousness, emotional stability, and openness. Undercontrollers are characterized by lower conscientiousness and agreeableness, compared to others. Overcontrollers typically have relatively lower extraversion and lower emotional stability, compared to others, yet comparable agreeableness as resilients (Klimstra et al., 2010; Meeus et al., 2011; Robins et al., 1996). We will adopt this personality classification to understand how individuals with these three distinct personality types vary in their social relationships.

Relationship quality. Social relationships have both positive and negative features (Barrera, Chassin, & Rogosch, 1993; Laursen & Mooney, 2008). On one hand, social relations can be salient sources of support by providing companionship, intimacy, assistance, and guidance. On the other hand, relationships provide a context for negative interactions, such as conflict and antagonism. A third feature that needs to be distinguished to understand relationships is the perceived dominance in the relationship, that is, the extent to which one is controlled and dominated by the other (Youniss, 1980). In the current study, we will therefore focus on perceived support, negative interaction, and perceived dominance from interpersonal

partners as key dimensions to typify friendships over the course of adolescence and romantic relationships in emerging adulthood.

Personality Types and Friendship Quality in Adolescence

Research has shown that individuals with different personality types might have distinct patterns of friendship quality. Resilients tend to have better quality of friendships than both overcontrollers and undercontrollers (Asendorpf & Van Aken, 1999; Van Aken & Dubas, 2004). More specifically, cross-sectional studies using adolescent samples with average ages varying from 12 to 17 years have shown that resilients perceived more support from their friends than both overcontrollers and undercontrollers, whereas between the latter two there were no significant differences (Scholte, Van Lieshout, De Wit, & Van Aken, 2005; Steca, Alessandri, Vecchio, & Caprara, 2007). A longitudinal study examining this link among adolescents from 13 to 16 years showed similar findings (Van Aken & Dubas, 2004). Furthermore, one study followed adolescents from 12 to 16 years and showed that overcontrollers and undercontrollers were equally high in conflict frequency and hostile conflict management, and they were both significantly higher in these two aspects than resilients (Yu, Branje, Keijsers, & Meeus, 2013a). Former research also provides some evidence regarding different levels of perceived dominance from friends for youths with different personality types. Overcontrollers experienced more coercion from their friend, and they were more likely to comply with their best friend in conflict and be influenced by their best friend's delinquency than resilients (Van Aken & Dubas, 2004; Yu, Branje, Keijsers, Koot, & Meeus, 2013b; Yu et al., 2013a). Moreover, overcontrollers scored significantly lower in social potency than resilients, entailing a propensity of enjoying leadership roles and desiring to influence others (Caspi, 2000). For undercontrollers, results are less consistent: similar to overcontrollers, they experienced more coercion from their friend and were more likely to comply with their best friend during conflict than resilients (Van Aken & Dubas, 2004; Yu et al., 2013a). They did not differ from resilients in their tendency to influence their friend with their delinquent behavior, however, nor in their level of social potency (Caspi, 2000; Yu et al., 2013b). In sum, both overcontrollers and undercontrollers seem to perceive less support and more negative interaction in friendships than resilients, and overcontrollers tend to perceive more dominance from friends than resilients. Results are mixed as to whether undercontrollers differ from resilients regarding perceived dominance from friends. All of these studies were limited to early to middle adolescents, however, and predominantly studied differences in terms of mean levels. The current study will examine personality differences in the mean levels of, and the developmental changes in, friendship quality among adolescents from 12 to 20 years.

Personality Types and Romantic Relationship Quality in Emerging Adulthood

Individuals with different personality types also differ in romantic relationship quality. Personality types identified in early childhood were found to predict the quality of romantic relationships in young adulthood (Asendorpf, Denissen, & Van Aken, 2008; Caspi, 2000; Newman, Caspi, Moffitt, & Silva, 1997): undercontrollers, compared to resilients, reported lower quality of romantic relationships, as indicated by lower emotional support and warmth (e.g., intimacy and trust, acceptance, and exchange of personal thoughts and feelings), higher levels of conflict, and a more unequal balance of power in the relationship. Quite surprisingly, overcontrollers had similarly high romantic relationship quality as resilients in these three studies, despite the fact that overcontrollers generally reported lower friendship quality. Perhaps this absence of differences between overcontrollers and resilients can be explained by the fact that previous studies have assessed personality at one point in early childhood, rather than accounting for adolescent personality and its maturation over the course of adolescence (Klimstra et al., 2010; Meeus et al., 2011). As personality develops during childhood and adolescence, personality measured during adolescence might be differently related to romantic relationship quality in young adulthood. Using a developmental personality typology to capture the normative changes of personality in adolescence might help in drawing a more comprehensive picture about the link between personality types and romantic relationship quality.

Adolescent Friendships and Romantic Relationships in Emerging Adulthood

Friendships offer an important training ground for developing capacities and expectations for later romantic relationships (Collins, Welsh, & Furman, 2009; Furman, Simon, Shaffer, & Bouchey, 2002; Sullivan, 1953). Consistent with these theoretical ideas, several longitudinal studies have shown positive linkages between adolescent friendships and emerging adult romantic relationships (Meeus et al., 2007; Oriña et al., 2011; Rauer, Pettit, Lansford, Bates, & Dodge, 2013; Seiffge-Krenke, 2003). These studies, with time intervals ranging from 4 years to 7 years, revealed significant associations of weak to moderate effect size for various indicators of quality of friendships and romantic relationships, such as social support, commitment, and hostility. Specifically, individuals' support from friends at age 15 and 17 was positively related to support from romantic partners at age 21 (Seiffge-Krenke, 2003), and more support from friends at 16 years was predictive of longer-term committed romantic relationship from 18 to 25 years (Rauer et al., 2013). Similarly, relational commitment in adolescent friendships was predictive of relational commitment to their romantic partner in emerging adulthood (Meeus et al., 2007). Moreover, positive conflict resolution with friends at age 16 was related to more commitment and less hostility in young adults' romantic relationships (Oriña et al.,

2011). In sum, existing studies have consistently provided support for the idea that friendship experiences during adolescence might contribute in important ways to the quality of romantic relationships in emerging adulthood.

Personality Types, Adolescent Friendships, and Romantic Relationships in Emerging Adulthood

No prior research has examined why adolescents with different personality types might vary in their quality of romantic relationships in emerging adulthood. As introduced above, previous studies have provided some evidence about the linkages between personality types and friendship quality, although they predominately focused on early to middle adolescents. Additionally, prior research has shown significant linkages between quality of adolescent friendship and young adults' romantic relationships. These linkages suggest a natural progression for romantic relationship development, in which youths practice principals of volition and reciprocity in friendships and generalize related abilities and expectations to later romantic relationships. This developmental trajectory forms the rationale for an indirect effect of personality types on later romantic relationship quality, through earlier friendship quality. More specifically, we proposed that there would be an indirect pathway, such that adolescent personality types were associated with differential development of friendship quality during adolescence, which in turn would be associated with romantic relationship quality.

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The Current Study

Overall, this study aimed to test whether adolescent personality types were related to differential mean levels and developmental changes in friendship quality throughout adolescence (aim 1) and whether, through these differences in adolescents' friendship quality, adolescent personality types would indirectly predict romantic relationship quality during young adulthood (aim 2).

5.2 METHOD

Participants

Participants were 524 Dutch youths who had a romantic relationship during young adulthood. They were part of an ongoing longitudinal study CONAMORE (CONflict And Management Of RElationships study), which in total consists of 1313 participants divided into two age cohorts. We collected data for one cohort from age 12 onwards (i.e., younger cohort; $n = 923$), and for the other cohort from age 16 onwards (i.e., older cohort; $n = 390$), respectively. For the

current study, we used data from the annual measurements Wave 1 to Wave 5, collected from 2001 to 2005, and Wave 6 data, collected in 2010. Thus, participants were followed for ten years, from 12 to 21 years for the younger cohort and from 16 to 25 years for the older cohort. Because the aim of the study was to explain the quality of romantic relationships in early adulthood, only participants who had a romantic relationship during the sixth measurement wave (Wave 6) were included ($n = 524$). That is, 343 participants (227 girls) out of the initial 923 participants from the younger cohort, and 181 participants (112 girls) out of the initial 390 participants from the older cohort were included. The mean ages of these subsamples at Wave 1 were 12.37 years ($SD = 0.56$) for the younger cohort and 16.56 years ($SD = 0.81$) for the older cohort. For both cohorts, the ethnic compositions were 91.9% Dutch and 8.1% ethnic minorities. Regarding education levels, 266 participants (77.6%) from the younger cohort and 84 participants (46.4%) from the older cohort were still following education. In addition, 77 participants (22.4%) and 97 participants (53.6%) did not follow education anymore, respectively for the younger and older cohort.

There were significant differences between participants who had a relationship at Wave 6 and those who did not. Specifically, the percentages of girls and native Dutch in the group with a romantic relationship were significantly higher than those in the group without a relationship at Wave 6 ($\chi^2 [N = 1313, 1] = 60.92, p = .00, \phi = .22$; $\chi^2 [n = 1267, 1] = 25.41, p = .00, \phi = .14$). Moreover, after controlling for gender differences, young adults with a romantic relationship at Wave 6 perceived more support from their best friend ($F [1, 1099] = 10.61, p = .00, r = 10$), less negative interaction with their best friend, and less dominance from their best friend ($F [1, 1105] = 7.31, p = .01, r = .08$ and $F [1, 1083] = 4.83, p = .03, r = .07$, respectively), than young adults without a romantic relationship. There was a significant difference in the distributions of personality types among those who had a relationship at Wave 6 and those who did not ($\chi^2 [N = 1313, 2] = 9.10, p = .01, \phi = .08$). Undercontrollers were significantly less likely to have a romantic relation at Wave 6 ($\chi^2 [N = 1313, 1] = 4.35, p = .04, \phi = .06$), whereas resilients were significantly more likely to have a romantic relation at Wave 6 ($\chi^2 [N = 1313, 1] = 8.46, p = .00, \phi = .08$).

Procedure

Participants were initially included from a number of randomly selected high schools in the province of Utrecht, The Netherlands. Participants and their parents received an invitation letter, describing the research project and goals, and giving the option of not participating in the study. More than 99% of the approached adolescents decided to participate in our study. From Wave 1 to Wave 5, our participants annually filled in various questionnaires at school after school hours. Participants who changed schools during measurement of Waves 1 to 5 and participants at Wave 6 filled in the questionnaires at their homes. Trained assistants gave

verbal instructions to participants in addition to written instructions in the questionnaires. Confidentiality of participants' given answers was assured explicitly before participation. Participants received €10 as a reward for their participation from Wave 1 to Wave 5, and €30 in Wave 6.

For participation in the present study, written informed consent was obtained from adolescents and their parents, and also from all the participating schools. Treatment of participants was in accordance with the ethical standards of the APA and this study was reviewed and approved by the ethical-medical committee of University Medical Centre Utrecht, the Netherlands.

Measures

Adolescents' personality types. Adolescents' personality was assessed annually for five years with the Quick Big Five questionnaire (Goldberg, 1992; Vermulst & Gerris, 2005). Thirty personality makers were used to assess five personality dimensions (each with 6 items): Extraversion (e.g., "talkative"), Agreeableness (e.g., "sympathetic"), Conscientiousness (e.g., "systematic"), Emotional stability (e.g., "worried", reverse-scored), and Openness to experience (e.g., "creative"). Adolescents rated their personality on a 7-point Likert scale ranging from 1 (*very untrue*) to 7 (*very true*). Prior research have reported adequate reliability and validity of this scale (Branje, Van Lieshout, & Gerris, 2007). In the current study, across Wave 1 to Wave 5, Cronbach's alphas ranged from .80 to .87 for Extraversion, from .81 to .87 for Agreeableness, from .85 to .91 for Conscientiousness, from .80 to .83 for Emotional stability, and from .76 to .77 for Openness to experience. Several studies have shown that Block and Block's (1980) three personality types (i.e., overcontrollers, undercontrollers, and resilients) can be constructed directly from the Big Five dimensions (Klimstra et al., 2010; Meeus et al., 2011; Robins et al., 1996). An earlier study constructed personality types with Latent Class Growth Analysis (LCGA; Nagin, 2009) on the original 1313 cases, including the current sample (Branje, Hale III, Frijns, & Meeus, 2010). The LCGA indicated that a three-class solution fit the data the best and the entropy was .91, which indicated a high accuracy of classification (Nylund, Asparouhov, & Muthén, 2007). Therefore, in the current research, we adopted that study's classification of personality types (See Branje et al., 2010) for specific scores on Big Five traits for each personality type). In our sample, there were 120 overcontrollers, 78 undercontrollers, and 145 resilients among the 343 participants in the younger cohort. There were 57 overcontrollers, 53 undercontrollers, and 71 resilients among the 181 participants in the older cohort.

Friendship and romantic relationship quality. Participants' friendship quality from 12 to 20 years (i.e., from Wave 1 to Wave 5) and romantic relationship quality during young adulthood (i.e., 21 and 25 years at Wave 6) were assessed with Network of Relationships Inventory (NRI; Furman & Buhrmester, 1992). This inventory measures participants' perceptions of

support from their best friend or romantic partner, negative interaction with their best friend or romantic partner, and perceived dominance from their best friend or romantic partner. Support was assessed with twelve items, including items from different subscales tapping into companionship, instrumental aid, intimacy, nurturance, affection, admiration, and reliable alliance in friendship or in romantic relationship. A sample item was “How often do you turn to this person for support with personal problems?” Negative interaction was measured with six items from two subscales tapping conflict and antagonism. A sample item was “How much do you and this person get upset with or mad at each other?” Perceived dominance was assessed with six items from two subscales tapping the extent to which adolescents were controlled and dominated by their best friend or romantic partner. A sample item was “How often does this person get his/her way when you two do not agree about what to do?” Participants reported their friendship and romantic relationship quality on a 5-point Likert scale, ranging from 1 (*never*) to 5 (*always*). The NRI has good predictive, factorial, and construct validity (Furman, 1996). In the current study, across the five waves, Cronbach’s alphas ranged from .91 to .93 for perceived support from best friend, from .81 to .87 for negative interaction with best friend, and from .81 to .86 for perceived dominance from best friend. At Wave 6, Cronbach’s alphas were .92 for perceived support from romantic partner, .90 for negative interaction with romantic partner, and .88 for perceived dominance from romantic partner.

Statistical Analyses

All research questions were tested within comprehensive models existing of three groups of variables: 1) adolescent personality types (determined by five waves of personality data); 2) latent growth factors (i.e., intercepts and slopes) capturing development of adolescent friendship quality across five waves; and 3) emerging adults’ romantic relationship quality. We estimated separate models for each friendship and romantic relationship quality variable. Age cohort was used as a grouping variable. In the model, depicted in Figure 5.1, adolescent personality types were entered as two dummy variables (i.e., overcontrollers vs. resilients and undercontrollers vs. resilients, with resilient personality type as a reference category coded as 0). We explored models including a dummy variable for the comparison between overcontrollers and undercontrollers. As only one out of twelve comparisons was significant (in the younger age cohort, overcontrollers experienced higher dominance from friends than undercontrollers), we did not further include results of these models. To test for the proposed structural linkages among these variables, we added paths from the personality dummies to the latent growth factors of friendship quality, paths from adolescent personality to romantic relationship quality in emerging adulthood, and paths from the latent growth factors of adolescent friendship quality to emerging adults’ romantic relationship quality. We additionally controlled for gender on the intercepts and slopes of adolescent friendship quality and on

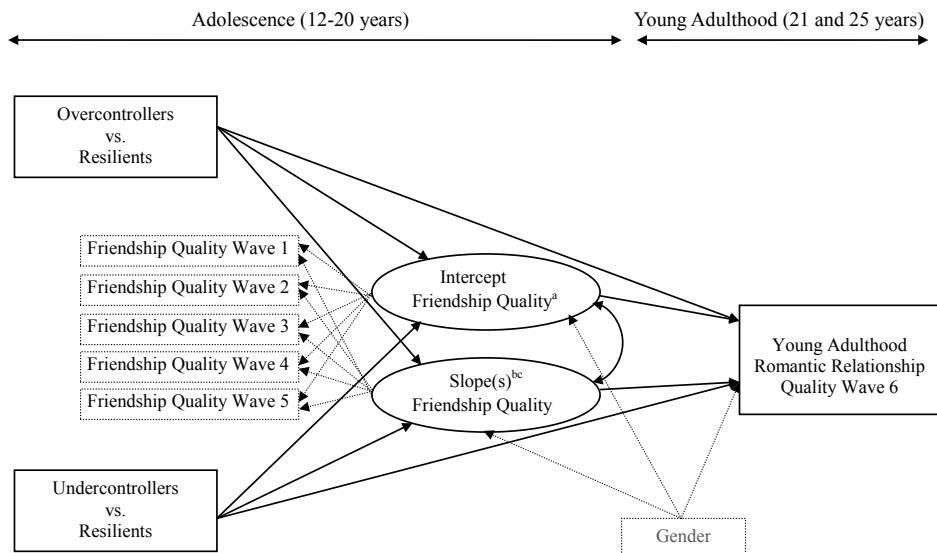


Figure 5.1 Structural Equation Model Testing the Relations between Adolescent Personality Types, Adolescent Friendship Quality Development, and Young Adulthood Romantic Relationship Quality

Note. ^a We estimated separate models for each friendship quality variable (i.e., support, negative interaction, and dominance). ^b Slope(s) indicates both linear and quadratic growth parameters. ^c To avoid convergence problems, the variances of quadratic slopes were fixed at zero and structural parameters were only estimated for the linear slope factor.

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young adulthood romantic relationship quality. The models were tested in *Mplus* (Muthén & Muthén, 1998-2012) using a maximum likelihood (ML) estimator.

We first determined the shape of growth in friendship quality during adolescence. To that end, we compared the chi-square values of models including a linear and quadratic growth to capture changes in friendship support, negative interaction, and dominance (Satorra & Bentler, 2001). The tests for negative interaction and dominance indicated that adding quadratic slopes significantly improved model fit (i.e., a significantly lower chi-square value; $\Delta\chi^2$ [N = 524, 2] = 25.35, $p = .00$ and $\Delta\chi^2$ [N = 524, 2] = 18.61, $p = .00$, respectively). For perceived support, the model with quadratic slope had a similar fit as the linear model ($\Delta\chi^2$ [N = 524, 2] = 3.21, $p = .20$). However, to facilitate the comparability between models across three friendship quality indicators, we chose models with both linear and quadratic slopes. To avoid convergence problems, the variances of quadratic slopes were fixed at zero.

After determining the shape of the growth of friendship quality, we tested whether parameters in the models could be constrained to be equal across cohorts, again by using chi-square difference tests (Satorra & Bentler, 2001). These parameters included means, variances, and covariances of intercepts and slopes of friendship quality, and all structural regression

paths in the models. In the final models, we constrained each parameter to be equal across two age cohorts that did not result in a significant decrease in chi-square value compared to the unconstrained model. All of the difference tests can be obtained from the first author upon request.

In addition, to evaluate the indirect effects of adolescent personality types on young adulthood romantic relationship quality through initial levels and developmental changes of friendship quality, the bias corrected bootstrapping method proposed by Preacher and Hayes (Preacher & Hayes, 2008) was used, using 10000 bootstrap resamples.

To evaluate the overall goodness of fit of the model, we used the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Squared Error of Approximation (RMSEA), and the Standard Root Mean Square Residual (SRMR). CFI and TLI values of .90 and above, and RMSEA and SRMR values of less than .08 are considered to indicate acceptable fit (Hu & Bentler, 1999; Kline, 2011).

5.3 RESULTS

Table 5.1 presents the means and standard deviations of Wave 1 to Wave 5 adolescent friendship quality and Wave 6 young adulthood romantic relationship quality, for each adolescent personality type (i.e., overcontrollers, undercontrollers, and resilients). Table 5.2 presents bivariate intercorrelations between relationship quality indicators. Table 5.3 and Figures 5.2, 5.3, and 5.4 present the results of our final structural equation models. These models all had an acceptable model fit, with CFIs and TLIs higher than .90, and RMSEAs and SRMRs lower than .08.

Adolescent Personality Types and Adolescent Friendship Quality

Regarding our first research aim, the findings generally confirmed that the mean levels (i.e., intercepts) of adolescent friendship quality differed by adolescent personality types (Figures 5.2-5.4). In both cohorts, overcontrollers (unstandardized coefficients [Bs] = -0.22, ps = .00) and undercontrollers (Bs = -0.32, ps = .00) perceived significantly lower levels of support from their best friend during adolescence than resilients. Regarding negative interaction with best friend during adolescence, overcontrollers (Bs = 0.08, ps = .04) and undercontrollers (Bs = 0.09, ps = .02) had higher levels of negative interaction than resilients. Moreover, both overcontrollers (Bs = 0.16, ps = .00) and undercontrollers (B = 0.14, p = .03) perceived higher levels of dominance from their best friend during adolescence. For undercontrollers, however, this was found only for the younger age cohort.

Fewer effects were found of the personality types on the developmental changes (i.e., linear slopes). In fact, the only significant finding was that undercontrollers increased

Table 5.1 Means and Standard Deviations of the Observed Values of Adolescent Friendship Quality and Young Adulthood Romantic Relation Quality by Adolescent Personality Types

Relation Quality Indicator	Early to Middle Adolescent Friendship Quality				Romantic Relation Quality				Middle to Late Adolescent Friendship Quality				Romantic Relation Quality							
	12 years		13 years		14 years		15 years		16 years		21 years		16 years		17 years		18 years		19 years	
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Support																				
O	3.16 (0.70)	3.25 (0.75)	3.24 (0.73)	3.31 (0.68)	3.42 (0.71)	3.88 (0.62)	3.36 (0.76)	3.35 (0.54)	3.40 (0.55)	3.33 (0.50)	3.40 (0.57)	3.86 (0.49)								
U	3.08 (1.01)	3.00 (0.81)	3.15 (0.84)	3.38 (0.77)	3.40 (0.76)	3.86 (0.70)	3.12 (0.67)	3.19 (0.57)	3.31 (0.49)	3.39 (0.54)	3.28 (0.60)	3.89 (0.46)								
R	3.45 (0.82)	3.51 (0.72)	3.49 (0.68)	3.63 (0.68)	3.59 (0.64)	3.84 (0.81)	3.44 (0.68)	3.59 (0.49)	3.57 (0.51)	3.58 (0.44)	3.60 (0.60)	3.96 (0.52)								
Neg. Int.																				
O	1.26 (0.39)	1.37 (0.50)	1.29 (0.43)	1.26 (0.43)	1.25 (0.47)	1.58 (0.55)	1.33 (0.44)	1.32 (0.36)	1.25 (0.41)	1.27 (0.46)	1.21 (0.35)	1.53 (0.46)								
U	1.31 (0.43)	1.55 (0.51)	1.49 (0.68)	1.41 (0.53)	1.42 (0.52)	1.50 (0.53)	1.28 (0.37)	1.33 (0.55)	1.21 (0.32)	1.18 (0.34)	1.21 (0.35)	1.55 (0.46)								
R	1.15 (0.25)	1.24 (0.36)	1.28 (0.46)	1.20 (0.31)	1.19 (0.37)	1.45 (0.51)	1.26 (0.38)	1.23 (0.38)	1.13 (0.22)	1.07 (0.18)	1.14 (0.25)	1.49 (0.47)								
Dominance																				
O	1.77 (0.53)	1.89 (0.62)	1.82 (0.51)	1.84 (0.58)	1.78 (0.56)	2.01 (0.59)	1.74 (0.53)	1.76 (0.53)	1.81 (0.62)	1.72 (0.49)	1.73 (0.52)	1.95 (0.55)								
U	1.70 (0.55)	1.98 (0.60)	2.09 (0.74)	1.87 (0.54)	1.81 (0.47)	2.03 (0.46)	1.61 (0.44)	1.72 (0.52)	1.78 (0.49)	1.84 (0.54)	1.77 (0.63)	2.04 (0.51)								
R	1.58 (0.50)	1.67 (0.55)	1.65 (0.46)	1.62 (0.53)	1.64 (0.46)	1.88 (0.63)	1.68 (0.42)	1.74 (0.44)	1.66 (0.41)	1.57 (0.45)	1.60 (0.47)	1.89 (0.51)								

Note. M (SD) = Mean (Standard Deviation). O = Overcontrollers. U = Undercontrollers. R = Resilients. Neg. Int. = Negative Interaction.

Table 5.2 Bivariate Intercorrelations between Relationship Quality Indicators

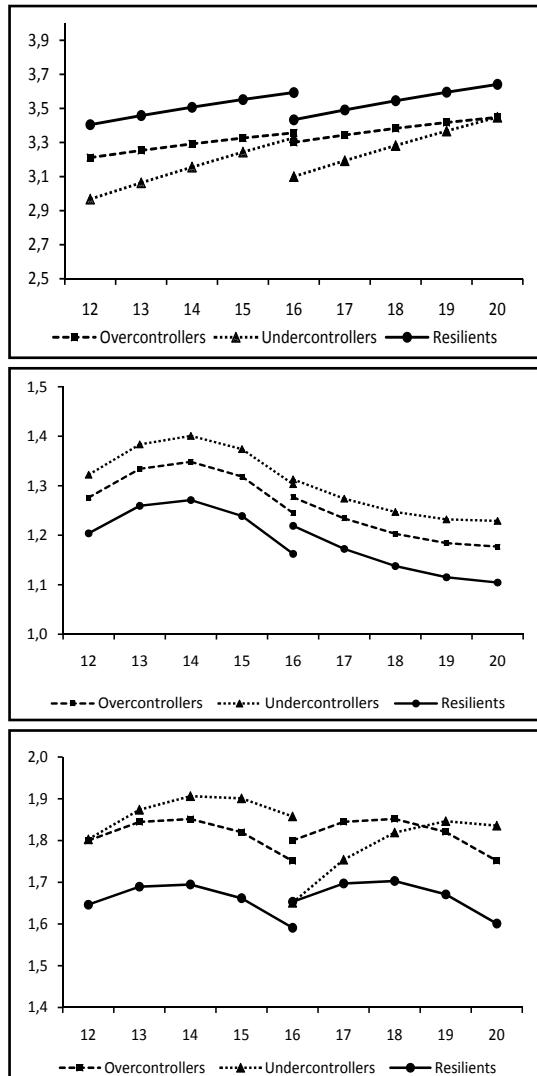
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1 Support T1	1																		
2 Neg. Int. T1		-.18*	1																
3 Dominance T1		.12*	.18*	1															
4 Support T2		.54**	-.11*	.04	1														
5 Neg. Int. T2		-.12**	.38**	.13**	-.20**	1													
6 Dominance T2		.03	.15**	.38**	.14**	.30**	1												
7 Support T3		.44*	-.10*	.04**	.61**	-.13**	.06	1											
8 Neg. Int. T3		-.11*	.25**	.09*	-.12**	.27**	.18**	-.17**	1										
9 Dominance T3		-.04	.11*	.30**	.00	.17**	.53**	.04	.35**	1									
10 Support T4		.40**	-.01	.08	.46**	-.06	.03	.55**	-.09*	-.02	1								
11 Neg. Int. T4		-.18**	.20**	.07	-.21**	.24**	.11*	-.20**	.40**	.20**	-.17**	1							
12 Dominance T4		-.08	.07	.28**	-.07	.12**	.36**	-.04	.14**	.44**	.00	.33**	1						
13 Support T5		.34**	-.06	-.04	.37**	-.08	-.00	.45**	-.09	-.02	.51**	-.10*	-.02	1					
14 Neg. Int. T5		-.05	.19**	.16**	-.15**	.21**	.13**	-.13**	.30**	.24**	-.05	.45**	.25**	-.05	1				
15 Dominance T5		-.08	.07	.30**	-.08	.13**	.39**	-.07	.21**	.42**	-.09*	.20**	.51**	-.02	.37**	1			
16 Support T6		.10*	.04	-.01	.17**	.03	.06	.24**	.02	-.00	.26**	-.07	-.03	.29**	.02	.03	1		
17 Neg. Int. T6		.00	.11*	.08	-.01	.16**	.09*	.00	.14**	.09	-.09	.23**	.17**	.00	.18**	.15**	-.24**	1	
18 Dominance T6		-.12**	.05	.22**	-.07	.07	.25**	-.09	.09*	.22**	-.09*	.12**	.38**	-.04	.09*	.36**	.02	.36**	1

Note. Neg. Int. = Negative Interaction. * $p < .05$. ** $p < .01$. T1-T5 referred to best friendship quality. T6 referred to romantic relationship quality.

Table 5.3 Standardized Parameter Estimates of the Structural Part of the Models Testing the Indirect Effect of Adolescent Personality Types on Young Adulthood Romantic Relationship Quality through Development of Friendship Quality throughout Adolescence

Parameter	Support		Negative Interaction		Dominance	
	Younger Cohort β (SE)	Older Cohort β (SE)	Younger Cohort β (SE)	Older Cohort β (SE)	Younger Cohort β (SE)	Older Cohort β (SE)
Effects of Personality on Friendship Quality						
O vs. R → I Friendship Quality						
O	-.17*** (.05)	-.21*** (.06)	.14* (.06)	.12* (.06)	.22** (.07)	.22** (.06)
R	-.22*** (.05)	-.30*** (.07)	.15* (.06)	.14* (.06)	.18* (.08)	.06 (.09)
I	-.04 (.08)	-.04 (.08)	.01 (.06)	.02 (.10)	.01 (.09)	.01 (.09)
U	.12 (.08)	.13 (.08)	.04 (.06)	.06 (.10)	.15 (.11)	.34* (.12)
Effects of Personality on Romantic Relation Quality						
O vs. R → Romantic Relation Quality						
O	.03 (.05)	.04 (.06)	.05 (.05)	.05 (.05)	.03 (.05)	.03 (.05)
R	.03 (.04)	.04 (.06)	-.01 (.05)	-.01 (.05)	-.01 (.05)	-.01 (.05)
I	Effects of Friendship Quality on Romantic Relation Quality					
I	.41*** (.08)	.42*** (.08)	.30*** (.06)	.33*** (.08)	.38*** (.06)	.39*** (.06)
LS	.43* (.08)	.56*** (.10)	.32** (.08)	.23** (.06)	.35* (.08)	.37* (.08)
Indirect Effects						
O vs. R → I Friendship Quality → Romantic Relation Quality						
O	-.07** (.03)	-.09** (.03)	.04* (.02)	.05* (.03)	.09** (.03)	.08** (.03)
R	-.09** (.03)	-.13** (.04)	.04* (.02)	.05* (.03)	.07**a (.03)	.02b (.04)
I	U vs. R → I Friendship Quality → Romantic Relation Quality					
O	-.02 (.04)	-.02 (.05)	.00 (.02)	.00 (.02)	.00 (.04)	.00 (.04)
U	.05 (.04)	.07 (.06)	.01 (.02)	.01 (.03)	.05* (.06)	.12* (.08)
O vs. R → LS Friendship Quality → Romantic Relation Quality						
O	U vs. R → LS Friendship Quality → Romantic Relation Quality					
O	.42*** (.04)	.55*** (.06)	-.23*** (.06)	-.23*** (.06)	.09** (.03)	.08** (.03)
R	-.16*** (.07)	-.17*** (.08)	.06 (.06)	.09 (.10)	.07* (.08)	.02* (.04)
I	Correlation between I and LS Friendship Quality					
O	.06 (.05)	.08 (.06)	-.07 (.04)	-.08 (.05)	-.12* (.04)	-.12* (.04)
R	-.62*** (.06)	-.54** (.10)	-.48** (.07)	-.72** (.08)	-.27* (.12)	-.12b (.17)

Note. O vs. R = Overcontrollers compared to Resilients. U vs. R = Undercontrollers compared to Resilients. β (SE) = Standardized coefficient (Standard error). I = Intercept. LS = Linear Slope. ^a $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$. Superscripts ^a and ^b indicated that magnitudes of parameters were significantly different across the younger and the older cohorts, thus they were freely estimated across cohorts.



Figures 5.2, 5.3, and 5.4 Estimated Developmental Changes in Adolescents' Perceived Support from, Negative Interaction with, and Dominance from Best Friend by Adolescent Personality Types

significantly faster in perceived dominance from their best friend than resilients ($B = 0.06$, $p = .01$), in the older age cohort. These results were found while controlling for the fact that girls had significantly higher mean levels ($Bs = 0.54$, $ps = .00$) and slower growth ($Bs = -0.04$, $ps = .03$) in perceived friendship support, and significantly lower mean levels of negative interaction with their best friend in adolescence ($Bs = -0.13$, $ps = .00$) than boys in both cohorts. Overall, the pattern was quite consistent. Whereas almost no differences were found in the developmental

changes in friendship quality, resilients reported the highest-quality friendships over the course of adolescence, compared to their overcontrolled or uncontrolled age-mates.

Indirect Effect of Adolescent Personality Types on Young Adults' Romantic Relationship Quality, through Adolescent Friendship Quality

The second research aim was to determine whether personality types would be linked to romantic relationships through a developmental spill-over from earlier friendship quality to later romantic relationship. Indications were found for this indirect linkage, because each of the essential paths constituting this indirect effect was significant. That is, over and above the effects of personality on quality of friendship, we also found indications for transmission of friendship quality to later romantic relationship quality in emerging adulthood. In fact, these linkages were generally (moderately) strong. Path estimates (β s) from adolescent friendship quality to young adulthood romantic relationship quality ranged from .41 to .56 for support, from .23 to .33 for negative interaction, and from .35 to .39 for perceived dominance.

Moreover, the transmission of the quality of adolescent friendships to young adulthood romantic relationships was further supported when the indirect effect was tested using stringent bootstrapping methods. Despite the fact that there were no direct paths from adolescent personality types on perceived support from, negative interaction with, and perceived dominance from romantic partners in young adulthood (B_s ranged from -0.01 to 0.04, $p > .05$), there were significant indirect effects of adolescent personality types on young adulthood romantic relationship quality through the mean levels of adolescent friendship quality. Specifically, resilients indirectly experienced higher mean levels of support from their romantic partners in emerging adulthood than overcontrollers ($B_s = -0.10$, $p = .00$) and undercontrollers ($B_s = -0.14$, $p = .00$), through mean levels of adolescent friendship support. This was found in both age cohorts. In terms of negative interaction, resilients across cohorts indirectly experienced less negative interaction with romantic partner in young adulthood than overcontrollers ($B_s = 0.04$, $p = .08$) and undercontrollers ($B_s = 0.05$, $p = .04$), through the mean levels of negative interaction with their best friend in adolescence. Moreover, overcontrollers in both age cohorts indirectly perceived more dominance from romantic partner during young adulthood than resilients ($B_s = 0.10$, $p = .01$), through the mean levels in perceived dominance from their best friend in adolescence. In addition, undercontrollers in the younger cohort indirectly experienced more dominance from their romantic partner during young adulthood than resilients ($B_s = 0.09$, $p = .04$), through the mean levels in perceived dominance from their best friend during adolescence.

5

Although these indirect linkages were not observed for the developmental changes in friendship quality, findings provide support for the idea of indirect effects of adolescent

personality types on young adulthood romantic relationship quality, through friendship quality in adolescence. Together, these models explained 12% to 27% of variance in the quality of young adults' romantic relationships. Explained variances were 14% and 26% for perceived support, 12% and 7% for negative interaction, and 23% and 27% for perceived dominance, for the younger and older cohorts respectively. This indicates medium to large effect sizes (rs ranged from .26 to .52) according to the standards set by Cohen (Cohen, 1988).

5.4 DISCUSSION

The current study aimed to provide more insight into the associations between personality types (i.e., overcontrollers, undercontrollers, and resilients), friendship quality in adolescence, and romantic relationship quality in early adulthood. Results showed that both overcontrollers and undercontrollers had lower friendship quality during adolescence than resilients, as indicated by lower perceived support from, more negative interaction with, and more perceived dominance from their best friend. Further, adolescent personality types had an indirect linkage with romantic relationship quality during young adulthood, through perceived quality of friendship during adolescence. These findings suggest that individuals' personality may play an important role in the continuity of quality of relationships with friends and romantic partners. Results indicate that individual differences in adolescent friendship quality could spill over to romantic relationship quality in young adulthood.

Personality Types and Development of Friendship Quality in Adolescence

The current study indicates that adolescents with different personality types differed significantly in the mean levels of all friendship quality indicators across the whole period of adolescence. Except for the finding that undercontrollers grew faster in perceived best friends' dominance from middle to late adolescence, however, we did not find differences in growth rates in any of the friendship quality indicators by adolescent personality types. These findings suggest that the differences in friendship quality by personality types lie mainly in the mean levels.

The results that overcontrollers and undercontrollers perceived lower support and more negative interaction from their best friend were in accordance with the findings in the prior studies covering shorter time spans in adolescence (Scholte et al., 2005; Steca et al., 2007; Van Aken & Dubas, 2004; Yu et al., 2013a). Findings may add to the existing literature by showing that the distinct patterns of perceived support and negative interaction reported by the different personality types were rather persistent across the whole period of adolescence. The reasons behind the relatively higher relationship quality for resilients are not yet clear. One

prior study reported that resilients had better understanding of the conceptions of friendship, such as the meaning of closeness and trust between friends, conflict resolution among friends, and the processes through which people become friends (Hart, Hofmann, Edelstein, & Keller, 1997). It might be that resilients' more mature understanding of friendship increases their capabilities for developing and maintaining friendships, and for experiencing more satisfactory friendships, compared to overcontrollers and undercontrollers.

Overcontrollers perceived more dominance from their best friend than resilients throughout adolescence. That is, overcontrollers were less likely to be the leader and take charge in their friendships than resilients. This finding is in accordance with the findings that overcontrollers are generally more compliant during conflicts with their best friend and experience more coercion from their friend than resilients (Van Aken & Dubas, 2004; Yu et al., 2013a). The findings are also line with a study reporting that overcontrollers were particularly vulnerable to their best friend's influence in delinquent behaviors (Yu et al., 2013b). There might be two reasons for the overcontrollers' "follower" position in their friendship. First, it might be due to overcontrollers' low social potency: they are found to be more submissive, not fond of leadership roles, and to have little desire to influence others (Caspi, 2000). As such, it is possible that overcontrollers do not mind if their interpersonal partner (e.g., friend) takes charge in the relationship and dominates them. The other reason could be their low decision-making ability. A recent study has found that overcontrollers scored relatively high on indecisiveness (Germeijs & Verschueren, 2011), and it could well be that their friends therefore need to take charge and make decisions for them in the relationship. These two reasons might explain the finding that overcontrollers are more likely to be dominated in their friendships and follow their friends' delinquent behaviors.

Similar to overcontrollers, undercontrollers also perceived more dominance from their best friend than resilients from early to middle adolescence. This result is in contrast to prior findings indicating that undercontrollers were not different from resilients in their reports of being forceful and being fond of leadership roles, and that they seemed to be capable of influencing delinquent behaviors of their best friend (Caspi & Silva, 1995; Yu et al., 2013b). The finding, however, is in agreement with studies reporting that undercontrollers were more compliant during conflict with their best friend and perceived more coercion in their friendship than resilients (Van Aken & Dubas, 2004; Yu et al., 2013a). It is intriguing that these two lines of evidence regarding undercontrollers' influence on their friend are contradictory. It seems that, although undercontrollers generally have the propensity of assuming leadership roles and have the desire to influence others, they are only capable of influencing their best friend with actual behaviors such as delinquency. They do not seem to be proficient in impacting their friend by presenting convincing arguments. One possible reason might be that undercontrollers lack social skills (Caspi & Silva, 1995), and therefore are not able to persuade their friend to

follow their suggestions. Another reason could be that, like overcontrollers, their relatively higher level of indecisiveness compared to resilients (Germeijs & Verschueren, 2011) puts their friend in the position of making decisions in the relationship. In sum, undercontrollers might unintentionally impact their friends' behavior, as their risk-taking may be regarded as evidence of independence and maturation during adolescence, and thus appear attractive to and be copied by their friends (Moffitt, 1993). However, undercontrollers might not be able to purposefully influence their friends.

Indirect Effect of Personality Types on Romantic Relationship Quality through Friendship Quality

Our results suggest that adolescent personality types could potentially have an impact on romantic relationship quality during young adulthood, although this impact appears to be indirect, through friendship quality during adolescence. Consistent with prior studies, our study showed that overcontrolled children did not directly differ from resilients in romantic relationship quality during young adulthood (Asendorpf et al., 2008; Caspi, 2000). In contrast, we did not find that undercontrollers directly had more conflicting romantic relationships during young adulthood than resilients.

Although we did not find directly effect of personality types on romantic relationship, indirectly, however, undercontrollers, as well as overcontrollers, experienced lower romantic relationship quality than resilients. Specifically, overcontrollers' and undercontrollers' lower friendship quality during adolescence, as compared to resilients', was subsequently related to lower romantic relationship quality during young adulthood. Our study suggests that individuals' differential levels of quality in friendship during adolescence tend to spill over to different levels of quality in romantic relationship during young adulthood. These spill-over effects were further suggested by the consistently moderate, significant linkages between friendship quality and romantic relationship quality five years later. These findings provide more insight into potential mechanisms underlying how personality may affect romantic relationship quality. Perceived friendship quality during adolescence might be one of the underlying processes linking personality and perceived romantic relationship quality during emerging adulthood.

Two explanations could be provided for this potential mechanism. First, from an attachment perspective, youths may develop expectancies for interpersonal relationships based on their earlier close relationships (Furman et al., 2002; Hazan & Shaver, 1987). These expectancies form mental representations (working models) of the self and relationship partners that guide interaction patterns in their later relationships, including romantic ones (Branje, Van Aken, Van Lieshout, & Mathijssen, 2003; Kenny, 1994; Roisman, Collins, Sroufe, & Egeland, 2005).

Resilients perceived relatively higher friendship quality in adolescence, and might thus develop representations of themselves as desirable and skillful interpersonal partners. However, overcontrollers and undercontrollers who had lower friendship quality in adolescence might develop internal representations of themselves as undesirable interpersonal partners. These differential expectations, based on earlier interpersonal relationships, might affect their romantic relationship quality. Second, friendships might serve as a place where youths can practice social skills in egalitarian and reciprocal relationships (Collins et al., 2009; Sullivan, 1953). These findings thus suggest that overcontrollers and undercontrollers may not have the opportunities to develop such skills in the friendship context during their adolescent years. Therefore, overcontrollers and undercontrollers might enter romantic relationships with fewer social skills learned from prior friendships than resilients, such as abilities to establish intimacy, negotiate in conflict, and balance dominance with their best friend. Ultimately, due to their own poorer relationships skills, they could also end up in romantic relationships of poorer quality. These two potential explanations could unfortunately not be tested in the current study, but are an important area for future research.

Strengths, Limitations, and Future Research Directions

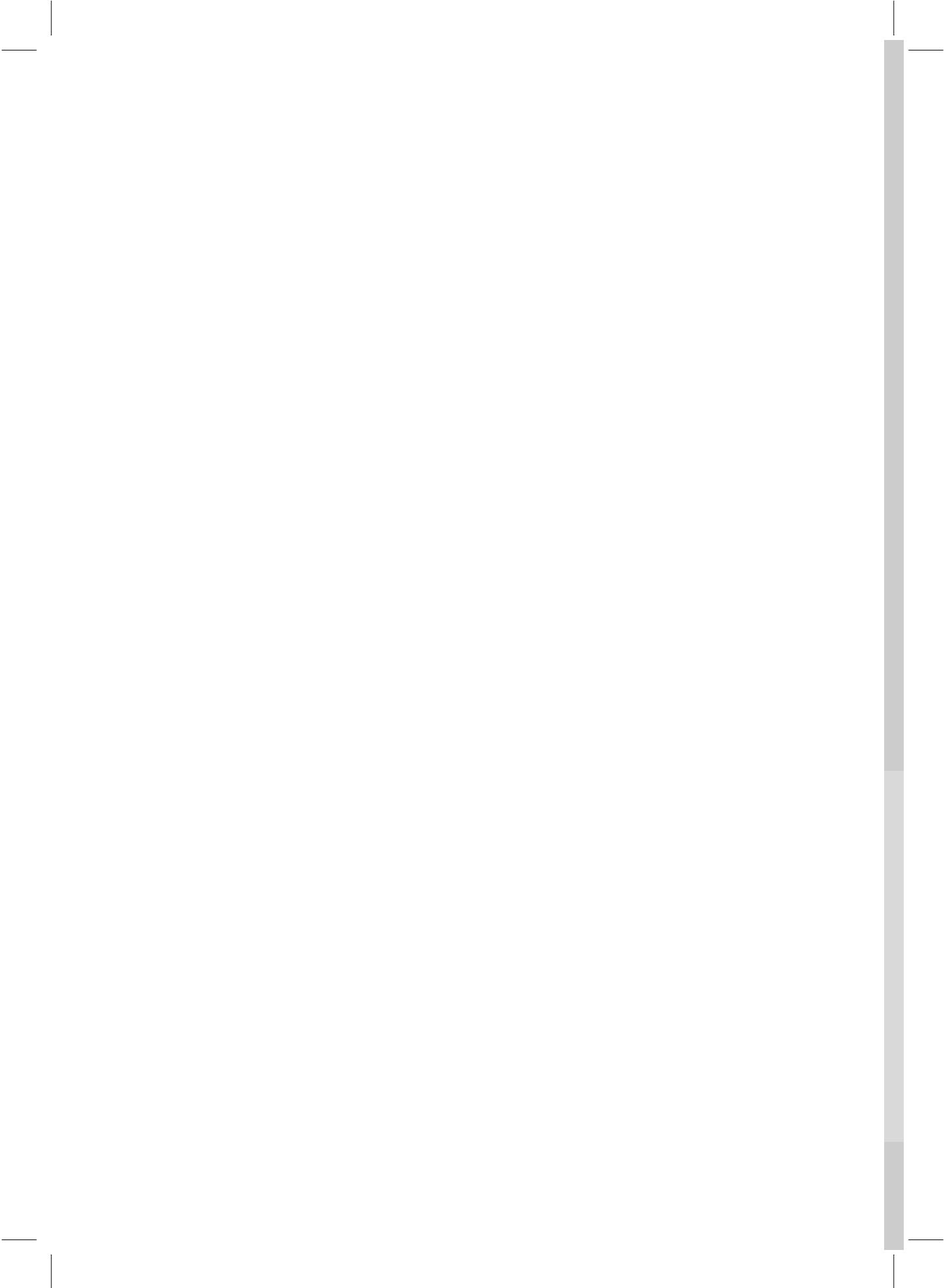
This study has several strengths. It followed two age cohorts of youths over a period of ten years. This allowed us for the first time examine the link between personality and development of friendship quality throughout adolescence. In addition, the current study provides more insight into the mechanism underlying the link between personality and romantic relationship quality. That is, by integrating personality, friendships, and romantic relationships into one model, this study revealed that personality predicted later romantic relationship through earlier friendship quality development.

Despite these strengths, some limitations of the current study should be mentioned. One limitation lies in the use of single-informant data, which might introduce reporter bias. Both friendships and romances are dyadic relationships, within which each person's perceptions and behaviors are important factors to consider. Prior research has shown that the degree of similarity between friends' and partners' personality influences the quality of their relationship (Linden-Andersen, Markiewicz, & Doyle, 2009). Thus future research could explore the relationships between the variables using data from various sources (e.g., both participant and their best friend and romantic partner) to capture a more complete picture. Second, even though we found longitudinal associations between adolescent personality, adolescent friendship quality, and young adulthood romantic relationship quality, we cannot draw causal conclusions due to the design of the study.

5.5 CONCLUSION

Taking together, the current study extends previous research by showing that individuals with different personality types differed in their mean levels of friendship quality during the whole period of adolescence, and through these differences, they might indirectly experience different levels of romantic relationship quality during young adulthood. These findings illustrate the complex processes by which personality might affect quality of close social relationships in the short run, and the longer run. They suggest a developmental sequence in which individuals' personality predicts proximal friendship quality during adolescence, and this in turn predicts distal romantic relationship quality during young adulthood.







CHAPTER 6

Pals, Problems, and Personality: The Moderating Role of Personality in the Longitudinal Association between Adolescents' and Best Friends' Delinquency¹

¹ Yu, R., Branje, S., Keijsers, L., Koot, H., & Meeus, W. (2013). Pals, problems, and personality: The moderating role of personality in adolescents' and best friends' delinquency. *Journal of Personality*, 81, 499-509.

ABSTRACT

Objective

We examined the potential moderating role of Block's personality types (i.e., overcontrollers, undercontrollers, and resilients) on the longitudinal associations between adolescents' and their best friends' delinquency.

Method

Across three annual waves, 497 Dutch adolescents (283 boys, $M_{\text{Age}} = 13$ years at Wave 1) and their best friends reported on their delinquent behaviors. Adolescents' three personality types were obtained by latent class growth analysis on their annual reports on Big Five personality. A three-group cross-lagged panel analysis was performed on three waves of data.

Results

Delinquency of overcontrollers was predicted by their best friends' delinquency, whereas delinquency of undercontrollers and resilients was not. Delinquency of undercontrollers and resilients predicted their best friends' delinquency, but overcontrollers' delinquency did not.

Conclusions

These findings suggest that personality may play an important role in adolescents' susceptibility to the influence of friends' delinquency, as well as in youths' ability to influence friends through their own delinquency.

Keywords: overcontrollers, undercontrollers, resilients, delinquency, friends

6.1 INTRODUCTION

Adolescents' delinquency is strongly associated with the delinquency of their friends (Haynie & Osgood, 2005; Sutherland, 1947). This similarity in delinquent behaviors may be caused not only by the selection of similar friends or by the deselection of dissimilar ones, but also by a process in which friends influence each other to engage in similar behaviors (Burk, Steglich, & Snijders, 2007). Through influence processes, friends may become increasingly similar in their delinquent behaviors over time. However, not all adolescents may be equally affected by, or affect, their peers. Some adolescents might be more vulnerable to their peers' delinquency, and some might have a stronger influence on their peers' delinquency. Although research on moderators of peer influence has been a rapidly growing area in the past decade (Cohen & Prinstein, 2006), the study of personality characteristics as potential moderators remains relatively rare. The aim of the present study, therefore, is to examine how adolescents' personality types moderate the ways in which adolescents and their best friends influence each others' delinquency.

Empirical studies suggest that individual characteristics may moderate the extent to which adolescents are influenced by or exert influence on others' behavior (Brechwald & Prinstein, 2011). For instance, the association between adolescents' deviant peer affiliation and their later antisocial behavior was weaker for adolescents with higher than those with lower self-regulation ability (Gardner, Dishion, & Connell, 2008). In addition, adolescent boys with different levels of disruptiveness were differently affected by their deviant best friends. The delinquency of moderately disruptive boys but not the delinquency of highly disruptive or conforming boys was predicted by their best friends' deviant behaviors over time (Vitaro, Tremblay, Kerr, Pagani, & Bukowski, 1997). Further, psychopathological symptoms, such as anxiety and depression, moderated the link between adolescents' and their friends' behaviors. In particular, high depressive or social anxiety symptoms magnified the association between adolescents' and their peers' aggressive and violent behaviors (Cohen & Prinstein, 2006; Prinstein, Boergers, & Spirito, 2001). Moreover, adolescents' peer status plays a role in their ability to exert influence on behaviors of their peers. Adolescents displayed greater conformity to aggressive or health risk behaviors of peer with higher status than to those with lower status (Cohen & Prinstein, 2006). These findings imply that individual characteristics can play an important role in the association between adolescents' and their peers' deviant behaviors.

The Role of Personality in the Link between Adolescents' and Friends' Delinquency

Recent work starts to deal with the moderating role of personality traits in peer influences on delinquency. One study examined the moderating role of psychopathic traits on peer influence processes. The results suggested that delinquency of adolescents with higher levels of callous-

unemotional and grandiose-manipulative traits was less influenced by, but more influential upon, their friends' delinquency, than the delinquency of adolescents who were lower in these psychopathic traits (Kerr, Van Zalk, & Stattin, 2012). Another study only found an association between delinquency of adolescents and their friends among adolescents with lower levels of impulsivity, but not among adolescents displaying higher levels of impulsivity (Vitulano, Fite, & Rathert, 2010). Thus, although research on the moderating role of personality traits is still rare, these studies demonstrate that personality could magnify or mitigate the link between delinquency of adolescents and their friends.

Previous studies examining personality characteristics as moderators in peer influence processes exclusively used a variable-centered approach, which assesses the correlational structure of the personality traits across persons within a particular population. A person-centered approach has been considered as an important and necessary complement to the variable-centered approach in studies involving personality (Meeus, Van de Schoot, Klimstra, & Branje, 2011). This approach enables us to delineate typical configurations of personality traits within the person and thus assesses the common within-person structure of personality. Therefore, in the current study, we examined the role of personality type, or the patterning of personality traits within the individual, in the longitudinal associations between adolescents' and their best friends' delinquency.

The most commonly used person-centered approach to personality was based on personality theory of ego-control and ego-resiliency by Block and Block (1980). Ego-control refers to containing versus expressing emotional and motivational impulses and ego resiliency refers to the dynamic capacity of individuals to adjust their modal levels of ego-control, depending on environmental demands (Block & Block, 1980). Studies have suggested that three personality types: Resilients, Undercontrollers, Overcontrollers, could be constructed as specific combinations of ego-control and ego-resiliency (Asendorpf, Borkenau, Ostendorf, & Van Aken, 2001; Hart, Hofmann, Edelstein, & Keller, 1997; Robins, John, Caspi, Moffitt, & Stouthamer-Loeber, 1996). Specifically, resilients are characterized by a high level of ego-resiliency and a medium level of ego-control. Overcontrollers and undercontrollers both have a low level of ego-resiliency, but differ on ego-control. Overcontrollers have a high level of ego-control and undercontrollers have a low level of ego-control (e.g., Robins et al., 1996). These three personality types have been identified in various samples including children, adolescents, and adults, by using various methods such as *Q* factor analysis or cluster analysis (Asendorpf et al., 2001; Klimstra, Hale III, Raaijmakers, Branje, & Meeus, 2010; Robins et al., 1996).

Differential levels of delinquency by personality types. Individuals with different personality types are distinguishable on their levels of delinquency. In particular, undercontrollers have significantly higher levels of delinquency than overcontrollers and

resilients. Between the latter two, there are generally no significant differences (Klimstra et al., 2010; Robins et al., 1996). It is not clear, however, whether adolescents with different personality types differ in susceptibility to or ability to exert peer influence on delinquency.

Among individuals with different personality types, resilients are often considered as a well-adjusted group, since they can respond adaptively and flexibly towards situational demands. Overcontrollers and undercontrollers are the more mal-adjusted groups, who exhibit little adaptive flexibility when encountering stressful situations (Block & Block, 1980). A recent study has showed that personality types mature in the direction of resiliency, with an increasing number of resilient adolescents with age (Meeus et al., 2011). In other words, resilients are considered as psychologically more mature than overcontrollers and undercontrollers. Recent work suggests that vulnerability to peer influence might become weaker as a function of developmentally normative psychosocial maturation (Allen, Porter, & McFarland, 2006; Brechwald & Prinstein, 2011; Sumter, Bokhorst, Steinberg, & Westenberg, 2009). Following this line of reasoning, it may therefore be that resilients are less affected by the delinquency of their peers than overcontrollers and undercontrollers.

Although undercontrollers may be more vulnerable to their best friends' delinquency because of their less mature personality, it is possible that undercontrollers, who have higher delinquency than overcontrollers and resilients, could become a "role model" for their best friends. Adolescents face a need to fill the gap between their biological maturation and social opportunities to be fully acknowledged as adults, and peer delinquency may be attractive to adolescents because it may be a statement of independence or a way to evidence maturation (Moffitt, 1993). It is not clear, therefore, whether undercontrollers' higher delinquency is an outcome of their higher susceptibility to their best friends' delinquent behaviors because of immaturity, or a source of influence on their best friends' delinquency during adolescence.

In addition, some studies suggested that overcontrollers might be more likely to be influenced and less influential in friendships. In particular, compared to resilients and undercontrollers, overcontrollers are less decisive and assertive, less confident, and more anxious in social interaction, which were positively related to vulnerability to peer influence (Cohen & Prinstein, 2006; Hart et al., 1997). Thus, they might be particularly more likely to be influenced and less influential in their friendships in delinquency development.

The Present Study

In sum, although we could not formulate specific hypotheses based on the current literature, it seems reasonable to suspect that personality types might magnify or mitigate peer influence processes between adolescents' and their best friends' delinquency. Therefore, in the current study, we examined the moderating role of the three personality types in the extent to which

adolescents influence each other's delinquency. Specifically, we tested whether individuals with different personality types differed in their susceptibility to the influence of their best friends' delinquency and their ability to exert influence on their best friends' delinquency over three years.

6.2 METHOD

Sample

Participants came from an ongoing longitudinal study, Research on Adolescent Development And Relationships (RADAR). Three waves of data were used in the current study. The study consists of 497 Dutch early adolescents (283 boys), with a mean age of 13.0 years ($SD = 0.52$) at the first measurement (T1). Of the adolescents, 95.2% identified themselves as being Dutch. 10.8% came from low SES families (i.e., both parents were unemployed or held an elementary job; Statistics-Netherlands, 1993). Of the total sample of 497 adolescents, all of them reported having a friend at T1. Among them, 50.1% ($n = 249$) had the same best friends participating at each wave, 28.5% ($n = 141$) changed best friends once over the three waves, 6.2% ($n = 31$) changed best friends every wave. Best friends did not participant in all the waves for all adolescents: 3.6% ($n = 18$) had the same best friend participating in two of the three waves, 5.8% ($n = 29$) had a best friend participating in one of the three waves, and 5.8% ($n = 29$) of adolescents' best friends did not provide data on their delinquency. There was no significant difference in the level of delinquency of adolescents with best friends participating at least one wave and adolescents whose best friends did not provide data on delinquency ($F [1, 402] < 1$, $r = .02$). In addition, 11.7% ($n = 58$) adolescents did not have information on friendship stability.

The attrition was low in the current study (i.e., 4.6% dropout over the three waves). For each variable, a maximum of 17.1% of the cases was missing (the average percentage of missing values per variable was 11.8% across the three measurements). The pattern of missing values was evaluated with Little's MCAR test and found to be completely at random ($\chi^2 [N = 497, 101] = 91.33$, $p = .74$). Therefore, we applied Full Information Maximum Likelihood for our model estimations.

Procedure

The target adolescents were recruited from various Dutch elementary schools. The target adolescents were asked to invite their best friend to participate. A description of the study was sent to the target adolescents' and the best friends' home address, and parents and adolescents provided informed consent to participate. Adolescents and best friends filled out various questionnaires during the annual home visits with one-year interval, supervised by

trained research assistants. Both of them received €15 as a reward for their participation in each wave. Confidentiality was assured before participation. The study was approved by the ethical-medical committee of University Medical Centre Utrecht.

Measures

Youths' delinquent behaviors. Adolescents and their best friends independently reported on their involvement in 30 delinquent behaviors in the past year, such as vandalism, shoplifting, and selling stolen goods. This scale was based on a large international comparative study on delinquency (Enzmann et al., 2010). Youths responded on a 5-point scale, ranging from 0 (*never*) to 4 (*more than ten times*). We adopted a variety measure rather than a frequency measure as the former measure is considered as more accurate in indicating the severity of an individual's delinquency than the latter measure. The reason is that minor offences occur usually more frequently than serious offences. Thus, in frequency scale, minor offences get a larger weight than serious offences (Bendixen, Endresen, & Olweus, 2003). To calculate variety in delinquency acts, we recoded all delinquent items into 0/1 variables (i.e., never versus at least once) and summed across the 30 delinquent behaviors. Measures like this have been widely used and are considered to be reasonably reliable and valid (Junger-Tas & Marshall, 1999). The Cronbach's alphas of the scale were acceptable, ranging from .83 to .86 across three waves.

6

Classification of adolescents' personality types. We assessed adolescents' and their best friends' personality using a shortened Dutch version of Goldberg's Big Five questionnaire (Gerris et al., 1998). Using 30 Big Five personality makers, five personality dimensions (each dimension with 6 items) were assessed: extraversion (e.g., talkative), agreeableness (e.g., sympathetic), conscientiousness (e.g., systematic), neuroticism (e.g., worried, reverse-scored), and openness to experience (e.g., creative). Adolescents and their best friends responded on a 7-point Likert scale, ranging from 1 (*very untrue*) to 7 (*very true*). Prior studies have shown this instrument to have adequate reliability and validity (Branje, Van Lieshout, & Gerris, 2007). In the current study, Cronbach's alphas ranged from .72 to .88 across waves. Several studies used longitudinal data on the Big Five personality traits to constitute the developmental typology of personality types (Branje, Hale III, Frijns, & Meeus, 2010; Klimstra et al., 2010). Three developmental types of personality were consistently identified and reliably related to different kinds of problem behaviors. Namely, resilients were relatively free from problem behaviors, overcontrollers were more prone to internalizing problem behaviors and undercontrollers were more prone to externalizing problem behaviors. We also constituted the developmental types of personality with three annual waves of Big Five data.

To examine the developmental typology of the target adolescents' personality, we used

Mplus 6 (Muthén & Muthén, 2010) to perform a multivariate Latent Class Growth Analysis (LCGA; Nagin, 2005) with adolescents' the Big Five personality scores across three waves. LCGA is designed to find the smallest number of classes capturing the most variance among individuals in initial levels (i.e., intercept) and change rate (i.e., slope) of the variables under observation. We used multiple criteria to determine the model with the optimal number of latent classes (i.e., developmental personality types). First, we used the Sample Size Adjusted Bayesian Information Criterion (SSA-BIC; Schwarz, 1978) and the Lo-Mendell-Rubin Likelihood Ratio Test (LMR-LRT; Lo, Mendell, & Rubin, 2001). The optimal model has the lowest SSA-BIC, and a significant LMR-LRT indicates that a model with k classes is better than a model with $k-1$ classes. Second, we considered the theoretical meaningfulness of the classes. That is, if an additional class was only a slight variation of a previously extracted class, the most parsimonious solution was chosen (Muthén & Muthén, 2000). In addition, we checked whether the model had adequate entropy, which indicates classification accuracy. It ranges from .00 to 1.00, with higher figures indicating a more accurate classification (Hix-Small, Duncan, Duncan, & Okut, 2004).

A three-class solution was the best fit to our data. In particular, the SSA-BICs for the models with 1-4 classes were 20066.94, 19266.58, 18708.32, and 18476.79, respectively. Although the SSA-BIC figure for the model with a 4-class solution was lower than the SSA-BIC value for the model with a 3-class solution, the LMR-LRT test indicated that adding a forth class did not result in an improvement of the model ($p = .10$). In addition, the 4-class model added a class that was highly comparable to one of the three classes in the three-class model. Moreover, the model for the three-class solution had high entropy (i.e., .82), indicating high classification accuracy. Entropies for models with 2 to 4 classes were .79, .82, and .82, respectively. Hence, we chose the three-class solution as the final classification. Table 6.1 presents the three-class model, with the intercepts (i.e., mean level) and slopes (i.e., average change per year) of the personality characteristics for the three personality types.

Among our 497 target adolescents, resilients ($n = 170$) scored moderate to high on all Big Five personality characteristics, overcontrollers ($n = 127$) scored particularly low on extraversion and emotional stability, and undercontrollers ($n = 200$) scored low on agreeableness, conscientiousness, and openness. These results were comparable to previous studies (e.g., Klimstra et al., 2010). In addition, only one out of fifteen slopes was significantly different from zero (i.e., undercontrollers' emotional stability increased across waves). This is consistent with a previous study indicating substantial stability in personality development within each personality type during adolescence (Klimstra et al., 2010).

The distribution of gender differed significantly in the three personality types ($\chi^2 [N = 497, 2] = 12.37, p = .00, \phi = .16$). Boys were more likely to be classified as undercontrollers than girls (41.64% and 31.78%, respectively; $\chi^2 [N = 497, 1] = 11.20, p = .00, \phi = .15$), but less likely to be

Table 6.1 Intercepts and Slopes of Big Five Personality Dimensions

Growth Factor Per Variable	Overcontrollers (N = 127)	Undercontrollers (N = 200)	Resilients (N = 170)
Intercept	M (95% C.I.)	M (95% C.I.)	M (95% C.I.)
Extraversion	4.19 ^{**c} (3.93, 4.44)	5.10 ^{**b} (4.89, 5.32)	5.76 ^{**a} (5.59, 5.94)
Agreeableness	5.62 ^{**b} (5.46, 5.77)	4.93 ^{**c} (4.74, 5.13)	5.91 ^{**a} (5.77, 6.05)
Conscientiousness	4.44 ^{**a} (4.18, 4.70)	3.57 ^{**b} (3.38, 3.77)	4.13 ^{**a} (3.81, 4.67)
Emotional Stability	3.51 ^{**b} (3.20, 3.83)	4.70 ^{**a} (4.53, 4.89)	4.79 ^{**a} (4.59, 4.98)
Openness	5.19 ^{**a} (5.00, 5.39)	4.24 ^{**b} (4.03, 4.45)	5.40 ^{**a} (5.18, 5.62)
Slope			
Extraversion	-.07 ^a (-.21, .07)	.04 ^a (-.04, .12)	.02 ^a (-.07, .11)
Agreeableness	.00 ^a (-.07, .07)	.01 ^a (-.06, .08)	.01 ^a (-.05, .06)
Conscientiousness	-.01 ^a (-.10, .09)	-.05 ^a (-.12, .03)	.01 ^a (-.08, .10)
Emotional Stability	.05 ^a (-.08, .17)	.10 ^{**a} (.01, .20)	.04 ^a (-.05, .13)
Openness	-.01 ^a (-.08, .07)	-.02 ^a (-.10, .06)	.04 ^a (-.04, .11)

Note. * $p < .05$; ** $p < .01$. Within a row, different superscripts indicate significant differences ($p < .05$) between Resilients, Undercontrollers and Overcontrollers in extraversion, agreeableness, conscientiousness, emotional stability and openness.

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classified as overcontrollers (21.20% and 31.31%, respectively; $\chi^2 [N = 497, 1] = 6.54, p = .01, \phi = .11$). Moreover, the prevalence of personality types did not differ for adolescents with stable versus unstable best friendships ($\chi^2 [n = 439, 2] = 0.53, p = .77, \phi = .03$), neither for adolescents with reciprocal versus non-reciprocal best friendships at T1 ($\chi^2 [N = 497, 2] = 0.19, p = .91, \phi = .02$). In addition, we constituted the personality type of best friends with the same method as for constituting personality types for the target adolescents. Chi-square test revealed that personality type of best friends was unrelated to that of the target adolescents ($\chi^2 [N = 497, 6] = 6.25, p = .40, \phi = .11$).

Adolescent delinquency was significantly related to personality type. Undercontrollers had a significantly higher variety in delinquency than overcontrollers and resilients (i.e., M [SD] = 2.27 [2.94] vs. 1.44 [2.40] and 1.29 [1.59], respectively; both $p < .00$), yet delinquency of overcontrollers and resilients did not significantly differ ($p = 1.00$). Moreover, delinquency of undercontrollers' best friends was significantly higher than that of overcontrollers' best friends (i.e., M (SD) = 2.81 [3.56] vs. 1.69 [1.95]; $p = .00$), whereas there were no significant differences in delinquency between overcontrollers' and resilients' best friends (i.e., M (SD) = 1.69 [1.95] vs. 2.16 [1.89]; $p = .24$), nor between undercontrollers' and resilients' best friends (i.e., M (SD) = 2.81 [3.56] vs. 2.16 [1.89]; $p = .39$).

Analytical Strategy

To answer our research questions, we performed a three-group cross-lagged panel, which enabled us to test the role of personality on the reciprocal over-time effect between adolescents' and their best friends' delinquency in a longitudinal design (Kline, 2011). We used robust maximum likelihood (MLR; Satorra & Bentler, 2001) to take the non-normal distribution of delinquency into account. Groups were based on the three personality types (i.e., overcontrollers, undercontrollers, and resilients). The model included annual measurements of adolescents' and their best friends' delinquency, stability paths of adolescents' and best friends' delinquency, the within-wave correlations between adolescents' and best friends' delinquency, the cross-lagged paths from adolescents' delinquency to best friends' delinquency one year later, and the cross-lagged paths from best friends' delinquency to adolescents' delinquency one year later (see Figure 6.1).

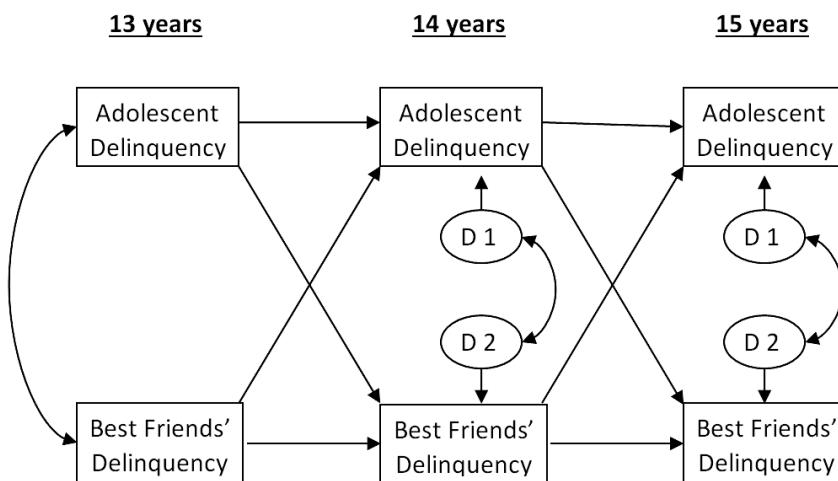


Figure 6.1 Cross-lagged Model on Moderating Effect of Personality Types between Adolescents' and Best Friends' Delinquency

Note. D = Disturbance

To test whether the associations between adolescents' and best friends' delinquency differed between the personality types, we compared a fully constrained baseline model (M0), in which all longitudinal parameters were constrained to be time invariant (see results section), with models (M1-M7) in which we unconstrained sets of parameters across different personality types. In Model M1, the stability paths of adolescents' delinquency were unconstrained across personality types and in Model M2, the stability paths of best friends' delinquency were unconstrained. In Model M3 and M4, respectively, T1 within-wave associations, and T2/T3 within-wave associations between adolescents' delinquency and best

friends' delinquency were freely estimated across personality types. In Model M5, cross-lagged paths from adolescents' delinquency to best friends' delinquency were unconstrained, and in Model M6, cross-lagged paths from best friends' delinquency to adolescents' delinquency were unconstrained. In the final model, Model M7, all parameters that significantly improved the model fit after being freely estimated in previous models were estimated freely across personality types.

To test which paths were significantly different for the three personality types, we compared the fit of these models against the baseline model by using an adjusted chi-square difference test (Satorra & Bentler, 2001). A significant improvement in chi-square model fit (i.e., decreasing chi-square) would be indicative of personality differences. We subsequently conducted post-hoc pairwise comparisons between specific personality types to determine which personality types significantly differed from each other. In addition, we controlled for SES and gender in the final model, by regressing observed scores of adolescents' delinquency on SES or gender to examine whether the cross-lagged effects were affected by these two variables.

As not all adolescents had stable friends over three years, to disentangle the "influence" effect from selection effects between delinquency of adolescents' and their best friends' over time, we conducted additional group analyses on the final model, to test whether there were significant differences in cross-lagged effects between adolescents who retained the same best friends across three waves and the rest of adolescents. Adolescents in the rest group had unstable friendships since they changed best friends at least once among the three waves and/or had their best friends participating in a maximum of two waves. Selection effects could not be examined in the unstable friendships in our sample. One reason was that only a small percent of adolescents in our sample changed best friends at each wave across three years. In addition, even when adolescents changed their best friends from one wave to another, the effect from adolescents' delinquency to their best friends' later delinquency might not only be a selection effect but also be an influence effect since the "new" best friends could already be friends with the adolescent for several years. Moreover, in unstable friendships, the effect of best friends' delinquency on adolescents' subsequent delinquency might be an influence effect of an ended friendship, or a deselection effect.

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We evaluated the overall fit of the models using the comparative fit index (CFI), with values above .90 indicating satisfactory fit, and the root mean square of error of approximation (RMSEA), with values up to .08 representing an adequate fit of the model (Kline, 2011).

6.3 RESULTS

The fit indices for the time invariant model were acceptable ($\chi_{\text{SB}}^2 [N = 497, 39] = 71.88, p = .00$, CFI = .92, RMSEA = .07). We tested whether it was acceptable to use such a time invariant model by freely estimating sets of parameters across waves. Freeing paths did not improve the fit for the stability paths ($\Delta\chi_{\text{SB}}^2 [N = 497, 1] = 1.77, p = .18$, and $\Delta\chi_{\text{SB}}^2 [N = 497, 1] = 0.14, p = .70$, for adolescents' and best friends' delinquency respectively), for cross-lagged paths from adolescents' delinquency to best friends' delinquency ($\Delta\chi_{\text{SB}}^2 [N = 497, 1] = 0.06, p = .81$), for cross-lagged paths from best friends' delinquency to adolescents' delinquency ($\Delta\chi_{\text{SB}}^2 [N = 497, 1] = 0.18, p = .68$), or for correlated changes T2/T3 ($\Delta\chi_{\text{SB}}^2 [N = 497, 1] = 0.94, p = .33$). Hence, a fully time invariant model was chosen as a baseline model M0 for the subsequent moderation analyses.

Moderation Effects of Personality Types

Table 6.2 presents the model comparisons of the three-group analyses, aimed at examining the moderation effects of personality types. The groups based on personality types did not significantly differ on stability paths of adolescents' delinquency (M1), best friends' delinquency (M2), or T1 within-wave correlations (M3). Significant differences between personality types were found in the T2/T3 within-wave correlations (M4), however, and for both the cross-lagged effects from adolescents' delinquency to best friends' delinquency one year later (M5) and the cross-lagged effects from best friends' delinquency to adolescents' delinquency one year later (M6).

Table 6.3 shows the results of the final model (M7), in which T2/T3 within-wave correlations and cross-lagged effects were estimated for each personality type separately. Across personality types, both adolescents' and best friends' delinquency were relatively stable, with β 's ranging from .41 to .79. Initial correlations between adolescents' delinquency and best friends' delinquency were positive and significant (β 's between .14 and .29), and they did not differ significantly across personality types. T2 and T3 correlated changes varied between personality types, however. Pair-wise comparisons indicated that T2/T3 within-wave correlations between adolescents' delinquency and their best friends' delinquency were significantly stronger for undercontrolling adolescents (β 's ranging from .20 to .21) and resilient adolescents (β 's ranging from .11 to .18), as compared to overcontrolling adolescents (β 's ranging from .07 to .10) ($\Delta\chi_{\text{SB}}^2 [N = 497, 1] = 14.81, p = .00$ and $\Delta\chi_{\text{SB}}^2 [N = 497, 1] = 5.87, p = .02$, respectively). There were no significant differences when comparing undercontrolling and resilient adolescents ($\Delta\chi_{\text{SB}}^2 [N = 497, 1] = 1.02, p = .31$).

The cross-lagged effect of adolescents' delinquency on best friends' delinquency one year later was moderated by adolescents' personality type. That is, this effect was significantly

Table 6.2 Model Comparisons and Fit Indices for Cross-lagged Model on Moderating Effect of Personality between Adolescents' and Best Friends' Delinquency

Models	Model Fit				Model Comparisons			
	χ^2_{Sg}	df	CFI	RMSEA	ΔModel	Δdf	$\Delta\chi^2_{\text{Sg}}$	p
M0. Fully Constrained	71.88	39	.92	.07	---	---	---	---
M1. M0 + Stability Paths of Adolescents' Delinquency Free	76.86	37	.91	.08	M1-M0	2	0.58	.75
M2. M0 + Stability Paths of Best Friends' Delinquency Free	69.44	37	.92	.07	M2-M0	2	2.84	.24
M3. M0 + T1 Correlations Free	67.87	37	.93	.07	M3-M0	2	4.05	.13
M4. M0 + T2 T3 Within-wave Correlations Free	65.45	37	.93	.07	M4-M0	2	10.34	.00
M5. M0 + Path Adolescents' Delinquency → Best Friends' Delinquency Free	62.93	37	.94	.07	M5-M0	2	10.15	.01
M6. M0 + Path Best Friends' Delinquency → Adolescents' Delinquency Free	66.85	37	.93	.07	M6-M0	2	5.93	.05
M7. Final Model ^a	53.33	33	.95	.06	M7-M0	6	22.58	.00

Note. ^aIn the final model, T2 and T3 correlations, paths from adolescents' delinquency to best friends' delinquency, and paths from best friends' delinquency to adolescents' delinquency were freely estimated across personality types.

Table 6.3 Parameter Estimates for Cross-lagged Model on Moderating Effect of Personality between Adolescents' and Best Friends' Delinquency

Personality Types	Overcontrollers		Undercontrollers		Resilients	
	B (CI)	β	B (CI)	β	B (CI)	β
Stability Paths						
Adolescents' Delinquency T1 → T2	0.56 (0.46, 0.66)	.63***	0.56 (0.46, 0.66)	.68***	0.56 (0.46, 0.66)	.56***
Adolescents' Delinquency T2 → T3	0.56 (0.46, 0.66)	.79***	0.56 (0.46, 0.66)	.57***	0.56 (0.46, 0.66)	.43***
Best Friends' Delinquency T1 → T2	0.46 (0.36, 0.57)	.62***	0.46 (0.36, 0.57)	.41***	0.46 (0.36, 0.57)	.49***
Best Friends' Delinquency T2 → T3	0.46 (0.36, 0.57)	.41***	0.46 (0.36, 0.57)	.47***	0.46 (0.36, 0.57)	.43***
Within Wave Correlations						
Adolescents' Delinquency T1 ↔ Best Friends' Delinquency T1	1.64 (0.72, 2.56)	.20**	1.64 (0.72, 2.56)	.14**	1.64 (0.72, 2.56)	.29***
Adolescents' Delinquency T2 ↔ Best Friends' Delinquency T2	0.24 (-0.06, 0.55)	.07	1.49 (0.41, 2.56)	.21**	0.66 (-0.03, 1.36)	.18**
Adolescents' Delinquency T3 ↔ Best Friends' Delinquency T3	0.24 (-0.06, 0.55)	.10	1.49 (0.41, 2.56)	.20**	0.66 (-0.03, 1.36)	.11**
Cross-lagged Effects						
Adolescents' Delinquency T1 → Best Friends' Delinquency T2	-0.01 (-0.07, 0.06)	.00	0.14 (-0.00, 0.29)	.14*	0.33 (0.03, 0.63)	.21**
Adolescents' Delinquency T2 → Best Friends' Delinquency T3	-0.01 (-0.07, 0.06)	.00	0.14 (-0.00, 0.29)	.11*	0.33 (0.03, 0.63)	.20*
Best Friends' Delinquency T1 → Adolescents' Delinquency T2	0.14 (0.01, 0.27)	.12**	-0.02 (-0.14, 0.10)	-.02	0.02 (-0.06, 0.10)	.04
Best Friends' Delinquency T2 → Adolescents' Delinquency T3	0.14 (0.01, 0.27)	.12**	-0.02 (-0.14, 0.10)	-.03	0.02 (-0.06, 0.10)	.03

Note. CI = 95% Confidence Interval. * $p < .05$; ** $p < .01$; *** $p < .001$.

stronger for resilient adolescents (β 's ranging from .20 to .21) and undercontrolling adolescents (β 's ranging from .11 to .14) than for overcontrolling adolescents (β 's = .00) ($\Delta \chi^2_{\text{SB}}[N = 497, 1] = 8.12, p = .00$, and $\Delta \chi^2_{\text{SB}}[N = 497, 1] = 8.37, p = .00$, respectively). There was no significant difference between undercontrolling and resilient adolescents, however ($\Delta \chi^2_{\text{SB}}[N = 497, 1] = 1.23, p = .27$). As such, adolescents' with different personality types differed in the effect of their delinquency on their best friends' delinquency one year later.

The longitudinal effect of best friends' delinquency on adolescents' delinquency one year later was also moderated by adolescents' personality types. This effect was significantly stronger for overcontrolling adolescents (β 's = .12) than for undercontrolling adolescents (β 's ranging from -.02 to -.03) ($\Delta \chi^2[\Delta df = 1] = 10.20, p = .00$), and marginally significantly stronger for overcontrolling adolescents than for resilient adolescents (β 's ranging from .03 to .04) ($\Delta \chi^2[\Delta df = 1] = 3.66, p = .055$). There was no significant difference in this effect between undercontrolling and resilient adolescents ($\Delta \chi^2_{\text{SB}}[N = 497, 1] = 0.24, p = .62$). Thus, personality also moderated the effect of best friends' delinquency on subsequent adolescents' delinquency.

In addition, when we controlled for SES and gender in the final model, by regressing observed scores of adolescents' delinquency on SES or gender, the results were highly similar. Confidence intervals showed that none of the cross-lagged effects between adolescents' and best friends' delinquency changed significantly after controlling for SES (i.e., the differences on β s ranged from .01 to .03) or gender (i.e., the differences on β s were .01). Furthermore, multiple group analysis by gender and SES also indicated no significant gender and SES effect on the cross-lagged effects of adolescents' delinquency on that of their best friends' ($\Delta \chi^2_{\text{SB}}[N = 497, 3] = 4.05, p = .26$ and $\Delta \chi^2_{\text{SB}}[N = 497, 3] = 1.28, p = .79$, respectively), nor of best friends' delinquency on adolescents' delinquency ($\Delta \chi^2_{\text{SB}}[N = 497, 3] = 6.99, p = .07$, and $(\Delta \chi^2_{\text{SB}}[N = 497, 3] = 5.07, p = .74$, respectively).

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Effects in stable and unstable friendships. As not all adolescents had a stable friendship across the three years, we compared cross-lagged effects between adolescents who had stable best friends ($n = 249$) and those who had unstable best friends ($n = 190$). To that end, we did multiple group analysis in which groups were based on different combinations of personality types and stability of friendships. We compared whether cross-lagged effects between adolescents' and their best friends' delinquency were consistent across adolescents with stable and unstable friends within each personality type. The cross-lagged effect from adolescents' delinquency to their best friends' subsequent delinquency was not significantly different between adolescent with stable and those with unstable friendships, both for undercontrollers and resilients ($\Delta \chi^2_{\text{SB}}[n = 439, 1] = .42, p = .58$, and $\Delta \chi^2_{\text{SB}}[n = 439, 1] = .13, p = .76$, respectively). However, the cross-lagged effect of best friends' delinquency on adolescents' subsequent delinquency was significantly stronger for overcontrollers with stable friendships (β 's ranging

from .19 to .21, $p = .01$ and $.00$, respectively) than for overcontrollers with unstable friendships (β 's = $.00$, $ps = .97$, respectively; $\Delta\chi_{SB}^2[n = 439, 1] = 5.73, p = .00$).

6.4 DISCUSSION

In this study, we aimed to investigate the moderating role of personality types in the longitudinal associations between adolescents' delinquency and their best friends' delinquency. Consistent with previous research (Haynie & Osgood, 2005; Selfhout, Branje, & Meeus, 2008), our study confirmed a longitudinal link between adolescents' and their best friends' delinquency over time. Importantly, however, our study indicates that the strength of the longitudinal associations between adolescents' and their best friends' delinquency is moderated by their personality types. Specifically, overcontrollers' delinquency was longitudinally predicted by their best friends' delinquency, but the delinquency of undercontrollers and resilients was not. Moreover, the delinquent behavior of resilients and undercontrollers was predictive of their best friends' delinquency over time, whereas the delinquent behavior of overcontrollers was not. The magnitudes of these longitudinal associations did not change significantly after controlling for gender and SES. Thus, our study implies that adolescents' personality types could mitigate or magnify the longitudinal associations between delinquency of adolescents and their best friends.

Longitudinal Effects between Delinquency of Adolescents and Their Friends

These cross-lagged effects between delinquency of adolescents and their best friends were also found when looking at stable friendships. This finding indicates that adolescents and their best friends might indeed influence each other over time on delinquency, depending on personality types. Namely, overcontrolling adolescents seem to have changed their delinquent behavior due to their best friends' delinquent behaviors. Undercontrollers and resilients seem to exert influence on their best friends' delinquent behaviors.

Further, the longitudinal associations between undercontrollers' and resilients' delinquency and their best friends' delinquency did not significantly differ among adolescents with stable and unstable friendships. This result implies that the mixture of influence and selection effects of adolescents' delinquency found in unstable friendship contributes similarly as the influence effect appeared in stable friendship to their best friends' delinquency development. This result also indicates that effect between adolescents and their best friends could already appear in the process of befriending. However, the cross-lagged effect from best friends' delinquency to overcontrollers' delinquency was significant only in stable friendship but not in unstable friendship. This result highlights the importance of stability of influence sources for the effect

to occur, as in a dissolving friendship, best friends' delinquency could not exert influence on adolescents' delinquency.

Understanding the Influence Process from a Developmental Perspective

The finding that the cross-lagged effect between adolescents' and their best friends' delinquency was moderated by personality types might be understood from a developmental perspective. Individual differences in adolescents' handling of peer influences can be viewed as a process of developing toward psychological maturation (Brechwald & Prinstein, 2011). A recent study has concluded that personality types mature in the direction of resiliency. Namely, resilients are considered as more mature than overcontrollers and undercontrollers (Meeus et al., 2011). Resilient adolescents are usually described as self-confident, having high social potency such as being decisive and fond of assuming leadership roles. These developments indicate high capacity of independent thinking and self-direct one's behavior in peer interaction, which is a reflection of autonomy maturity (Allen et al., 2006; Caspi & Silva, 1995; Hart et al., 1997). Resilients also have well-adjusted or adaptive profile during adolescent development, in particular, they are relatively free of psychological disorders such as anxiety and depression which are related to susceptibility to peer influence (Asendorpf et al., 2001; Cohen & Prinstein, 2006; Prinstein et al., 2001). In addition, resilients are advanced in their social skills development and thus interpersonally effective and well-liked by their peers, which in turn could provoke others to imitate their behaviors (Cohen & Prinstein, 2006; Prinstein & Cillessen, 2003). Therefore, their mature psychological status might make them more influential in their friendships.

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On the other hand, overcontrollers seem less advanced in their development, in terms of autonomy and adaptation to the environment. They are often described as having low self-esteem, being submissive and dependent (e.g., preferring others to take charge), indicating low autonomy maturation (Caspi & Silva, 1995; Hart et al., 1997). In addition, they are often less adaptive to environment and prone to high social anxiety and depressive symptoms which are related to high conformity to other's behavior (Asendorpf et al., 2001; Cohen & Prinstein, 2006; Prinstein et al., 2001). Thus, their relatively immature psychological status might explain their susceptibility to and inability to exert influence upon their best friends' delinquency.

As for resilients, a significant longitudinal effect on their best friends' delinquency was found for undercontrollers. Their ability to influence their best friends' delinquency could also be understood from a developmental perspective, although undercontrollers are relatively less mature and maladaptive in psychological function compared to resilients (e.g., react to their environment in an aggressive way, often are less sociable, and have difficult interpersonal relationships; Asendorpf et al., 2001). Specifically, undercontrollers distinguish themselves from overcontrollers and resilients with their significant higher level of delinquency. During

adolescence, delinquency may be regarded as a way to evidence independence or maturation (Moffitt, 1993). Hence, with their higher delinquency, undercontrollers might in fact become a “role model” in adolescence thus provoke their best friends to imitate their delinquent behaviors. Undercontrollers’ delinquency was not predicted by their best friends’ delinquency. This finding further suggests that undercontrollers’ high delinquency indeed might be only a source of influence rather than an outcome of susceptibility to pressure from their best friends. Undercontrollers are often described as impulsive and disruptive, which might account for their lower susceptibility to the influence of their best friends’ delinquent behavior (Caspi & Silva, 1995; Vitaro et al., 1997; Vitulano et al., 2010).

Although undercontrollers and resilients, in particular, may affect their friends’ behavior towards more delinquency, it should of course be noted that the longitudinal associations in the current study could also be interpreted the other way around. That is, lower levels of delinquency behavior may predict lower levels of best friends’ delinquency over time. An interesting question for future research is whether undercontrollers, who have higher levels of delinquency, have a more negative influence on their friends toward more delinquency and whether resilient adolescents, who have lower levels of delinquency, have a more positive influence toward fewer delinquent behaviors.

Adolescents’ personality and their best friends’ personality. We found that adolescents’ personality types were not related to their best friends’ personality types. This is an intriguing finding given the homophily process between them. Our finding might indicate that the homophily process applies only to what adolescents do together but not to who they are. This is also suggested by a study showing medium to high similarity between adolescents and their best friends in problem behaviors such as aggression and depression, but lower and often insignificant magnitudes of similarity in Big Five personality traits between adolescents and their best friends (Selfhout, Branje, Raaijmakers, & Meeus, 2007).

Limitations and Future Directions

Some limitations of this study should be noted:

First, although we were able to control for selection effects by distinguishing stable from non-stable friends, we were not able to examine selection effects. Future studies could examine whether individual personality types could also moderate the selection effect between adolescents and their best friends’ delinquency.

Second, the sample size did not enable us to investigate an interaction between adolescents’ and their best friends’ personality types on the delinquency development. Future studies could examine dyadic peer influence processes, based on combinations of personality types of adolescents and their friends.

Third, friendship characteristics like reciprocity may affect influence processes between

friends. However, the reciprocity of friendships at the initial wave were not related to the personality types of the target adolescents, it is unlikely that this variable accounts for the moderation effect of adolescents' personality types found in the current study.

Fourth, only adolescents' best friend was included in our study, which excluded other potentially influential contacts in the peer network. Recent research starts to assess influence processes in networks of multiple relationships while controlling for various selection effects (Kerr et al., 2012). However, the main goal of the current study was to examine the influence effects between adolescents and their best friends, and other friends' deviancy could not moderate the effect of best friends' deviancy on adolescents' delinquency (Vitaro, Brendgen, & Tremblay, 2000).

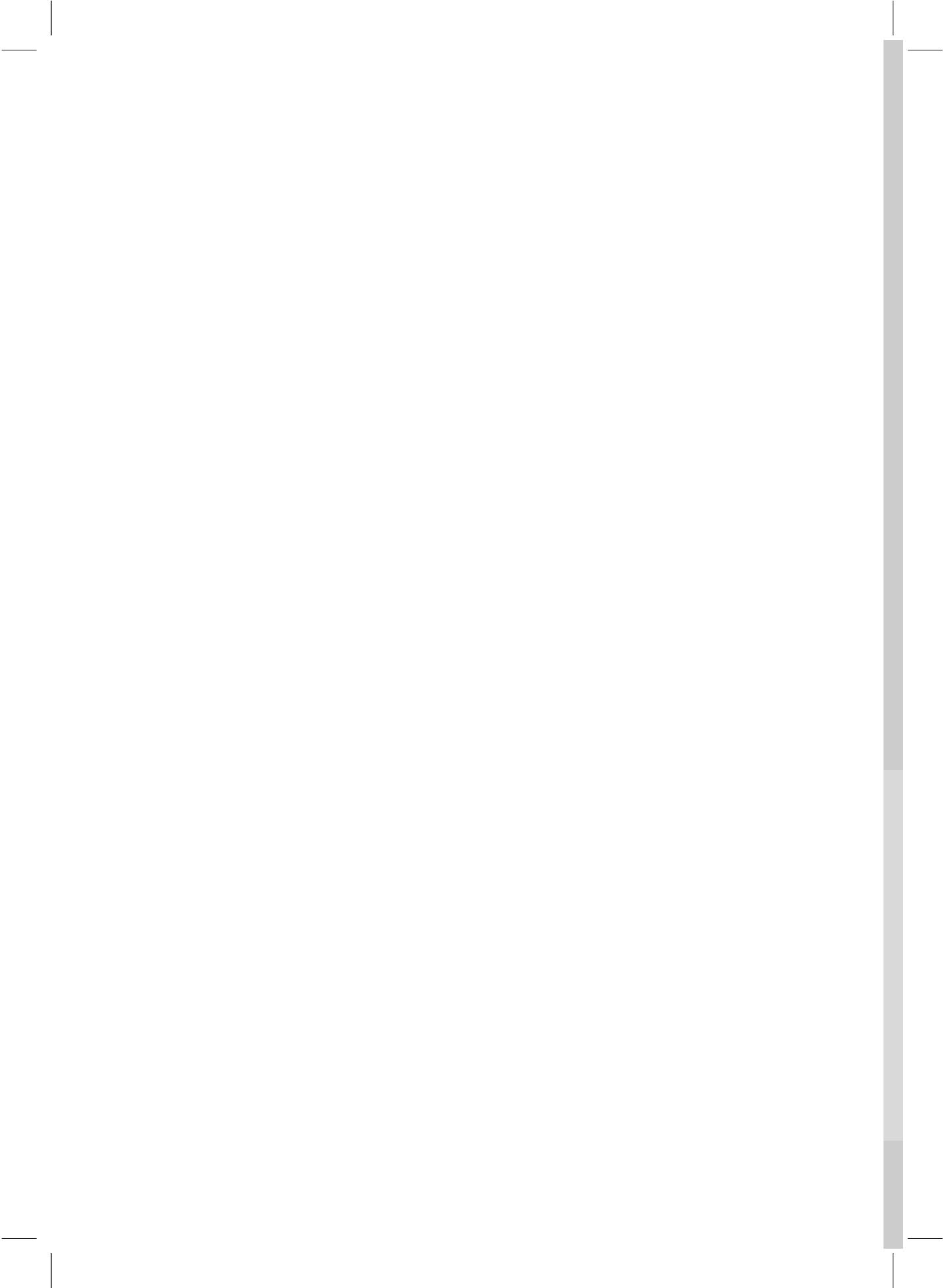
Fifth, in this study, we used the term influence as it is commonly used in the peer influence literature. However, we have to keep in mind that even though we found longitudinal associations between stable friends' delinquency, we cannot draw causal conclusions. Moreover, we have to be aware that possible third variables might also explain the over-time association between adolescents' and their best friends' delinquency.

Finally, we did not test our hypotheses with a variable-centered approach. Using all Big Five personality traits as moderators in one model would increase the complexity of the model by adding more interaction and direct effects of personality traits. We were limited by our sample size in testing such a model. Moreover, running five separate models with each Big Five personality trait as moderator would not have been informative of the moderating effect of a within-person personality structure. Future studies could endeavor to test our hypotheses with a variable-centered approach.

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6.5 CONCLUSIONS

Despite these limitations, this study is, to the best of our knowledge, the first attempt to investigate the moderating role of personality in the longitudinal association between adolescents' and their best friends' delinquency. Our findings suggest that personality types may partly determine the extent to which youths' engagement in different forms of delinquent behavior is shaped by, or is influential upon, their best friends' engagement in delinquent behavior. Findings also suggest that resilient and undercontrolling adolescents are more likely to influence their best friends' delinquent behavior, and overcontrolling adolescents are more likely to be influenced by their best friends' delinquent behavior. Furthermore, since we found that individuals who are susceptible to be influenced by their friends' delinquency did not influence their best friends, and vice versa, it might be that in friendship dyads, adolescents are not likely influencing and being influenced at the same time.





CHAPTER 7

Brief Report: How Adolescent Personality Moderates the Effect of Love History on the Present Romantic Relationship Quality?¹

¹ Yu, R., Branje, S., Keijsers, L., & Meeus, W. (2014). How adolescent personality moderates the effect of love history on the present romantic relationship quality. *Journal of Adolescence*. 37, 749-752.

ABSTRACT

This study examined the effect of previous romantic relationship involvement on later romantic relationship quality and tested whether adolescents' personality type (i.e., overcontrollers, undercontrollers, resilients) moderated this link. We answered our research questions in a sample of 320 Dutch participants (213 girls) who had a romantic relationship when they were 21 years old. At 12 years of age, their personality types were identified. At 21 years of age, participants reported their current romantic relationship quality (i.e., commitment, exploration, and reconsideration) and indicated the number of romantic relationships they had before. No main effects of the number of romantic relationships on current romantic relationship quality were found. There were significant interaction effects between personality types and the number of romantic relationships on romantic relationship quality. With more romantic relationship experiences, undercontrollers committed less to and explored less in their current romantic relationship. No such link was found for resilients and overcontrollers.

Keywords: overcontrollers, undercontrollers, resilients, romantic relationship experience, romantic relationship quality

7.1 INTRODUCTION

Although romantic relationship involvement is common during adolescence, it has been linked to both negative and positive developmental outcomes (e.g., depression, delinquency, self-confidence; Furman & Collins, 2009; Zimmer-Gembeck, Siebenbruner, & Collins, 2001). However, it is unknown for which adolescents romantic relationship involvement has negative or positive consequences. In this study, we examined the overall hypothesis that the developmental significance of involvement in romantic relationships might depend on individual personality characteristics (Furman & Collins, 2009).

More specifically, we focused on the quality of later romantic relationships as an outcome. A recent study showed that adolescents who dated fewer romantic partners during mid-adolescence had better romantic relationship quality in young adulthood (Madsen & Collins, 2011), suggesting that romantic relationship involvement in adolescence may have adverse effects on later relationship satisfaction. However, a risk group was studied and replicability of the results needs to be tested in other populations. More importantly, individuals' personality types (i.e., overcontrollers, undercontrollers, resilients; Block & Block, 1980) might moderate the effect of romantic relationship involvement on future romantic relationship quality. In particular, resilients are more capable to develop high-quality relationships than individuals with less resilient personalities such as undercontrollers and overcontrollers (Asendorpf, Borkenau, Ostendorf, & Van Aken, 2001). Moreover, dissolutions of relationships might have more negative effects for individuals who are less able to have a good relationship. Thus, individuals with a less resilient personality type might be more negatively influenced by their romantic relationship dissolutions. The current study tested the replicability of the negative link between romantic relationship involvement and later romantic relationship quality in a normal population and whether adolescent personality moderates the link.

7.2 METHOD

Participants and Procedure

Participants were 320 Dutch participants (213 girls) who had a romantic relationship when they were on average 21.35 years old ($SD = 0.54$). This sample was part of the younger cohort of an ongoing longitudinal study CONflict and Management of Relationships (CONAMORE; Meeus et al., 2010). The present study used data gathered when participants were at age 12 and 21.

Measures

Age 12 personality types. Adolescents rated their personality on the Quick Big Five

questionnaire (Goldberg, 1992; Vermulst & Gerris, 2005). Five personality dimensions: Extraversion, Agreeableness, Conscientiousness, Emotional stability, and Openness to new experience, were assessed with 6 items each, scored on 7-point Likert scales (from 1 = *very untrue* to 7 = *very true*). Cronbach's α s ranged from .75 to .86. An earlier study has revealed that three personality types can be constructed directly from the Big Five dimensions with a latent class analysis which is an advanced person-centered analytic strategy grouping individuals into classes (Meeus, Van der Schoot, Klimstra, & Branje, 2011; Nylund, Asparouhov, & Muthén, 2007). We adopted this classification from the larger study including our sample. In our sample, there were 151 overcontrollers, 29 undercontrollers, and 140 resilients. See Meeus et al., (2011) for mean scores on the Big Five dimensions for each personality type.

Age 21 relationship history and quality. *Number of relationships* was obtained by counting the frequency of starting a relationship as reported by participants in a Life History Calendar (LHC; Caspi et al., 1996). LHC is a data-collection method for obtaining reliable retrospective event-history data, which has shown good test-retest reliability and has been considered as an accurate measure of romantic relationship history (Caspi et al., 1996; Denissen, Asendorpf, & Van Aken, 2008).

Quality of intimate relationship was assessed with the Utrecht-Management of Identity Commitments Scale (U-MICS; Crocetti, Rubini, & Meeus, 2008). Participants rated their current romantic relationship commitment (e.g., My partner gives me certainty in life; 5 items, $\alpha = .91$), in-depth exploration (e.g., I tried a lot to learn about my partner; 5 items, $\alpha = .78$), and reconsideration (e.g., I often think another partner would make my life more interesting; 3 items, $\alpha = .94$). Likert-scale ranging from 1 (*strongly agree*) to 5 (*totally disagree*) was used and scores were reversely coded.

7.3 RESULTS

Overview of Participants' Romantic Experiences

On average the participants had 0.95 ($SD = 1.17$) romantic relationships before the current one. In particular, 146 (45.6%) reported having no prior relationship, 90 (28.1%) reported having had one, 57 (17.8%) reported having had two, and 27 (8.4%) reported having had three or more relationships. The frequency of prior romantic relationship was not different for boys or girls ($t [320] = 0.64, p = .52$), nor for youths with different personality types ($F [2, 319] = 0.71, p = .49$). In addition, there was no significant difference in the distribution of number of relationships by personality types ($\chi^2 [N = 320, 8] = 8.57, p = .74$). To answer our research questions, we conducted linear regression analyses in *Mplus* (Muthén & Muthén, 1998-2012) and used robust maximum likelihood (MLR; Satorra & Bentler, 2001) to take the non-normal

distribution of the data into account. Two dummy variables were used to compare personality types, with resilients as the reference group (see Table 7.1 for descriptive statistics and Table 7.2 for results). In addition, following up the significant interaction effects, sub-group analyses were conducted to examine the effects of number of prior romantic relationships on current romantic relationship quality for both resilient and non-resilient personality types.

Main Effects

The number of prior romantic relationships did not relate to current romantic relationship quality (i.e., commitment, exploration, and reconsideration), while controlling for gender and personality effects (See Table 7.2, Model 1). We found significant gender differences in the current relationship quality, with girls reported higher exploration and lower reconsideration than boys. Moreover, the three personality types did not differ in the three relationship quality measures.

Interaction Effects

There were significant interaction effects between personality types and number of romantic relationships on commitment and exploration, but not on reconsideration of the current romantic relationship (See Table 7.2, Model 2). Further, follow-up subgroup analyses by personality types indicated that undercontrollers' relationship commitment was negatively predicted by number of previous romantic relationships ($n = 29, \beta = -.47, p = .02$). No such link was found for resilients and overcontrollers ($n = 140, \beta = -.01, p = .95$ and $n = 151, \beta = -.02, p = .80$, respectively). Also, with more romantic relationship experiences, undercontrollers explored less ($n = 29, \beta = -.34, p = .02$) within their current relationship. No significant association was found for resilients ($n = 140, \beta = .15, p = .09$) and overcontrollers ($n = 151, \beta = .11, p = .17$).

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7.4 DISCUSSION

This study showed that, on average, there may be no link between number of previous relationships and later quality of romantic relationships as was found in a previous study (Madsen & Collins, 2011). However, findings also suggest that for some youths, romantic relationship involvement may have negative consequences: for undercontrollers, but not for overcontrollers and resilients, there were negative effects of prior romantic relationship involvement on later romantic relationship commitment and reconsideration.

The mechanism behind the deleterious effect of former romantic relationships for undercontrollers is not clear. One explanation may be that as undercontrollers' have higher conflict tendencies in romantic relationships than overcontrollers and resilients (Asendorpf et

Table 7.1 Descriptive Statistics and Intercorrelations among Number of Previous Romantic Relationships and Young Adults' Romantic Relationship Quality by Personality Types

Measure	Overcontrollers (n = 151)				Undercontrollers (n = 29)				Resilients (n = 140)						
	M (SD)	1	2	3	4	M (SD)	1	2	3	4	M (SD)	1	2	3	4
1. No. of Relations Before	0.94 (1.14)	—	-.01	.11	-.10	0.72 (1.07)	—	-.49**	-.49**	.34	1.01 (1.21)	—	.00	.18*	-.06
2. Commitment	4.16 (0.62)	—		.21**	-.38**	4.38 (0.73)	—		.74***	-.21	4.12 (0.65)	—	.44**	.49***	
3. Exploration	3.93 (0.58)	—		-.10		4.14 (0.84)	—		—	-.15	3.97 (0.58)	—		.19*	
4. Reconsideration	1.50 (0.82)	—				1.49 (0.99)	—		—	1.38 (0.62)	—				—

Note. M (SD) = mean (standard deviation); * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 7.2 Regression Analyses Summary for Number of Romantic Relationships and Personality Types in Adolescence Predicting Romantic Relationship Quality during Young Adulthood

Predictor	Relationship Commitment			Relationship Exploration			Relationship Reconsideration		
	B	SE (B)	β	B	SE (B)	β	B	SE (B)	β
Model 1									
Gender	0.11	0.08	.08	0.21	0.08	.16*	-0.18	0.09	-.11*
O vs. R	-0.05	0.08	-.04	-0.03	0.07	-.03	0.11	0.08	.07
U vs. R	0.17	0.14	.08	0.22	0.16	.10	0.07	0.19	.03
No. Relations	-0.04	0.04	-.05	0.04	0.03	.06	-0.03	0.04	-.04
Model 2									
Gender	0.08	0.08	.06	0.18	0.07	.14*	-0.15	0.09	-.09
O vs. R	-0.05	0.08	-.04	-0.03	0.07	-.03	0.11	0.08	.07
U vs. R	0.11	0.13	.05	0.13	0.14	.06	0.15	0.18	.06
No. Relations	0.00	0.05	-.01	0.08	0.05	.14†	-0.04	0.04	-.05
(O vs. R) * No. Relations	-0.01	0.08	-.01	-0.02	0.07	-.02	-0.05	0.08	-.04
(U vs. R) * No. Relations	-0.37	0.13	-.16*	-0.49	0.11	-.22***	0.36	0.23	.13

Note. B = unstandardized regression coefficient; SE = standard error; β = standardized regression coefficient; O = Overcontrollers; U = Undercontrollers; R = Resilients; † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

al., 2001), their higher levels of engagement in conflict might lead to more relationship failures which could erode their faith for a good future relationship. Another explanation maybe that since undercontrollers have a lower inhibition of emotional responses than others, they fall in love or show love sooner than others, which might lead to more hurts and disappointments when facing relationship break-ups. To understand the potential mechanisms behind the deleterious effect of former romantic relationships on undercontrollers' romantic relationship quality in young adulthood, future research should look into how romantic relationship quality in adolescence relates to personality.

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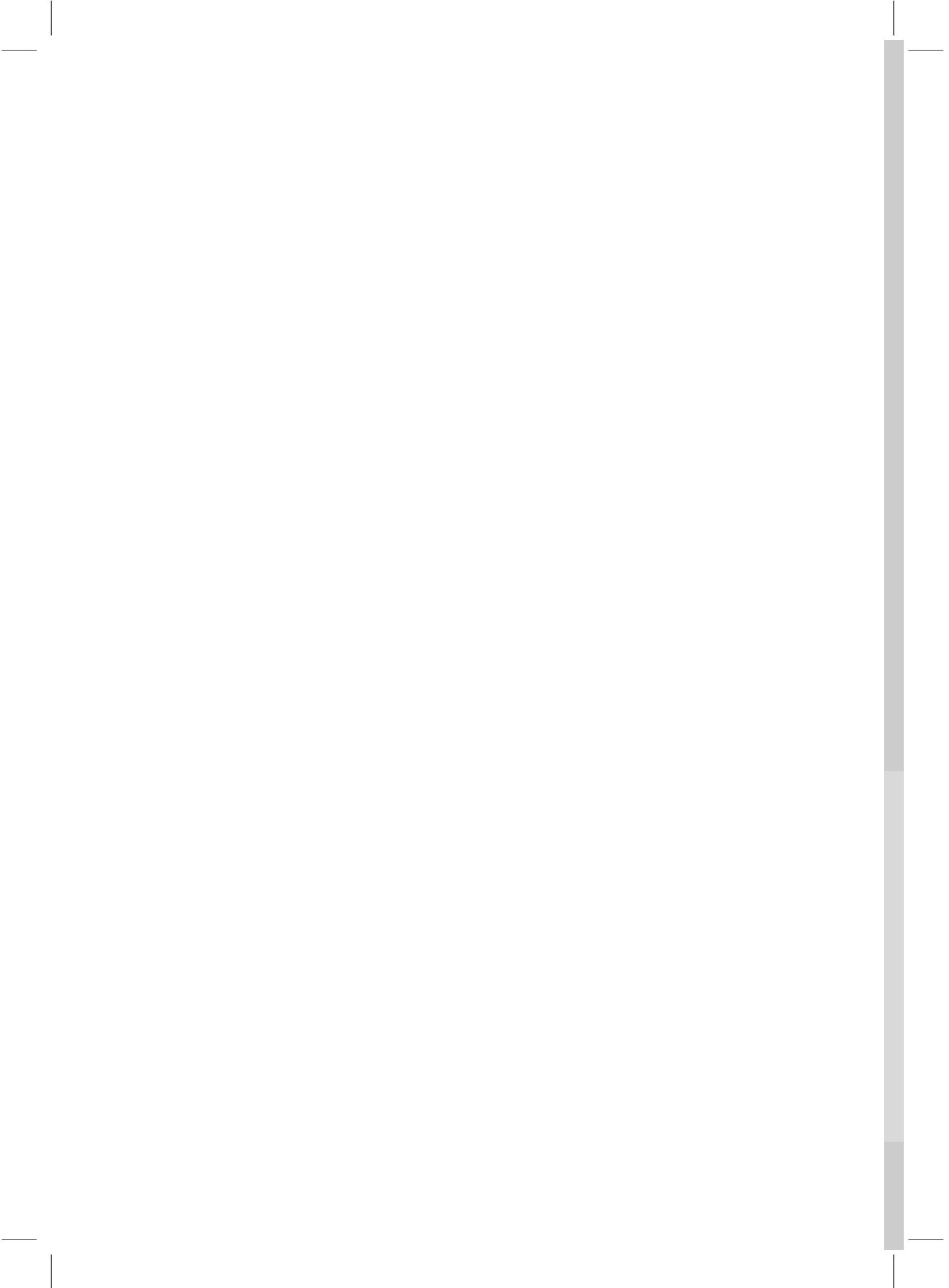
Although the profile of the Big Five for each of the type was similar to other studies, the distribution of personality types differed to some studies in the literature. For instance, Asendorpf and Van Aken (1999) reported having 28% overcontrollers in their sample whereas in our sample there were 47% overcontrollers. These variations might be due to a higher percentage of participants with high education levels in our study.

The current study reported a lower number of prior romantic relationships than some other studies (e.g., Connolly & McIsaac, 2009; Zimmer-Gembeck, Siebenbruner, & Collins, 2004). Probably this was due to measurement differences. In the study of Connolly and McIsaac

(2009), for instance, participants were asked to report on their total number of partners, which may involve serious relationships, but also more casual relationships. In the present study, participants were asked to fill in the dates of starting and ending of a relationship in the LHC, which makes it more likely that only serious relationships were reported.

Our study is the first to show that linkages between love history and current relationship quality are moderated by individuals' personality type. Undercontrollers in particular seem to experience the negative consequences of having more romantic relationships. Our results could be used to identify individuals who are especially vulnerable to the deleterious effects of romantic relationship history on future romantic relationship quality.







CHAPTER 8

Associations between Young Adult Romantic Relationship Quality and Problem Behaviors: An Examination of Personality-Environment Interactions¹

¹ Yu, R., Branje, S., Keijsers, L., & Meeus, W. (2013). Associations between young adult romantic relationship quality and problem behaviors: An examination of personality-environment interactions. *In Revision for Journal of Research in Personality*.

ABSTRACT

This longitudinal study examined person-environment interplay by testing interaction effects between adolescent personality type (i.e., overcontrollers, undercontrollers, and resilients) and young adult romantic relationship quality on young adult problem behaviors (i.e., delinquency and anxiety). The study employed six waves of longitudinal questionnaire data collected across ten years from Dutch youths who had a romantic relationship in young adulthood. We found some evidence for significant interaction effects between adolescent personality types and young adult romantic relationship quality in predicting young adult problem behaviors. Although negative interactions with romantic partner were significantly and positively linked to relative changes in anxiety symptoms for all youths, support from romantic partner was related to a relatively stronger decrease in anxiety symptoms in young adulthood for overcontrollers than for resilients. Moreover, although support from romantic partner was not related to relative changes in delinquency for all youths, higher negative interaction with romantic partner was related to a relative increase in delinquent behaviors for undercontrollers, while no such links emerged for overcontrollers and resilients. In conclusion, this study highlights the importance of considering the interplay between personality characteristics and environmental-relational factors when examining young adults' developmental outcomes.

Keywords: person-environment interaction, personality types, romantic relationships, anxiety, delinquency

8.1 INTRODUCTION

Personality characteristics may predispose individuals to certain problem behaviors, such as delinquency and anxiety (Caspi & Shiner, 2006; Tackett, 2006). Although these problem behaviors demonstrate considerable persistence over time, the potential for change may be heightened during emerging adulthood. This life phase may afford new contexts and roles, thereby allowing for turning points in developmental pathways (Arnett & Tanner, 2006). When individuals enter into adulthood, the quality of romantic relationships becomes very salient (Collins & Van Dulmen, 2006; Erikson, 1968; Rauer, Pettit, Lansford, Bates, & Dodge, 2013). Prior research has suggested that a high-quality romantic relationship might be linked to relative decreases in problem behaviors, such as antisocial behavior and emotional maladjustment (e.g., Meeus, Branje, Van der Valk, & De Wied, 2007; Roisman, Masten, Coatsworth, & Tellegen, 2004). However, there might be also personality differences in the association between quality of romantic relationships and relative changes in problem behaviors. An interactionist perspective would propose that individuals' developmental outcomes depend on the interplay between individual characteristics and environmental factors (Magnusson & Stattin, 2006). Thus, it is plausible that the interactions between personality characteristics and relational environment predict individuals' problem behavior pathways. Nevertheless, although interactions between personality and social relationships are frequently suggested in theories of individual development (e.g., Barber, 1992; Caspi, 2000; Magnusson & Stattin, 2006), relatively few empirical studies have been conducted in the context of romantic relationships. The present study tested the interaction effects between adolescent personality types and young adulthood romantic relationship quality on young adults' relative changes in delinquency and anxiety.

Personality Types and Problem Behaviors

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Personality types. Many studies have consistently distinguished three personality types: resilients, undercontrollers and overcontrollers (Caspi & Shiner, 2006; Robins, John, Caspi, & Moffitt, 1996). This typology is based on Block and Block's (1980) theory of ego-control and ego-resiliency. Ego-control refers to containing versus expressing emotional and motivational impulses, and ego-resiliency refers to the dynamic capacity of individuals to adjust their modal levels of ego-control, depending on environmental demands (Block & Block, 1980). Resilients are characterized by a high level of ego-resiliency and a medium level of ego-control. Overcontrollers and undercontrollers both have a low level of ego-resiliency, but differ on ego-control. Overcontrollers have a high level of ego-control and undercontrollers have a low level of ego-control (e.g., Robins et al., 1996). These three personality types have been consistently identified across cultures, ethnic groups, and ages using different methods (e.g., Asendorpf,

Borkenau, Ostendorf, & Van Aken, 2001; Caspi & Silva, 1995; Klimstra, Hale III, Raaijmakers, Branje, & Meeus, 2010).

Prior research has consistently shown that adolescents with these three personality types have different levels of problem behaviors. In general, resilients can respond adaptively and flexibly toward situational demands and are relatively free from problem behaviors, and thus are relatively well adjusted. Overcontrollers and undercontrollers, in contrast, exhibit little adaptive flexibility when encountering environmental challenges and are often considered as more maladjusted than resilients (Block & Block, 1980). In general, overcontrollers are more prone to internalizing problems such as anxiety, while undercontrollers exhibit higher risk of externalizing problems such as delinquency (e.g., Akse, Hale III, Engels, Raaijmakers, & Meeus, 2007; De Fruyt, Mervielde, & Van Leeuwen, 2002; Van Aken, Van Lieshout, Scholte, & Haselager, 2002; Van Leeuwen, Mervielde, Braet, & Bosmans, 2004).

Romantic Relationship and Problem Behaviors

Personality types are not the only factor important for understanding youths' problem behaviors. During young adulthood, romantic relationships become more salient (Collins & Van Dulmen, 2006) and, bonds to romantic partners may be linked to decreases in problem behaviors (Furman & Wehner, 1994; Laub & Sampson, 2001). Indeed, a good romantic relationship might provide an important source of support that may be associated with a relative decrease in individuals' insecure feelings such as anxiety. In contrast, negative interactions with a romantic partner could create frustration and hurt, resulting in anger and distrust, which may be associated with increased antisocial behavior (Larson, Clore, & Wood, 1999). At the same time, young adults that have been able to decrease their problem behaviors might be able to form high quality romantic relationships, characterized by high levels of support and low levels of negative interaction.

Empirical research has shown significant associations between quality of romantic relationships and problem behaviors. For instance, high attachment and support in a romantic relationship appears to be linked with decreases in youths' antisocial behaviors (Meeus, Branje, & Overbeek, 2004; Roisman et al., 2004; Sampson & Laub, 2005). In addition, higher support from a romantic partner proved to be associated with lower social anxiety (La Greca & Harrison, 2005) and high commitment in a romantic relationship in young adulthood was associated with a relative decrease in emotional adjustment (Meeus et al., 2007). In sum, these studies suggest that high-quality romantic relationships in early adulthood are associated with low levels and relative decreases in problem behaviors.

Adolescent Personality Types, Young Adulthood Romantic Relationship Quality, and Young Adults' Problem Behaviors

Apart from main effects that personality types and romantic relationship may have on young adults' problem behaviors, they may also reinforce each other through a developmental interplay. According to person-environment interaction theory, the interaction between individual characteristics (i.e., personality) and environment (i.e., romantic relationship) contributes to the development of individuals' problem behaviors (Barber, 1992; Caspi 2000; Magnusson & Stattin, 2006). In line with this theory, differential susceptibility theory (Belsky, 2004) proposes that environments might differently affect the development of youths with different personality characteristics. That is, some individuals are more susceptible to environmental influences than are others are.

Empirical research using a person-centered approach to personality, mostly cross-sectional in nature, supports this theoretical notion in the context of family and peer relationships. Specifically, undercontrollers with highly restrictive versus less restrictive parents showed greater differences in depressed affect and internalizing behaviors than did resilients and overcontrollers (Dubas, Gerris, Janssens, & Vermulst, 2002). Another study reported that parents of undercontrollers rated their children as significantly higher on externalizing behavior than parents of resilients, with the greatest difference occurring for undercontrollers exposed to high levels of negative parental control. However, the difference in externalizing behavior between undercontrollers and resilients faded when the level of negative parental control was low. In addition, parents of overcontrollers rated their children significantly higher on internalizing behavior than did parents of resilients, with overcontrollers in negative control families showing the highest levels of internalizing problem behavior. However, high or low negative parental control did not make a difference for the resilients (Van Leeuwen et al., 2004). Further, the positive associations between family and peer coercion and both internalizing and externalizing problem behaviors were stronger for undercontrollers than for overcontrollers and resilients (Van Aken & Dubas, 2004). The same study reported that the effects of family and peer support on internalizing and externalizing problem behaviors were stronger for overcontrollers than for undercontrollers and resilients (Van Aken & Dubas, 2004).

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Interaction effects between personality types and parent-child relationships on developmental outcomes have not appeared in all existing studies, however. In the studies by Dubas et al. (2002) and Van Leeuwen et al. (2004), cross-sectional examinations showed no interaction effects between personality types and positive parental control on problem behaviors. Moreover, a longitudinal study showed that personality types only moderated the initial association between mother-child relationship quality and adolescent depressive symptoms, with stronger associations for overcontrollers and undercontrollers than for resilients. Personality types did not moderate the initial associations between father-child

relationship quality and depressive symptoms, the overtime associations between mother-child relationship quality and depressive symptoms, or the links between father-child relationship quality and depressive symptoms (Branje, Hale III, Frijns & Meeus, 2010).

Taken together, the majority of studies regarding personality-environment interaction in family and peer contexts suggest that adolescents low in resiliency are generally more vulnerable to negative relational environments than those who are high in resiliency. Prior research suggests that the associations between both internalizing and externalizing problem behaviors and family or peer coercion and control are generally stronger for undercontrollers than for the other personality types. For overcontrollers, findings are more mixed. The effects of negative parental control on problem behaviors were stronger for overcontrollers than for resilients in Van Aken and Dubas' (2004) and Van Leeuwen et al.' (2004) studies, but not in the Dubas et al. (2002) study.

Although the personality-environment interaction perspective has received some empirical support in family and peer contexts, it has been understudied in the context of romantic relationships. There has been no person-centered research on personality-romantic relationship interactions, although variable-centered research has provided some support for undercontrollers' higher sensitivity to environmental contexts with regard to externalizing problem behaviors. For instance, one study showed that a better romantic relationship, higher cohesiveness, intimacy, and shared interests predicted a larger decrease in delinquent behavior in young adulthood, particularly for individuals with low self-control (Wright, Caspi, Moffitt, & Silva, 2001). In addition, negative associations between romantic involvement and antisocial behaviors were stronger for those with pre-existing antisocial behaviors and personality traits of impulsivity and thrill seeking (Eklund, Kerr, & Stattin, 2010; Roisman et al., 2004). Among individuals with different personality types, undercontrollers in particular lack control of their emotional and behavioral impulses, and generally score the highest on delinquent and antisocial behaviors (e.g., Asendorpf et al., 2001; Hart, Hofmann, Edelstein, & Keller, 1997). Hence, it is plausible that the association between quality of romantic relationships and delinquency is stronger for undercontrollers than for overcontrollers and resilients. The present study will test this hypothesis using a person-centered approach.

Overcontrollers, in contrast, are particularly prone to anxiety symptoms (Akse et al., 2007; De Fruyt et al., 2002), and they may therefore exhibit a stronger susceptibility to environmental contexts when it comes to the development of internalizing problems. We therefore expect that, for overcontrollers, the associations between quality of romantic relationships and anxiety symptoms are stronger than for undercontrollers and resilients. To the best of our knowledge, no previous studies have empirically examined this hypothesis.

The Present Study

In sum, the aim of the current study was to examine personality-environment interaction effects in predicting youth problem behaviors, using a person-centered approach to personality. We investigated interaction effects between adolescent personality types (i.e., overcontrollers, undercontrollers, and resilients) and quality of young adult romantic relationships (i.e., perceived support and negative interaction) on young adults' delinquent behaviors and anxiety symptoms. We expect significant personality type-romantic relationship interaction effects on youths' problem behaviors, with overcontrollers' and undercontrollers' problem behaviors more strongly associated with their romantic relationship quality than resilients'.

8.2 METHOD

Participants

Participants were 523 Dutch youths who had a romantic relationship during young adulthood. They were part of the ongoing CONflict and Management of RElationships longitudinal study (CONAMORE; Meeus et al., 2010), which in total consists of 1313 participants divided into two age cohorts. To date, they have been participating for ten years. The younger cohort has been followed from 12 to 21 years ($n = 923$), and the older cohort has been followed from 16 to 25 years ($n = 390$). For the current study, we used data from the first measurements (i.e., Wave 1 to Wave 5), collected annually from 2001 to 2005, and data from the sixth measurement (i.e., Wave 6), collected in 2010. Since the aim of the current study was to examine the interaction effects between adolescent personality types and romantic relationship quality in young adulthood, only participants who reported on their romantic relationship quality at Wave 6 were included ($N = 523$). That is, 343 participants (65.6%; 227 girls [66.2%]) out of the initial 923 participants from the younger cohort, and 180 participants (34.4%; 111 girls [61.7%]) out of the initial 390 participants from the older cohort were included. The mean ages of these subsamples at Wave 1 were 12.36 years ($SD = 0.57$) for the younger cohort and 16.59 years ($SD = 0.74$) for the older cohort. The ethnic compositions were 91.8% Dutch and 9.2% ethnic minorities.

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Procedure

We included participants from 12 randomly selected high schools in the province of Utrecht, The Netherlands. We sent participants and their parents an invitation letter, describing the research project and goals, and giving the option of not participating in the study. Confidentiality of participants' responses was assured explicitly before participation. More than 99% of the approached adolescents at these schools decided to participate in our study.

From Wave 1 to Wave 5, our participants annually filled out various questionnaires at school after school hours. Participants who were not present at school during measurement of Wave 1 to Wave 5 and participants at Wave 6 filled out the questionnaires at their homes. Trained assistants gave verbal instructions to participants in addition to written instructions in the questionnaires. Participants received €10 (approximately US \$13) from Wave 1 to Wave 5 and €30 (approximately US \$39) at Wave 6 as a reward for their participation.

Measure

Adolescents' personality types. Adolescents' personality was assessed annually in the first five measurements with the Quick Big Five questionnaire (Goldberg, 1992; Vermulst & Gerris, 2005). Thirty personality markers were used to assess five personality dimensions (each with 6 items): Extraversion (e.g., "talkative"), Agreeableness (e.g., "sympathetic"), Conscientiousness (e.g., "systematic"), Emotional stability (e.g., "worried", reverse-scored), and Openness to experience (e.g., "creative"). Adolescents reported on their personality on a 7-point Likert scale ranging from 1 (*very untrue*) to 7 (*very true*). Psychometric properties of this scale are good (e.g., Branje, Van Lieshout, & Gerris, 2007). In the present study, across Wave 1 to Wave 5, Cronbach's alphas ranged from .80 to .87 for Extraversion, from .81 to .87 for Agreeableness, from .85 to .90 for Conscientiousness, from .80 to .83 for Emotional stability, and from .75 to .77 for Openness to experience. Prior studies have shown that Block and Block's (1980) three personality types (i.e., overcontrollers, undercontrollers, and resilients) can be constructed directly from the Big Five dimensions (Robins et al., 1996; Klimstra et al., 2010; Meeus, Van de Schoot, Klimstra, & Branje, 2011). An earlier study constructed personality types with Latent Class Growth Analysis (LCGA; Nagin, 2005) on the original 1313 cases, including the current sample (Branje et al., 2010). Therefore, in the current research, we adopted that study's classification of personality types. In our sample, there were 176 overcontrollers, 131 undercontrollers, and 212 resilients. There were no age cohort differences in number of adolescents classified as overcontrollers, undercontrollers, and resilients ($\chi^2 [N = 523, 2] = 2.91, p = .23, \phi = .08$). Compared to boys, girls were more likely to be classified as overcontrollers ($\chi^2 [N = 523, 1] = 10.03, p = .00, \phi = .14$), and less likely to be classified as undercontrollers ($\chi^2 [N = 523, 1] = -15.05, p = .00, \phi = .17$).

Romantic relationship quality. Participants' romantic relationship quality during young adulthood (i.e., the sixth measurement) was assessed with the Network of Relationships Inventory (NRI; Furman & Buhrmester, 1992). This inventory measures participants' perceptions of support from, and negative interaction with, their romantic partner. Support was assessed with twelve items tapping into instrumental aid and reliable alliance in romantic relationships. A sample item was "How often do you turn to this person for support with personal problems?" Negative interaction was measured with six items tapping conflict and

antagonism. A sample item was “How much do you and this person get upset with or mad at each other?” Participants reported their romantic relationship quality on a 5-point Likert scale, ranging from 1 (*never*) to 5 (*always*). The NRI has good predictive, factorial, and construct validity (Furman, 1996). In the current study, Cronbach’s alphas were .91 for perceived support from romantic partner and .90 for negative interaction with romantic partner.

Delinquent behaviors. Youths’ delinquent behaviors were assessed in all six measurements with a self-report questionnaire measuring the frequency of minor offences (Baerveldt, Van Rossem, & Vermande, 2003). Youths reported on how many times they had committed 14 minor offences in the past year, such as stealing a bike and deliberately damaging or breaking something in the street. The items were scored on a four-point scale, ranging from 0 (*never*) to 3 (*four times or more*). The use of self-report instruments is widespread in criminology, and it is a valid measure when restricted to minor offences (Baerveldt, 2000). In the current study, the Cronbach’s alphas of the scale from Wave 1 to Wave 6 were good, ranging from .82 to .87.

Anxiety disorder symptoms. Anxiety disorder symptoms were measured in all six measurement waves, by the Dutch version of the original 38-item Screen for Child Anxiety Related Emotional Disorders (SCARED; Birmaher et al., 1997; Hale III, Raaijmakers, Muris, & Meeus, 2005). The SCARED taps into five dimensions of anxiety disorder, including generalized anxiety disorder, panic disorder, separation anxiety disorder, social anxiety disorder, and school anxiety symptoms. Psychometric properties of the SCARED have shown to be good in several studies (Birmaher, Brent, Chiappetta, Bridge, Monga, & Baugher, 1999; Hale III, Crocetti, Raaijmakers, & Meeus, 2011). In the current study, the Cronbach’s alphas of the scale from Wave 1 to Wave 6 were good, ranging from .91 to .94.

Statistical Analyses

We conducted multiple regression analyses to answer our research questions. Separate models for young adulthood delinquency and anxiety were examined. Before the examinations of interaction effects, we assessed the main effects of adolescent personality types and young adult romantic relationship quality on young adult problem behaviors. In the regression models, we included independent variables adolescent personality types and young adult romantic relationship quality. The three personality types were represented by two dummy variables. In the analyses with delinquency as the dependent variable, we adopted dummy variables with undercontrollers as a reference category (i.e., undercontrollers vs. overcontrollers and undercontrollers vs. resilients). In the analyses with anxiety as the dependent variable, we adopted dummy variables with overcontrollers as a reference category (i.e., overcontrollers vs. undercontrollers and overcontrollers vs. resilients). These choices were based on prior research showing that overcontrollers scored the highest in anxiety and undercontrollers scored the highest in delinquency among the three personality types (Asendorpf et al., 2001;

De Fruyt et al., 2002; Van Leeuwen et al., 2004). In addition, young adult romantic relationship quality includes perceived support from and negative interaction with romantic partner. As these two dimensions represent independent domains of romantic relationship quality (Laursen & Mooney, 2008), the effects of these two dimensions were estimated in separate models. Thus, in total we ran four models to examine the main effects: two on delinquency and two on anxiety, with separate models for the effects of support and negative interaction. After examining the main effects, we tested the interaction effects by subsequently including personality type \times quality of romantic relationship interactions into the existing regression models. Hence, another four models were conducted. In all models, we controlled for mean levels of adolescent problem behaviors (i.e., delinquency or anxiety) across Wave 1 to Wave 5, to predict the *relative changes* in problem behaviors from adolescence to young adulthood (i.e., between Wave 5 and Wave 6 five-year's time lag). Moreover, cohort and gender differences were controlled across models, by including them as covariates in the model. All regression analyses were conducted within *Mplus 7.0* (Muthén & Muthén, 1998-2012). We adopted a robust maximum likelihood estimator (MLR; Satorra & Bentler, 2001) to take the non-normal distribution of the data into account.

8.3 RESULTS

Table 8.1 presents the means and standard deviations of adolescent and young adult problem behaviors and young adult romantic relation quality for each adolescent personality type (i.e., overcontrollers, undercontrollers, and resilients). T-tests revealed significant differences between adolescent personality types in youths' delinquency and anxiety in adolescence and young adulthood. Specifically, overcontrolling adolescents scored the highest in anxiety symptoms in both adolescence and early adulthood. Moreover, undercontrolling adolescents scored significantly higher in delinquency in both adolescence and early adulthood, while no significant differences appeared among overcontrolling and resilient adolescents. Further, t-tests indicated that adolescents with different personality types did not differ significantly in perceived support or negative interactions in romantic relationships in young adulthood. Table 8.1 also presents the intercorrelations among adolescent delinquency, adolescent anxiety symptoms, perceived support and negative interaction in young adult romantic relationships, and delinquency and anxiety symptoms in young adulthood.

Main Effects of Adolescent Personality Types and Young Adulthood Romantic Relationship Quality on Young Adults' Delinquent Behaviors

We examined the main effects of personality types and young adulthood romantic relationship

Table 8.1 Descriptive Statistics and Intercorrelations among Problem Behaviors in Adolescence, and Quality of Romantic Relationships and Problem Behaviors in Young Adulthood

Measure	M (SD)						Correlations		
	Overcontrollers	Undercontrollers	Resilients	1	2	3	4	5	6
1. Adolescent Delinquency	1.11 ^b (0.19)	1.21 ^a (0.32)	1.12 ^b (0.21)	—	.01	-.04	.09	.50**	-.07
2. Adolescent Anxiety	1.42 ^a (0.23)	1.26 ^b (0.18)	1.21 ^c (0.14)	—	-.01	.16**	.06	.63**	
3. Support	3.87 ^a (0.57)	3.87 ^a (0.57)	3.95 ^a (0.58)	—	—	-.24**	-.08	-.12**	
4. Negative Interaction	1.53 ^a (0.51)	1.53 ^a (0.49)	1.45 ^a (0.48)	—	—	.18**	.28**		
5. Young Adult Delinquency	1.04 ^b (0.11)	1.11 ^a (0.28)	1.06 ^b (0.15)	—	—	.08			
6. Young Adult Anxiety	1.36 ^a (0.28)	1.24 ^b (0.24)	1.19 ^b (0.19)	—	—	—	—	—	

Note. *M (SD)* = mean (standard deviation). Within a row, different superscripted alphabetical letters indicate significant differences ($p < .05$) between resilients, undercontrollers, and overcontrollers in mean levels of problem behaviors in adolescence and in perceived quality of romantic relationships and problem behaviors in young adulthood.

quality on young adult problem behaviors, controlling for effects of problem behaviors in adolescence, age cohort, and gender. In the two models predicting young adulthood delinquency, the only significant predictor was delinquency level in adolescence ($N = 523/519$, $\beta_s = .48$, $ps < .00$). The sample sizes differed across models, because 523 youths filled out the romantic relationship support scale and 519 filled out the romantic relationship negative interaction scale. Adolescent personality types did not predict the relative changes in delinquency from adolescence to young adulthood (i.e., overcontrollers vs. undercontrollers [$N = 523/519$, β_s ranged from $-.08$ to $-.09$, $ps > .05$]; resilients vs. undercontrollers [$N = 523/519$, β_s ranged from $-.04$ to $-.05$, $ps > .05$]).

In addition, young adult romantic relationship quality did not significantly relate to the relative changes in delinquency (i.e., support [$N = 523$, $\beta = -.06$, $p > .05$]; negative interaction [$N = 519$, $\beta = .14$, $p > .05$]). Adolescent personality types and young adult romantic relationship quality were not significantly related to relative changes in delinquency from adolescence to young adulthood, above and beyond the significant stability in adolescent delinquency.

Main Effects of Adolescent Personality Types and Young Adulthood Romantic Relationship Quality on Young Adults' Anxiety Symptoms

In the models predicting young adulthood anxiety symptoms, significant predictors were: level of anxiety symptoms in adolescence ($N = 523/519$, β_s ranged from $.56$ to $.58$, $ps < .05$), young adult romantic relationship quality (i.e., support [$N = 523$, $\beta = -.13$, $p < .00$], negative interaction [$N = 519$, $\beta = .20$, $p < .00$], and gender (girls vs. boys; $N = 523/519$, β_s ranged from $.12$ to $.13$, $ps < .00$). Adolescent personality types did not predict the relative changes in anxiety symptoms from adolescence to young adulthood (i.e., undercontrollers vs. overcontrollers [$N = 523/519$, β_s ranged from $-.01$ to $-.00$, $ps > .05$]; resilients vs. overcontrollers [$N = 523/519$, β_s ranged from $-.03$ to $-.04$, $ps > .05$]). Hence, adolescent anxiety symptoms predicted young adult anxiety symptoms. Moreover, both perceived support and negative interaction in young adult romantic relationships, but not adolescent personality types, were significantly related to relative changes in anxiety symptoms from adolescence to young adulthood.

Interaction Effects between Adolescent Personality Types and Young Adult Romantic Relationship Quality on Young Adults' Delinquent Behaviors

Table 8.2 presents the results of the interaction effects between adolescent personality types and young adulthood romantic relationship quality on young adulthood delinquent behaviors, while controlling for the effects of age cohort, gender, and adolescent delinquency. In the models linking support from romantic partners with young adult delinquent behaviors, we did not observe significant interaction effects between adolescent personality types and young

Table 8.2 Interaction Effects between Adolescent Personality Types and Young Adult Romantic Relationship Quality on Young Adults' Delinquency

Young Adult Delinquency						
	B (SE)	β	R ²		B (SE)	β
			.28			.33
Age cohort	-0.02 (0.01)	-.05		Age cohort	-0.02 (0.01)	-.06
Gender	-0.01 (0.02)	-.02		Gender	-0.01 (0.02)	-.03
A. Delinquency	0.38 (0.06)	.49***		A. Delinquency	0.36 (0.05)	.46***
O vs. U	-0.03 (0.03)	-.08		O vs. U	-0.03 (0.02)	-.07
R vs. U	-0.02 (0.02)	-.05		R vs. U	-0.01 (0.02)	-.03
Support	-0.02 (0.03)	-.13		Neg. Int.	0.10 (0.05)	.52*
(O vs. U) * Support	0.02 (0.03)	.07		(O vs. U) * Neg. Int.	-0.10 (0.05)	-.31*
(R vs. U) * Support	0.01 (0.03)	.05		(R vs. U) * Neg. Int.	-0.09 (0.05)	-.31*

Note. O vs. U = overcontrollers compared to undercontrollers; R vs. U = resilients compared to undercontrollers. SE = standard error. A. Delinquency = Adolescent delinquency mean score across Wave 1 to 5. Neg. Int. = Negative Interaction

Table 8.3 Interaction Effects between Adolescent Personality Types and Young Adult Romantic Relationship Quality on Young Adults' Anxiety

Young Adult Anxiety						
	B (SE)	β	R ²		B (SE)	β
			.43			.42
Age cohort	0.01 (0.02)	.02		Age cohort	0.01 (0.02)	.01
Gender	0.06 (0.02)	.12***		Gender	0.07 (0.02)	.13***
A. Anxiety	0.72 (0.05)	.59***		A. Anxiety	0.67 (0.05)	.55***
U vs. O	0.00 (0.02)	.00		U vs. O	-0.01 (0.02)	-.01
R vs. O	-0.01 (0.02)	-.04		R vs. O	-0.02 (0.02)	-.03
Support	-0.07 (0.02)	-.27***		Neg. Int.	0.05 (0.02)	.19**
(U vs. O) * Support	0.03 (0.03)	.06		(U vs. O) * Neg. Int.	0.02 (0.03)	.03
(R vs. O) * Support	0.06 (0.02)	.16**		(R vs. O) * Neg. Int.	-0.01 (0.02)	-.01

Note. U vs. O = undercontrollers compared to overcontrollers; R vs. O = resilients compared to overcontrollers. SE = standard error. A. Anxiety = Adolescent anxiety mean score across Wave 1 to 5. Neg. Int. = Negative Interaction.

adulthood romantic support in predicting young adult delinquency. That is, the magnitude of associations between perceived support in romantic relationships and relative changes in delinquency was not significant for all youths, regardless of their personality types. A different pattern emerged in models linking negative interactions with romantic partners and young

adult delinquent behaviors; there were significant interaction effects between adolescent personality types (i.e., overcontrollers vs. undercontrollers; resilients vs. undercontrollers) and young adult romantic negative interactions in predicting young adult delinquency ($N = 519$, $\beta_s = .31$, $p < .05$). For undercontrollers, the link between negative interaction in romantic relationships and relative changes in delinquency was stronger than for overcontrollers and also stronger than for resilients. Follow-up simple slope analyses indicated that undercontrollers' higher negative interaction with their romantic partner was significantly associated with a stronger relative increase in delinquency level ($n = 131$, $\beta = .33$, $p = .04$). For overcontrollers and resilients, this association was not found ($n = 176$, $\beta = .04$, $p = .58$ and $n = 212$, $\beta = .03$, $p = .48$, respectively). Overall, we found that the magnitude of the associations between negative interaction with romantic partner and delinquency were significantly stronger for undercontrollers than for overcontrollers and resilients.

Interaction Effects between Adolescent Personality Types and Young Adult Romantic Relationship Quality on Young Adults' Anxiety Symptoms

Regarding the prediction of young adults' anxiety symptoms, the main effect of support on the relative changes in anxiety was qualified by a significant interaction effect between adolescent personality types (i.e., resilients vs. overcontrollers) and young adult romantic relationship support in predicting young adults' anxiety symptoms ($N = 523$, $\beta = .16$, $p = .01$; See Table 8.3). For overcontrollers, the association between perceived support and relative changes in anxiety symptoms was stronger than for resilients, but was not significantly different from that for undercontrollers. Follow-up simple slope analyses indicated that, for overcontrollers, higher perceived support from romantic partner was significantly linked to a stronger relative decrease in their anxiety symptoms ($n = 177$, $\beta = -.22$, $p = .00$). Such a linkage was not found for resilients ($n = 215$, $\beta = -.07$, $p = .32$). For undercontrollers, the link between perceived support in romantic relationships and relative changes in anxiety was not significant ($n = 131$, $\beta = -.13$, $p = .11$), although this association was not significantly different from that for overcontrollers. Overall, we found that the magnitude of the relations between perceived support from romantic partner and relative changes in anxiety symptoms were significantly stronger for overcontrollers than for resilients, but not significantly different between overcontrollers and undercontrollers.

In contrast to the significant interaction effects between adolescent personality types and perceived romantic support, we did not observe any significant interaction effects between adolescent personality types and negative interaction in young adult romantic relationships on the relative changes in anxiety symptoms from adolescence to young adulthood. That is, the magnitude of the positive associations between perceived negative interaction in romantic relationships and relative increases in anxiety symptoms was equally strong and positive for youths with different personality types.

8.4 DISCUSSION

In this study, we examined interaction effects between adolescent personality types and young adulthood romantic relationship quality on young adults' anxiety symptoms and delinquent behaviors. Before studying interaction effects, we examined the effects of adolescent personality types and young adult romantic relationship quality on young adult problem behaviors. Adolescent personality types were significantly related to the mean levels of, but not the relative changes in, problem behaviors from adolescence to young adulthood. In predicting young adult delinquency, support from romantic partner was not related to relative changes in delinquency in youths' delinquency, regardless of personality type. However, higher negative interaction with romantic partner was related to a stronger relative increase in delinquent behaviors for undercontrollers, while no such links emerged for overcontrollers and resilients. In predicting anxiety, negative interaction with romantic partner was significantly and positively related to relative changes in anxiety symptoms for all youths, regardless of personality types. Support from romantic partner was related to decreased anxiety symptoms only for overcontrollers.

Adolescents with different personality types differed in the mean levels of anxiety symptoms and delinquent behaviors. During both adolescence and young adulthood, overcontrolling adolescents had the highest mean score in anxiety symptoms and undercontrolling adolescents had the highest mean level in delinquency. These findings are consistent with previous studies (e.g., Donnellan & Robins, 2010; Scholte, Van Lieshout, De Wit, & Van Aken, 2005). However, although we replicated previous findings of personality differences in the mean levels of anxiety and delinquency, the current study revealed that the three personality types did not differ in the relative changes of these problem behaviors from adolescence to young adulthood. These findings suggest stable associations between personality types and anxiety and delinquency, respectively. That is, the differences in levels of delinquency and anxiety between personality types are comparable from adolescence to young adulthood.

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However, when it comes to persistence of problem behaviors from adolescence to young adulthood, person-environment interactions seem play a role. Although not all interaction effects were significant, we found some evidence for significant interaction effects between adolescent personality types and young adult romantic relationship quality in predicting young adult problem behaviors. Mainly among overcontrollers, perceived support from romantic partner was linked to relative decreases in anxiety symptoms from adolescence to young adulthood. Moreover, only for undercontrollers, we found a relation between negative interaction with romantic partner and relative increases in delinquent behaviors from adolescence to young adulthood. These interaction effects between personality and

romantic relationship are in accordance with prior studies in family and peer contexts, showing adjustments of individuals low in resiliency were generally more strongly associated with their relational environments such as parenting practice and quality of family and peer relationships (Dubas et al., 2002; O'Connor & Dvorak, 2001; Van Aken & Dubas, 2004). Our findings provide further support for the differential susceptibility theory in the context of romantic relationships. That is, developmental outcomes of individuals with different personality characteristics were differentially associated with quality of romantic relationships.

Overcontrollers' and undercontrollers' higher susceptibilities to romantic relationship quality might be due to their typical vulnerability, namely inflexible and heightened reactivity towards environments. More specifically, their rigid, reactive tendencies and the dynamic features of romantic relationships may create a mismatch between the person and the environment. Person-environment mismatch can be stressful and might exacerbate problem behaviors to which individuals are prone. Overcontrollers are vulnerable for anxiety symptoms and undercontrollers for delinquent behaviors. Therefore, overcontrollers' relative changes in anxiety symptoms and undercontrollers' relative changes in delinquent behaviors were associated with their perceived romantic relationship quality. In addition, their greater susceptibility might be due to their heightened reactivity towards environments (Pluess & Belsky, 2009). Overcontrollers and undercontrollers are relatively extreme in their responses to the world around them. Overcontrollers' over-inhibited responses and undercontrollers' over-impulsive reactions to their relationships might lead them not only to become easily overwhelmed in relatively modest environments, but also to benefit disproportionately from care in supportive environments that enable them to regulate their proneness to distress.

In addition to the tendency of overcontrollers and undercontrollers to respond to environmental challenges with their own prototypical problem behaviors, we also found that developmental outcomes of individuals with certain personality types were more strongly associated with particular characteristics of romantic relationships. Compared to resilients, overcontrollers' relative decreases in anxiety symptoms were more strongly linked to perceived support from romantic partner, but were not more strongly linked to perceived negative interactions. Perhaps, as also suggested in another study on family and friends (Van Aken & Dubas, 2004), support from, but not negative interaction (i.e., coercion) with, important others is more relevant for overcontrollers than for others.

A differential pattern was evident for undercontrollers. Compared to overcontrollers and resilients, undercontrollers' relative increases in delinquency were more strongly associated with negative interaction in romantic relationships, but were not more strongly linked to perceived support. This is in agreement with findings from several studies indicating that undercontrollers, maybe due to their disruptive and aggressive characteristics, might be particularly more sensitive to the coercive elements of their social relationships (Dubas et al.,

2002, Van Aken & Dubas, 2004; Van Leeuwen et al., 2004). These findings add to the literature that often focuses on relationships with parents and peers, by demonstrating similar effects in romantic relationships. However, the mechanism behind these personality types' differential sensitivities to different elements of relationship quality is not yet clear. In addition, it is not clear why the three personality types showed equal associations between individuals' relative changes in delinquency and perceived support from romantic partner, as well as equal associations between individuals' relative changes in anxiety and perceived negative interaction in romantic relationships.

Finally, we noticed that the significant effects of perceived negative interaction with romantic partner on problem behaviors occurred more frequently than significant effects of perceived support from romantic partner. Among the associations between perceived support from romantic partner and anxiety or delinquent behaviors by three personality types, only one of the six associations was significant. That is, perceived romantic support was related only to overcontrollers' relative changes in anxiety symptoms. However, the associations between negative interaction with romantic partner and the relative changes in anxiety symptoms were equally significant for three personality types. Moreover, negative interaction with romantic partner was significantly linked to undercontrollers' relative changes in delinquency. Thus, four out of six associations were significant. The reason for this difference might be that negatively-valenced interaction is more likely to be associated with negatively-valenced behaviors such as anxiety and delinquency. If the developmental outcomes are positive behaviors instead of problem behaviors, perceived support that represents the positive side of a relationship might be more frequently associated with positive developmental outcomes. Future studies are encouraged to explore this possibility.

Limitations and Strengths

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Some limitations of the current study need to be considered. The present study found some evidence for explaining individuals' problem behaviors by the interaction of inner vulnerability (i.e., adolescent personality) and environmental factors (i.e., romantic relationship quality). Although our findings suggest the possibility that, for overcontrollers and undercontrollers, a high-quality romantic relationship might contribute to relative decreases in problem behaviors, we cannot sort out the direction of effects given the design of our study. We measured romantic relationship quality and problem behaviors concurrently, while controlling for earlier problem behaviors. Therefore, we cannot rule out the possibility that the relative decreases in problem behaviors of overcontrollers and undercontrollers go together with more positive romantic relationship quality. In particular, overcontrollers who are able to overcome their anxiety problems and undercontrollers who are able to overcome their antisocial problems

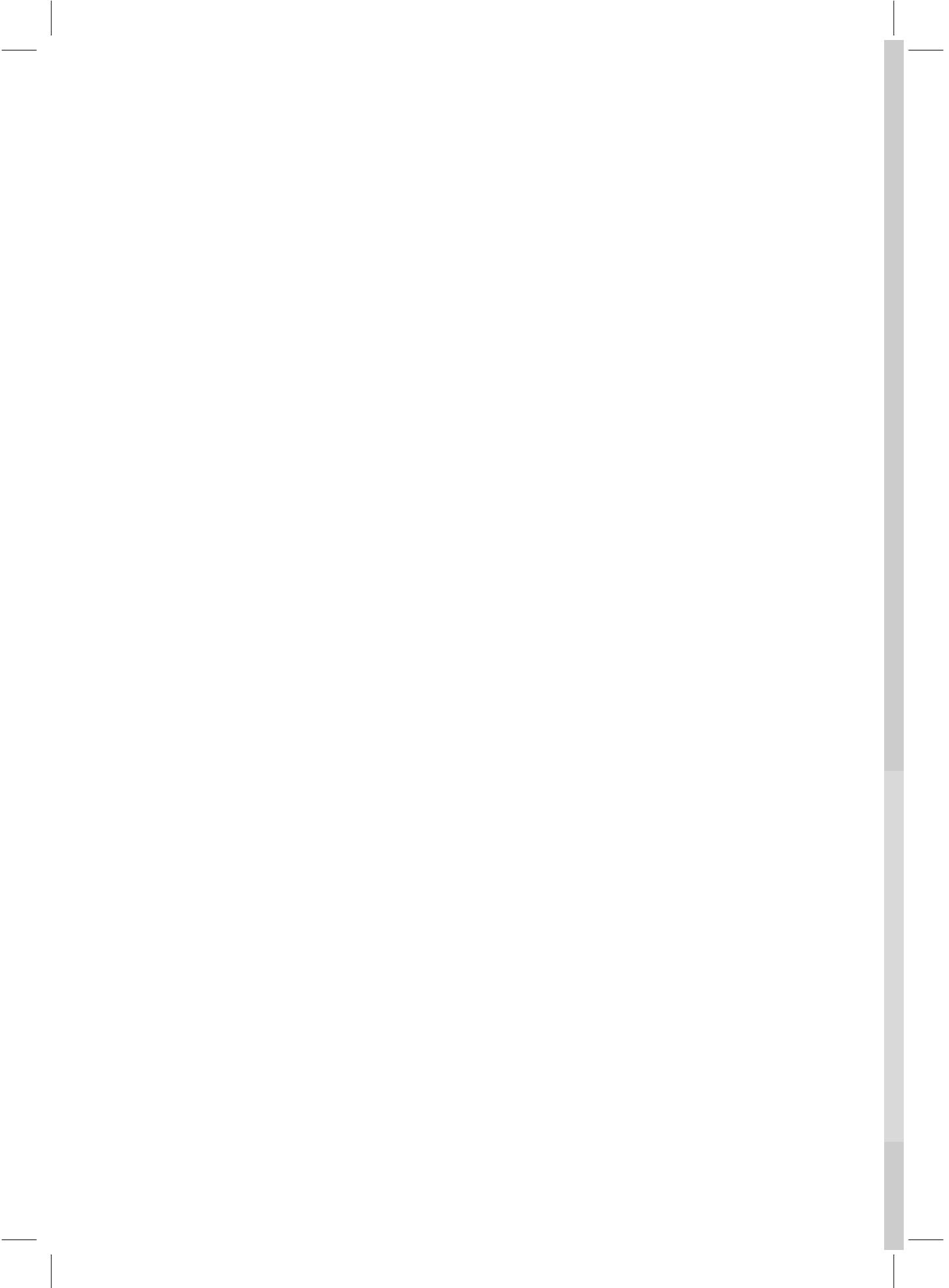
might be able to develop adaptive relationships. Another limitation lies in the use of single-informant data, which might introduce reporter bias leading to overestimations of correlations between variables. Future research could explore the relationships between these variables using data from both participant and romantic partner.

Despites of these limitations, this study followed youths over a period of ten years, and the prospective design of the longitudinal study allowed us to examine the relative changes instead of mean levels of problem behaviors from adolescence to young adulthood. Further, the current study extends previous person-centered research on person-social relationship interactions from the contexts of family and peer relationships to romantic relationships.

8.5 CONCLUSION

Taken together, our study showed some evidence for interaction effects between adolescent personality types and young adult romantic relationship quality in predicting young adult problem behaviors. Findings suggest that although certain personality types might predispose individuals to certain problem behaviors, a good romantic relationship in young adulthood may be implicative for decreases in those problem behaviors, particularly for non-resilient individuals. The present study highlights the importance of considering the interaction between individuals' personality characteristics and their social relationships in the development of problem behaviors.







CHAPTER 9

General Discussion

In this dissertation, we examined the associations between youths' personality and problem behaviors and experiences in friendships and romantic relationships. We also explored whether adolescents with different personality characteristics differ in their susceptibility to features of friendships and romantic relationships. This chapter discusses the key findings obtained in the studies that comprise this dissertation. For this purpose, a summary is provided of all the research results. This is followed by a general discussion of the implications of these findings in the "General Discussion" section. Finally, general strengths, limitations, directions for future research, and concluding remarks are provided.

9.1 SUMMARY OF MAIN FINDINGS

Personality and Problem Behaviors

BIS/BAS scales and problem behaviors. In Chapter 2, we examined the associations between problem behavior symptoms and personality as measured by Carver and White's (1994) BIS/BAS scales, which were designed to assess Gray's (1987) behavioral inhibition and activation sensitivities. We used data from Dutch early and middle adolescents and their mothers. Before examining the associations, we tested the factor structure of the BIS/BAS scales. We then assessed the associations between the BIS/BAS scales and internalizing and externalizing problem behavior symptoms. Confirmatory factor analyses revealed that, across all samples, two-factor models reflecting behavioral inhibition and behavioral activation sensitivities fitted the data within acceptable ranges, but only after deletion of two items from the original scales and some model modifications. Regarding the associations between personality and problem symptoms, we consistently found that across groups behavioral inhibition sensitivity was positively correlated with anxiety and depression. Behavioral activation sensitivity was positively correlated with externalizing problem behaviors such as aggressive and delinquent behaviors across the three age groups. Taken together, the revised BIS/BAS personality scales could be used, however with caution, in future studies of problem behaviors in Dutch adolescent and mother samples. Further, Gray's (1987) behavioral inhibition/activation sensitivities were associated with problem behaviors in a meaningful way.

Personality disorders and antisocial behaviors. Chapter 3 examined the associations between personality disorders and antisocial behaviors and recidivism. Two quantitative systematic reviews were conducted to synthesize the available evidence in the existing literature. Fourteen studies examining the link between personality disorders and antisocial outcomes were identified and twenty-five studies assessing risk of recidivism in personality disordered offenders were included. Although no age limit was set in searching for and identifying eligible studies, the literature search indicated a paucity of research on adolescents.

Only one study examined the risk of violence in adolescent personality disorders, while all the other studies focused on adults. The review of studies on personality disorders and antisocial behaviors revealed two main findings. First, there was a seven-fold increase in risk of any antisocial behaviors and a three-fold increase in risk of violent outcomes in personality disordered individuals, compared with general population controls. Second, there were high levels of heterogeneity in overall risk estimates for violence, which was partly explained by substantially higher risk estimates for antisocial personality disorders (i.e., a thirteen-fold higher risk of violence than the normal population). The review of studies on personality disorders and recidivism showed that criminal offenders with personality disorders were two to three times more likely to recidivate than other mentally-disordered or non-mentally-disordered offenders. In sum, these systematic reviews showed that personality disorders significantly increased the risk of antisocial behaviors and recidivism, supporting the validity of personality in understanding problem behaviors.

Personality, Friendships, and Romantic Relationships

Personality and conflict resolution in friendships. Chapter 3 examined whether adolescents' personality is related to specific behaviors in relationships. We adopted a person-centered approach to personality (Block & Block, 1980) and assessed the longitudinal association of personality with adolescents' conflict behaviors in friendships. Data from early to middle adolescence across five annual waves were employed. In general, overcontrollers and undercontrollers, who are often considered to have relatively less balance in approach and avoidance tendencies, reported having more conflicts with best friends than resilients. We also found personality differences in conflict resolution strategies. Resilients reported more constructive strategies and less hostile conflict resolution and compliance during conflict with best friends than overcontrollers and undercontrollers. As expected, overcontrollers, who have a high avoidance tendency, withdrew and complied the most during conflict. Although overcontrollers and undercontrollers scored in opposite extremes in approach and avoidance tendencies, they did not significantly differ from each other in the levels of hostile conflict resolution. In sum, these findings provide support for the theoretical assertion that personality-correlated skills such as affection expression, cognitive thinking, and behavioral regulation, can be expressed through individuals' specific situational behaviors, such as conflict behaviors (Shiner & Caspi, 2003).

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Personality and perceived quality of friendships and romantic relationships. In Chapter 4, we examined personality differences in developmental changes in friendship quality throughout adolescence. We further examined whether personality affected later romantic relationship quality through earlier development of friendship quality. We followed youths in two age cohorts for ten years, from age 12 to 21 and from age 16 to 25 years. A developmental

personality typology and friendship quality trajectories were identified during adolescence and romantic relationship quality was assessed in young adulthood. Regarding longitudinal associations between personality and friendship quality, our results showed that both overcontrollers and undercontrollers had lower friendship quality than resilients during the whole period of adolescence, as indicated by lower perceived support from, more negative interaction with, and more perceived dominance from their best friend. These results were in accordance with the findings in prior studies covering shorter time spans (e.g., Scholte, Van Lieshout, De Wit, & Van Aken, 2005; Steca, Alessandri, Vecchio, & Caprara, 2007). Findings support the idea that personality may be correlated with friendship quality in a persistent and enduring manner (Asendorpf & Van Aken, 2003; Shiner, Masten, & Roberts, 2003). Adolescent personality types also showed an indirect linkage with romantic relationship quality during young adulthood, through perceived quality of friendship during adolescence. That is, overcontrollers' and undercontrollers' lower friendship quality during adolescence, as compared to resilients', was subsequently related to lower romantic relationship quality during young adulthood. Findings offer empirical support for the theoretical notion that individuals bring histories to relationships, and these histories are correlated with stable personality traits (Epstein, 1991). Taken together, Chapter 4 illustrates the complex processes by which personality might affect quality of close social relationships in the short run and the longer run.

Personality and Personal Relationships: Patterns of Differential Susceptibilities

After finding personality differences in internalizing and externalizing problem behaviors and in best friendship and romantic relationship experiences, we examined whether individuals with different personality characteristics differ in their susceptibility to relational environments.

Personality and susceptibility to influence of best friends' delinquency. In Chapter 6, we examined the potential moderating role of personality types (i.e., overcontrollers, undercontrollers, and resilients) on the longitudinal associations between adolescents' and their best friends' delinquency. Cross-lagged panel models were conducted on data collected from both adolescents and their best friends across three years from early to middle adolescence (e.g., from age 13 to 15 years). Results showed that the delinquency of overcontrollers was predicted by their best friends' delinquency, whereas the delinquency of undercontrollers and resilients was not. These findings suggest that individuals with different personality types are differentially susceptible to their best friend's delinquency, and thus provide empirical evidence for the differential susceptibility hypothesis (Belsky, 1997). Further, we found that the delinquency of undercontrollers and resilients predicted their best friends' delinquency, but overcontrollers' delinquency did not. These findings suggest that individuals with different personality types differ in their ability to elicit influence on their friends' delinquent behaviors.

Personality and differential detrimental effects of romantic relationship dissolutions on relationship quality. In Chapter 7, we examined whether individuals with different personality types showed differential susceptibilities to romantic relationship features. In a ten-year longitudinal study, we examined whether adolescents' personality type moderated the effect of romantic relationship dissolutions on later romantic relationship quality. Our study revealed significant interaction effects between personality types and the frequency of romantic relationship dissolutions on future romantic relationship quality. With more romantic relationship dissolutions, undercontrollers showed less commitment and exploration in their current romantic relationship. No such link was found for resilients and overcontrollers. These findings indicated that for undercontrollers but not for overcontrollers and resilients, former romantic relationship dissolutions are detrimental for current romantic relationship quality. In short, Chapter 6 provides support for the differential susceptibility hypothesis by suggesting that certain personality types might be more sensitive to romantic relationship dissolutions.

Personality and differential effects of romantic relationship quality on anxiety and delinquency. In Chapter 7, we examined interaction effects between adolescent personality types and young adulthood romantic relationship quality on young adults' delinquency and anxiety. Data were from two age cohorts' youths across ten years: from age 12 to 21 and from age 16 to 25 years. Our study showed significant interaction effects between adolescent personality types and young adulthood romantic relationship quality on problem behaviors. More perceived support from romantic partners was correlated with relative decreases in anxiety symptoms for overcontrollers, however, not for undercontrollers and resilients. Higher perceived negative interaction with romantic partner was linked to relative increases in delinquency of undercontrollers but not of overcontrollers and resilients. Taken together, these findings suggest that individuals with a less resilient personality seem to be more sensitive to the influence of perceived quality of romantic relationships, than those with a more resilient personality. Thus, this study provides further empirical evidence for the differential susceptibility hypothesis (Belsky, 1997). Table 9.1 presents a summary of the main findings of this dissertation.

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9.2 THEORETICAL IMPLICATIONS

Personality and Problem Behaviors

The first part of the current dissertation focused on the associations between personality and problem behaviors. In order to draw a comprehensive picture regarding the links, we examined the associations between normal personality traits and internalizing and externalizing problem behaviors in community samples. Furthermore, we investigated the link between extreme

Table 9.1 Summary of the Main Findings of this Dissertation

Personality and Problem Behaviors	
Chapter 2	Individuals with high behavioral inhibition sensitivity were prone to internalizing problem behaviors and those with high behavioral activation sensitivity were prone to externalizing problem behaviors.
Chapter 3	Individuals with personality disorder were more likely to commit and to recidivate antisocial behaviors. Antisocial personality disorder substantially increased the risk of antisocial behavior but not the risk of recidivism.
Personality, Friendship, and Romantic Relationship	
Chapter 4	Overcontrollers and undercontrollers reported more conflicts, adopted more hostile conflict resolution and compliance, and had less positive conflict resolution styles, than resilients.
Chapter 5	Overcontrollers and undercontrollers, had lower friendship quality throughout adolescence, which was subsequently related to their lower romantic relationship quality during young adulthood, compared with resilients.
Personality and Personal Relationships: Patterns of Differential Susceptibilities	
Chapter 6	Overcontrollers' delinquency was predicted by but did not predict their best friend' delinquency, whereas undercontrollers' and resilients' delinquency predicted but was not predicted by their best friend' delinquency.
Chapter 7	For undercontrollers, but not for overcontrollers and resilients, more former romantic relationship dissolutions were linked to less commitment and exploration in the current romantic relationship.
Chapter 8	For overcontrollers, but not for undercontrollers and resilients, more perceived support from their romantic partner was correlated with a relative decrease in anxiety symptoms. For undercontrollers, but not for overcontrollers and resilients, higher perceived negative interaction with their romantic partner was linked to a relative increase in delinquency.

variants of normal personality (i.e., personality disorders) and antisocial behaviors and recidivism in clinical samples.

This dissertation showed that adolescents with different personality characteristics have distinct problem behaviors. The results indicate substantial consistency in behavior predictions across the different personality assessments: BIS/BAS scales, personality disorders diagnosis, and Big Five measures. Across measures, personality characterized by behavioral inhibition and overcontrol, which reflected an avoidance tendency, was related to internalizing problem behaviors such as anxiety and depressive symptoms. Adolescents with higher levels of behavioral activation, with an antisocial personality disorder, and with an undercontrolling personality type, reflecting a higher approach tendency, reported more externalizing problem

behaviors such as minor delinquency, aggression, antisocial behaviors, and recidivism. These personality-behavior associations were observed in different developmental stages and across community and clinical samples.

Findings imply that various internalizing problem behaviors might share a common underlying personality disposition, so do diverse externalizing problem behaviors. Theoretically, it has been proposed that the approach of pleasure and avoidance of pain are the basic drive of our thoughts and acts (Bentham, 1779). Good adaptation requires individuals to learn to restrain their approach tendency when the stimulus is harmful and to reduce inhibition tendency when the target is beneficial (Block, 2002; Carver, 2005). Unfettered approach and heightened avoidance tendencies, however, may limit individuals' ability to evaluate stimulus or to modify behaviors according to environmental demands (Block & Block, 1980). Our findings suggest that an unfettered approach tendency might be the common personality disposition underlying various externalizing problem behaviors ranging from minor delinquency, violence, and illegal acts, as all these behaviors share an overestimation of pleasure and an underestimation of threat. In addition, our results indicate that a heightened avoidance tendency might be the common personality disposition underlying various internalizing problem behaviors such as anxiety and depressive symptoms, as these symptoms share an underestimation of pleasure and overestimation of threat. In sum, our findings support the theoretical assertion that approach and avoidance tendencies are the building block of behaviors (Carver, 2006; Elliot & Covington, 2001; Elliot & Thrash, 2010; Miller & Dollard, 1941).

A measurement caveat. Although across studies we found consistent associations between personality and problem behaviors, however, these associations might in part be due to measurement overlap. That is, some personality measures tend to assess behaviors as indicators of personality. For instance, experiences of anxiety seem to be at the core of most personality measures such as the BIS scale and the Big Five neuroticism measure (Carver, 2005). Similarly, the occurrence of antisocial behaviors is one of the important diagnostic criteria for antisocial personality disorder (American Psychiatric Association, 2013). Although this approach to assess personality or extremes of personality implies an effort to get closer to actual behavior instead of to general views about persons. Personality and problem behavior measures may be assessing the same constructs. Therefore, the associations between personality and problem behaviors might be overestimated due to the commonality among measures. A potential solution to avoid this overestimation is to eliminate overlapping items from both measures of personality and problem behaviors. Research has shown that even after removal of threat to validity presented by overlap in measures, there continue to be significant, and interpretable relationships between personality and problem behaviors (Lengua, West, & Sandler, 1998).

Personality, Friendships, and Romantic Relationships

Findings from Chapters 4 and 5 provide more insight into the overtime linkages between personality and two voluntary and equal social relationships: friendships and romantic relationships. Further, findings also illustrate the complex processes by which personality might affect quality of later romantic relationships through earlier friendship quality.

Firstly, this dissertation showed longitudinal associations between personality and friendships. Over time, individuals with different personality types have different experiences in their friendships. Individuals who were less flexible in balancing their approach and avoidance tendencies tended to be involved in more conflict, to have adopted more maladaptive conflict resolution strategies in relationships with friends, and to have perceived their relationship quality with friends as more negative. The long-term longitudinal studies in Chapters 4 and 5 extended the existing literature, which is dominated by cross-sectional studies (Caspi, 2000; Scholte et al., 2005; Steca et al., 2007), by showing that youths' personality and friendship experiences are interrelated with each other over a significant period. Nevertheless, we noted that the overtime correlations emerged predominantly between personality and the mean levels rather than the change rates of friendship experiences, such as conflict resolution strategies and perceived relationship quality. This suggests that the associations between personality and social relationships are stable, indicating that the differences in levels of friendship quality by personality types are comparable throughout adolescence.

Our findings provide some support for the theoretical idea that the balance between approach and avoidance tendencies guides individuals towards potential positive interpersonal outcomes (Elliot, Gable, & Mapes, 2006). Specifically, individuals with a high avoidance tendency adopted higher levels of avoidant strategies (i.e., withdrawal and compliance), however, they also adopted higher levels of aggressive conflict resolution strategies and negative interaction. It could be that individuals who are too inhibited may not have their needs satisfied in the best friendship (Block & Block, 1980). Feelings of dissatisfaction in a relationship, in turn, might eventually lead to exceeding their inhibition threshold, which could result in aggression explosion and emotion blusters.

Secondly, this dissertation showed indirect links between personality and young adulthood romantic relationships via adolescent friendships. Personality may affect different social relationships in different ways. Chapters 4 and 5 showed that adolescent personality correlated with concurrent adolescent friendship experiences, Chapters 5 and 7, however, revealed that adolescent personality was not directly linked to young adult romantic relationship five to ten years later. These results underscore the necessity to also examine personality in later ages to assess its direct links with romantic relationship, as personality developments towards maturation during adolescence and young adulthood (Klimstra, Hale III, Raaijmakers, Branje, & Meeus, 2009; Roberts, Caspi, & Moffitt, 2003). Nevertheless, findings of Chapter 5 revealed

that personality types were indirectly linked to romantic relationships through a spillover from earlier friendship quality. Specifically, through the mean levels of friendship quality during adolescence, resilients indirectly had higher romantic relationship quality during young adulthood than both overcontrollers and undercontrollers. These findings provided support for the theoretical notion that individuals bring histories to their current relationships, and the histories are correlated with personality characteristics (Epstein, 1991). The processes by which these transmissions occur are not yet clear. It is speculated that different anticipations, interpretations, or affective responses developed in the context of previous relationships, due to personality dispositions, can be projected onto or transferred to new social relationships (Andersen & Baum, 1994).

The transmission of relationship quality from earlier friendships to later romantic relationships also provides support for several perspectives regarding the development of social relationships. Results support an attachment perspective: based on their earlier close relationships, youths may develop expectancies for interpersonal relationships that can form mental representations or working models of the self and relationship partners that might guide perceptions of their later romantic relationships (Kenny, 1994; Roisman, Collins, Sroufe, & Egeland, 2005). Findings also are in line with social learning models suggesting that friendships may offer an important training ground for later romantic relationships, as these two relationships are both voluntary and egalitarian (Collins, Welsh, & Furman, 2009; Furman, Simon, Shaffer, & Bouchey, 2002; Sullivan, 1953; Hazan & Shaver 1987).

Personality and Developmental Outcomes in the Context of Social Relationships

The third aim of the dissertation was to examine whether adolescents with different personality characteristics differ in their susceptibility to friendships and romantic relationships. Personality alone may be not sufficient to explain why an adolescent experiences positive or negative developmental outcomes. From a person-environment perspective, it is proposed that the interaction between personality characteristics and environment contributes to differential consequences for different individuals (Magnusson & Stattin, 2006). In addition, it is posited that individuals' characteristics such as personality may leave youths differentially susceptible to the environment (Belsky, 1997). The findings that the development of youths with a less resilient personality was more likely to be influenced by their friendships and romantic relationships environments than the development of youths with a resilient personality provide empirical support for the person-environment interactive perspective and the differential susceptibility hypothesis.

Across studies, resilients were consistently the group that seems to not be influenced by their social relationships. Specifically, resilients' delinquency was not influenced by but rather influenced their friends' delinquency, further their romantic relationship dissolution history

did not have detrimental effects on their current romantic relationship quality, and their romantic relationship quality was not correlated with relative changes in problem behaviors. These results are in agreement with typical characteristics of resilients as self-confident, having high social potency such as being decisive, assertive, and fond of leadership roles, and being considered as flexible and adaptive under challenging situations (Caspi & Silva, 1995; Block & Block, 1980). Empirically, resilients also have been found to be interpersonally effective and well-liked by their peers and psychologically more mature (Van Aken, Van Lieshout, Scholte, & Haselager, 2002; Meeus, Van de Schoot, Klimstra, & Branje, 2011). Chapters 4 and 5 in this dissertation also showed that resilients were significantly less compliant during conflict with best friends and that they experienced significantly less dominance from their best friends. Thus, in accordance with their psychological profile and empirical evidence, they are less susceptible to influence of their environments, but instead, they might influence their interpersonal partners.

In general, overcontrollers seem to be susceptible to environmental influences. Specifically, overcontrollers' delinquency was influenced by their best friend's delinquency and their relative changes in anxiety symptoms were associated with the level of support that they perceived in romantic relationships. These results are in line with the profile of and empirical findings regarding overcontrollers: they are often described as having low self-esteem, being submissive and dependent, and having low desire in influencing others (Caspi & Silva, 1995; Hart, Hoffman, Edelstein, & Keller, 1997). In addition, overcontrollers have a relatively strong avoidance tendency and are prone to high social anxiety and depressive symptoms, which are related to high conformity to others (Asendorpf, Borkenau, Ostendorf, & Van Aken, 2001; Block & Block, 1980; Cohen & Prinstein, 2006; Prinstein, Boergers, & Spirito, 2001). In addition, findings from chapter 4 and 5 further showed that within friendships, overcontrollers tended to be more compliant, withdrew more during conflict and experienced more dominance from their best friend. Thus, in accordance with the current literature, overcontrollers are likely to have a more submissive position in interpersonal relationships and are susceptible to the influence of their friends and partners.

Paradox of influence process. We noticed some inconsistencies regarding undercontrollers' capacity to influence others and their susceptibility to environmental influences. Chapter 6 suggests that undercontrollers' delinquent behavior is a source of influence rather than an outcome of susceptibility to pressure from their best friends. Other studies in this dissertation suggest, however, that they are sensitive to environmental influences. For instance, undercontrollers' former romantic relationship dissolutions were negatively associated with their current romantic relationship quality. In addition, their perceived negative interaction in romantic relationships was associated with relative increases in their delinquent behaviors. Moreover, Chapters 4 and 5 showed that in their best friend relationships undercontrollers

experienced relatively higher levels of compliance during conflict as well as more dominance from their best friend compared to resilients. It is intriguing that these lines of evidence are contradictory. Undercontrollers scored similarly to resilients in their social potency. Undercontrollers, just as resilients, have a strong desire to assume leadership roles and to influence others (Caspi & Silva, 1995). It seems, however, they are only able to influence their best friend with their actual behaviors such as delinquency. They do not seem to be proficient in influencing their friend by presenting convincing arguments, however. Therefore, their influence to others might be unintentional instead of purposeful.

Vulnerability and plasticity. Our results imply that youths with a vulnerable personality may not only be more affected by negative environments but also benefit more from supportive environments (Belsky, 2004). The reason why youths with less resilient personality types may be more susceptible to their social relationships might lie in the characteristics of vulnerable personality types. Both overcontrollers and undercontrollers are considered being rigid in dealing with the world around them. Undercontrollers lack control of their approach impulses even when such impulse would create problems, and overcontrollers often fail to express their thoughts and to act out even when moves are necessary. The inflexibilities dwelling in their personality and the dynamic and changing features of relational environments may create a mismatch that may contribute to youths' negative developmental outcomes. Another reason behind their susceptibilities might lie in their heightened reactivity towards environments (Pluess & Belsky, 2009). Undercontrollers' impulsive responses might particularly evoke behaviors from their relational partners that may in turn contribute to their relational outcomes. Overcontrollers' inhibited responses to their relationships might leave them in a passive position in which they are inevitably dominated and influenced. Due to their rigidity and extreme approach or avoidance tendencies, both overcontrollers and undercontrollers may in general have a heightened sensitivity to environmental stimuli. This heightened reactivity, in turn, might provoke overcontrollers and undercontrollers to become easily overwhelmed even in just modestly adverse environments, but also to benefit disproportionately from care in supportive environments that enable them to regulate their proneness to distress.

Taken together, these results indicated a link between vulnerability of personality and plasticity of developmental outcomes. For individuals whose personality is flexible and adaptive, their environment contributes little to their development, whereas for individuals whose personality is featured with vulnerabilities such as rigidity and extreme reactivity, environments might play an important role in shaping their development. However, these are merely speculations and have not received much attention in empirical research. In order to develop effective prevention program for decreasing youths' problem behaviors and foster youths' adaptation, it is important to know the mechanisms behind the differential susceptibilities. Future studies are thus needed to uncover potential pathways.

9.3 STRENGTHS AND LIMITATIONS

The studies comprising this dissertation have several strengths. First, this dissertation predominantly adopted person-centered approaches to personality. Person-centered approaches focus on how a configuration of traits is organized within an individual person. It is important to adopt personality typology in the development of youths' developmental outcomes, especially when interactions between personality and environment are involved. The reason is that it is unlikely that environments ever influence a single trait in isolation. Instead, environments interact with the whole person (Robins & Tracy, 2003). Further, a person-centered approach may facilitate communication among researchers and clinicians in identifying youths at risk for developing problem behaviors (Asendorpf et al., 2001; Costa, Herbst, McCrae, Samuels, & Ozer, 2002). Second, this dissertation employed three interconnected personality distinctions reflecting basic approach and avoidance tendencies that are considered as a unifying thread linking and integrating diverse personality theories (Elliot & Thrash, 2002). The utilization of these three different but interrelated distinctions: Block and Block's (1980) personality typology, Gray's (1987) BIS and BAS distinction, and personality disorder classification, facilitates a more comprehensive understanding of the implications of the level and balance of the approach and avoidance tendencies for youths' development of problem behaviors and social relationships.

Third, this dissertation predominantly used a longitudinal design with multiple annual measurements. This allowed us to reliably capture developmental trajectories of youths' personality, relationships, and psychosocial adjustment (Willett, Singer, & Martin, 1998). Also, we followed youths for a significant period of time from early adolescence to young adulthood, which facilitates us to gain more insight into longitudinal associations among the assessed variables.

Although this dissertation has several strengths, several limitations need to be noted. A first limitation is the use of self-report of personality and social relationships. The use of self-report measures might introduce biased answers and result in shared method variance. Individuals with different personality characteristics might differ in their self-knowledge of their personality characteristics: some individuals might have a more objective view of who they are, and others might have a distorted view towards themselves, either a self-enhanced or a self-destructed view. In addition, individuals with a certain personality may have a distorted view of their relationships, partly due to their personality (Shiner & Caspi, 2003). Some individuals might see a small quarrel with friends as a severe negative interaction, others might have a more objective view of interpersonal disagreement. Therefore, using self-reports for both personality and social relationships might lead to an overestimation of the associations among them. Therefore, although personality and relationship experiences might be more difficult for

others to observe (Paulhus & Vazire, 2007), it might be useful if future research could explore the relations between personality and social relationships using data from multiple sources, for instance, both the participants and their best friends or romantic partners.

A second limitation concerns causality. Although the majority of the studies in this dissertation adopted a longitudinal design, we cannot draw causal conclusions regarding personality, problem behaviors, and interpersonal relationships. The main reason is that these studies mainly relied on correlational data thus we cannot rule out the possibility of third variables which might affect the interrelations among studied concepts. Longitudinal personality-environments transaction studies are needed. However, the longitudinal design facilitates one requisite for drawing causal conclusions, that is, temporal precedence. Moreover, statistical techniques such as cross-lagged model are indicative of direction of effects.

A third limitation is that personality was exclusively treated as a predictor of problem behaviors and social relationships in all of the empirical studies. Both theories and empirical research, however, have suggested that problem behaviors and social relationships may also affect personality (Klimstra, Akse, Hale III, Raaijmakers, & Meeus, 2010; Neyer & Lehnart, 2007; Roberts et al., 2003). We took this approach, however, as basic personality characteristics are relatively enduring and stable. Also, we employed a developmental typology of personality which takes into account the normative developmental changes in personality across adolescence (Klimstra et al., 2009). Thus, personality served as a predictor in our studies. Future research is, however, encouraged to take into account the bidirectional effects between personality and psychosocial adjustment.

9.4 FUTURE DIRECTIONS

From the discussion above, directions can be found for future studies. First, regarding the examination of personality differences in relationship quality and influence processes within an interpersonal relationship, future studies should attempt to take the characteristics of both the target participants and their interpersonal partners into account. This need is underscored by the interdependence between interpersonal partners. For instance, the personality characteristics of an individual and relational partner are likely to interact with each other and may create compensation and exaggeration effects on the quality of a relationship. Taking an overcontroller-undercontroller best friendship as an example, the overcontroller's high conscientiousness may compensate for the undercontroller's low conscientiousness. Similarly, the undercontroller's high emotional stability may compensate for the overcontroller's low emotional stability. Individuals in this dyad might compensate each other's weaknesses. These compensation effects may lead to a good relationship. However, the relationship could also be

eroded or disengaged as the overcontroller could be overly challenged by the undercontroller's risk taking behavior because the overcontroller is fearful. Similarly, the undercontroller may be frustrated by the overcontroller's high level of introversion because the undercontroller is very outgoing. Future studies could examine the effect of interactions between the personality characteristics of interpersonal partners on quality of their relationship. In addition, these interaction effects between an individuals' and their relational partners' personality characteristics could also occur in peer influence processes. This dissertation suggests that overcontrollers' delinquency was influenced by their best friends' delinquency, whereas undercontrollers and resilients influenced their best friends' delinquency. However, we did not consider best friends' personality characteristics. Future studies should consider the interaction between adolescents' and best friends' personality types so that we can examine whether an overcontroller's delinquency would still be influenced by their best friends' delinquency, in a situation where the best friend was also an overcontroller. In short, future research should examine the interactive effects between personality characteristics of the individual and that of their relational partner on individuals' developmental outcomes.

Second, the current dissertation showed a paradox of influence process for undercontrollers in social contexts. Future studies should address this paradox. Studies in this dissertation suggest that undercontrollers elicit influence via their delinquent behaviors to which they are prone by nature. However, they cannot purposely convince their interpersonal partners to follow them. More specifically, it is suspected that undercontrollers' influence may be limited to a certain period in adolescence when delinquent behaviors are often considered as evidence of independence and maturation in the eyes of other adolescents (Moffitt, 1993). Future studies could test whether the influence of undercontrollers' delinquency disappears in young adulthood when delinquency is no longer considered to be a way of showing maturation. In addition, future studies should look into why undercontrollers comply and submit in their best friendships despite the fact that they have an equally high social potency (i.e., leadership roles, a propensity to be forceful) as resilients. It might be due to undercontrollers' characteristics such as relatively poor social skills (Van Aken, Van Lieshout, Scholte, & Haselager, 2002), low self-regulation ability (Gramzow et al., 2004), and/or their high level of indecisiveness (Germeijs & Verschueren, 2011). All these factors are hypothesized and empirically found to be related to a high susceptibility to peer influence (Allen, Porter, & McFarland, 2006; Gardner, Dishion, & Connell, 2008). In other words, in order to purposefully elicit influence on others, one must be able to control their own affect and impulses and also have good social skills to convey ideas or thoughts in an assertive way. Indeed, undercontrollers perform poorly in these aspects thus they are not able to make others follow. Future studies could test whether factors such as social skills, self-regulation, and decisiveness mediate the relationship between the willingness to influence (e.g., social potency) and the actual elicited influence. Moreover, undercontrollers'

compliance and submissive position in their best friendships may be because their best friends are one of the only available interpersonal resources they have, as undercontrollers are more likely to be disliked and rejected by their peers (Van Aken et al., 2002). Thus, it is plausible that they show compliant behaviors, even when it is against their wish for influencing others, in an effort to maintain or bolster their best friendship which is a voluntary relationship that could otherwise be terminated at any time. Future studies could examine whether friendship status mediates the relationship between social potency and compliant behaviors in best friendships.

Third, the findings of differential susceptibilities to social contexts among individuals with different personality types calls for research addressing the underlying mechanisms. This dissertation suggests that individuals who are low in resiliency are more susceptible to their interpersonal relationship environment. Differences in both flexibility and reactivity towards the environments among individuals with different personality types are thought to be the potential mediators for these differential susceptibilities, as these characteristics mismatch with the dynamic and changing features of interpersonal relationships. Thus, future studies could tap into these two aspects of individuals with different personality types and assess the mediating effects. Regarding the assessment of reactivity, stress reactivity might be an ideal candidate as a mediator linking individuals' innate personality characteristics and environments, as it addresses individuals' responses to environmental stressors. In terms of flexibility, future studies could assess the rigidity of the behaviors of individuals with different personality types in changing environments. Research addressing the mechanism behind differential susceptibilities will facilitate the development of tailored-made prevention and intervention strategies that mitigate youths' maladaptation and promote resilient adaptation.

Further, this dissertation has focused prominently on the study of interactions between individuals' personality characteristics and proximate environments (i.e., best friends and romantic partners). In these proximate environments, individuals themselves are relational partners and may relatively directly contribute to the features of the environments. Future studies could examine the interactions between personality characteristics and contextual factors, such as neighborhood environments, school environments, and work environments. Individuals may have a relatively less direct and strong impact on these contextual environments, in comparison to their impact on close interpersonal relationships. These types of studies would allow a more independent test of personality-environment interaction effects and provide a more comprehensive empirical examination of personality-environment interactionism theory.

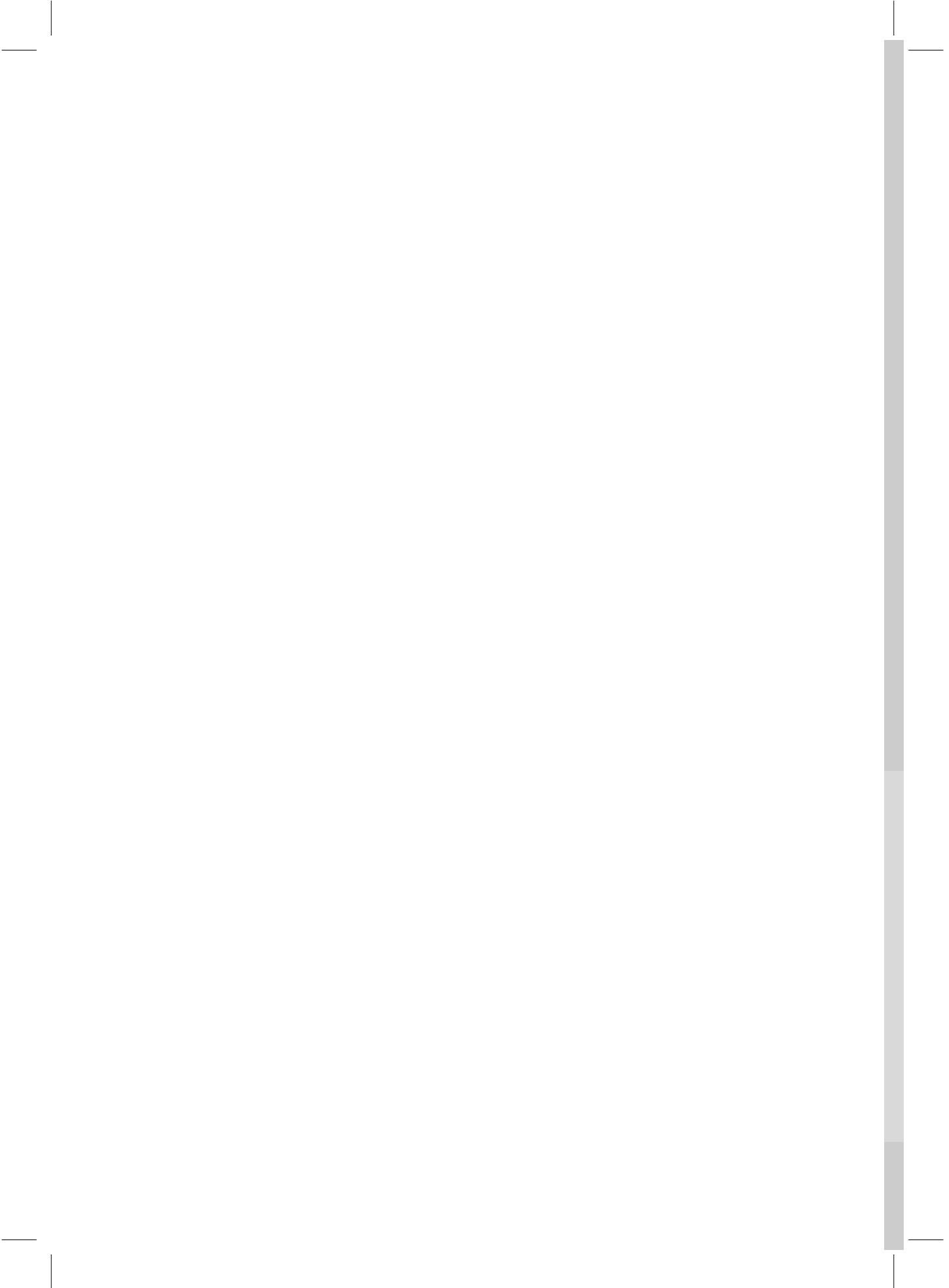
9.5 CONCLUDING REMARKS

The aim of the current dissertation was to show how adolescent personality was linked to youths' developmental outcomes. Our findings suggest that adolescent personality has concurrent and predictive relations to a variety of important developmental outcomes. Specifically, adolescent personality was associated with internalizing and externalizing problem behaviors at an individual level. Also, adolescent personality was related to conflict frequency and conflict resolution strategies as well as the quality of relationship with best friends and romantic partners at an interpersonal level. In addition, our findings indicated that the magnitude of associations between personality and youths' adaptation were stable across developmental stages. These findings extend the existing literature by illustrating the enduring associations between adolescent personality and youths' diverse and important aspects of development.

Both the person and the situation are necessary for explaining individuals' development. Results from the examinations of the interaction between youths' personality and their relational environments suggest that personality plays an important role in youths' differential susceptibility to interpersonal environments. Individuals with less-resilient personality characteristics are particularly more vulnerable to relational features than resilient youths. These findings provide further support for an interactionist perspective, which proposes that individuals' developmental outcomes depend on the dynamic interplay between innate characteristics and environmental influences (Magnusson & Stattin, 2006).

To sum up, adolescent *personality* is implicative for youth' development. It was found to be related to individuals' development directly (*problem behaviors* and relationship with *pals*) and indirectly (relationship with romantic *partners*) through its impact on and interaction with their social environments.







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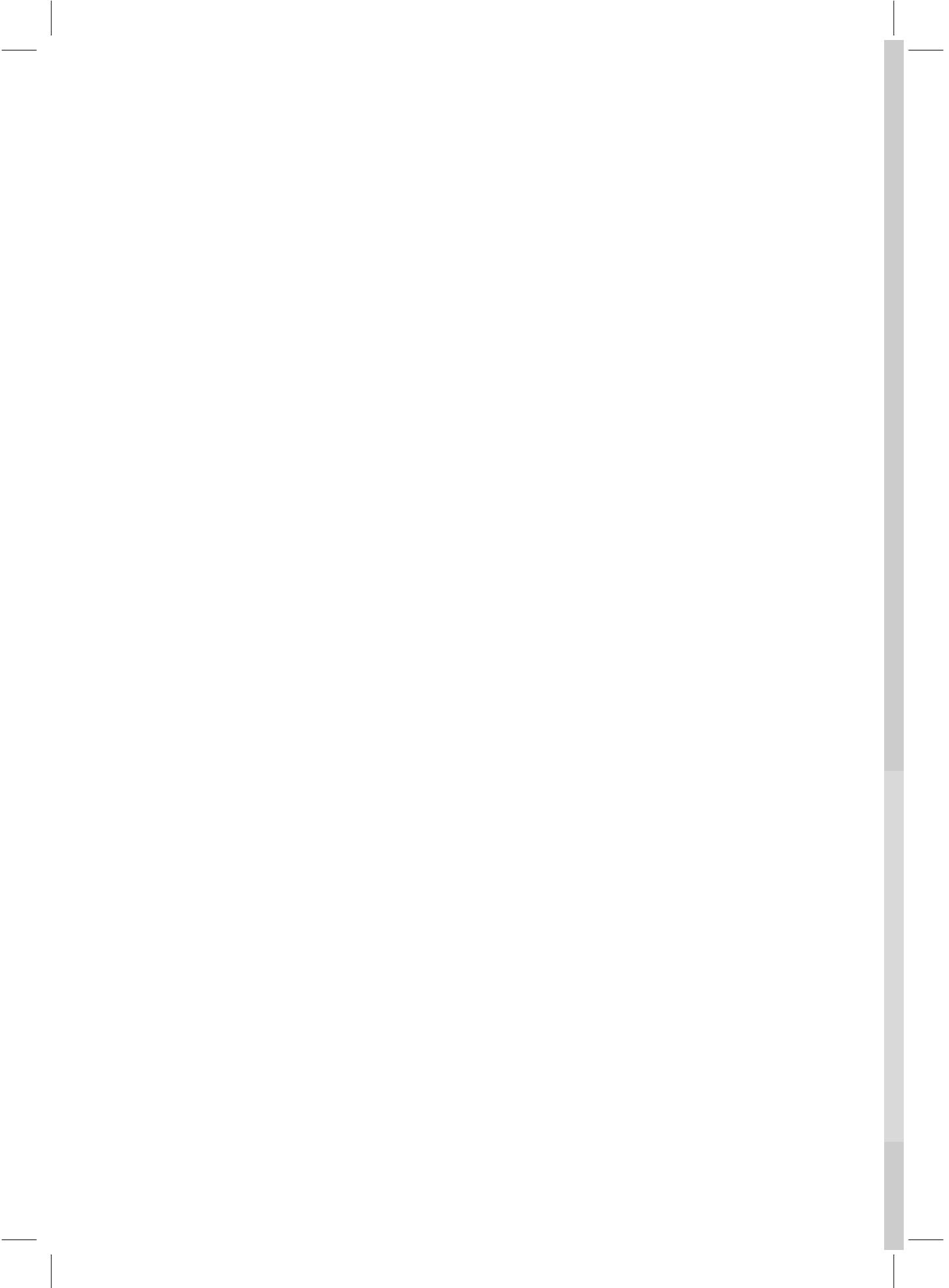
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SAMENVATTING

Summary in Dutch

SAMENVATTING (SUMMARY IN DUTCH)

Het nastreven van plezier en het voorkomen van pijn zijn rudimentaire menselijke behoeften. In deze dissertatie worden verschillende persoonlijkheidsbenaderingen onderzocht die uitgaan van deze basale neiging die mensen kunnen hebben om iets te benaderen of juist te vermijden. Het beschrijft onderzoek naar de associaties van persoonlijkheid met probleemgedrag en met relaties met vrienden en partners. Bovendien exploreert dit proefschrift of adolescenten met verschillende persoonlijkheidstrekkens verschillen in de mate waarin ze worden beïnvloed door bepaalde aspecten van vriendschappen en romantische relaties.

Persoonlijkheid en Probleemgedrag

BIS/BAS schalen en probleemgedrag. In hoofdstuk 2 onderzochten we het verband tussen probleemgedrag en persoonlijkheid, gemeten met de Carver en White (1994) BIS/BAS schalen. Deze schalen zijn ontwikkeld om Gray's (1987) gedragsinhibitie en activatie te meten. We maakten gebruik van Nederlandse data van vroeg en midden-adolescenten en hun moeders. Confirmatieve factor analyses lieten zien dat een twee-factor model met gedragsinhibitie en gedragsactivatie de data redelijk goed weergaf, maar alleen nadat er twee items van de originele schaal waren verwijderd en er enkele aanpassingen aan het model waren gedaan. Gedragsinhibitie bleek positief gecorreleerd te zijn met angst en met depressie, terwijl de schaal voor gedragsactivatie positief gecorreleerd was met agressief en delinquent gedrag. Samengevat kan de gereviseerde BIS/BAS schaal met enige voorzichtigheid worden gebruikt in toekomstig onderzoek naar probleemgedrag bij Nederlandse adolescenten en hun moeders. Bovendien bleken Gray's (1987) gedragsinhibitie en activatie op een betekenisvolle manier geassocieerd met probleemgedrag.

Persoonlijkheidsstoornissen en antisociaal gedrag. Hoofdstuk 3 onderzocht de samenhang tussen persoonlijkheidsstoornissen en antisocial gedrag en recidive. Twee kwantitatieve systematische reviews werden uitgevoerd om de beschikbare resultaten te synthetiseren. De review van studies naar persoonlijkheidsstoornissen en antisociaal gedrag had twee hoofdbevindingen. Ten eerste was er een zeven maal hoger kans op enige vorm van antisociaal gedrag en een drie maal hoger kans op gewelddadig gedrag bij individuen met een persoonlijkheidsstoornis in vergelijking met een controle groep uit de algemene populatie. Ten tweede, was er een grote heterogeniteit in de algemene risicoschattingen voor geweld, welke gedeeltelijk verklaard kon worden door een substantieel hogere kans op een antisociale persoonlijkheidsstoornis. The review van studies naar persoonlijkheidsstoornissen en recidive liet zien dat criminelen met een persoonlijkheidsstoornis twee tot drie keer hogere kans hebben op recidive dan criminelen met een andere psychische stoornis en criminelen zonder psychische stoornis. Samengevat laten de systematische reviews zien dat persoonlijkheidsstoornissen

het risico op antisociaal gedrag en recidive significant doen toenemen, wat onderschrijft dat persoonlijkheid belangrijk is in het begrijpen van probleemgedrag.

Persoonlijkheid, Vriendschappen en Romantische Relaties

In de andere studies in deze dissertatie, zijn we uitgegaan van een persoonsgerichte benadering van persoonlijkheid, gebaseerd op de persoonlijkheidstheorie van Block en Block (1980). Hoofdstuk 3 bekeek de longitudinale samenhang van persoonlijkheid met conflict gedragingen van adolescenten in hun vriendschappen, daarbij gebruik makend van data van vroeg tot midden-adolescenten. Over het algemeen, hadden overcontrollers en undercontrollers (van wie vaak wordt aangenomen dat ze minder balans hebben in hun neigingen om kwesties te benaderen of vermijden) meer conflicten met hun beste vriend dan resilients. Bovendien rapporteerden de resilients, in vergelijking met undercontrollers en overcontrollers, meer constructieve conflictoplossingstrategieën en minder vijandige strategieën of inschikking tijdens conflicten met hun beste vriend. Zoals verwacht waren overcontrollers (welke een hoge neiging hebben om zaken te vermijden) het meest geneigd om zich in conflicten terug te trekken of in te schikken. Ondanks dat overcontrollers en undercontrollers juist op hun neiging om iets te benaderen of te vermijden tegenovergesteld scoren, verschilden ze niet significant van elkaar in vijandige conflictoplossingstrategieën. Tezamen ondersteunen deze bevindingen het theoretische idee dat vaardigheden die samengaan met iemands persoonlijkheid, zoals het uiten van gevoel, cognitief redeneren en gedragsregulatie, zich kunnen uiten in iemands specifieke gedrag, bijvoorbeeld tijdens conflicten (Shiner & Caspi, 2003).

Persoonlijkheid en waargenomen kwaliteit van vriendschappen en romantische relaties. In hoofdstuk 4 hebben we onderzocht of ontwikkelingsveranderingen in vriendschap kwaliteit in de adolescentie samenhangen met persoonlijkheid en of persoonlijkheid invloed heeft op latere romantische relaties door eerdere ontwikkelingen in vriendschapskwaliteit. We volgden jongeren in twee leeftijdscohorten gedurende 10 jaar, van 12 tot 21 jaar en van 16 tot 25 jaar. Tijdens de adolescentie werd een longitudinale persoonlijkheidstypologie bepaald, evenals ontwikkelingstrajecten van vriendschapskwaliteit. De kwaliteit van romantische relaties werd gemeten in de jongvolwassenheid. Resultaten lieten zien dat zowel overcontrollers als undercontrollers lagere vriendschapskwaliteit rapporteerden gedurende de adolescentie dan resilients. Deze bevindingen ondersteunen het idee dat persoonlijkheid persistent en voortdurend samenhangt met de kwaliteit van vriendschappen (e.g., Shiner, Masten, & Roberts, 2003). De persoonlijkheid van adolescenten had ook indirect een verband met romantische relaties in de jongvolwassenheid, via waargenomen kwaliteit van vriendschappen: De lagere kwaliteit van vriendschappen die undercontrollers en overcontrollers hadden, in vergelijking met veekrachtigen, was op den duur gerelateerd aan een lagere kwaliteit romantische relatie in de jongvolwassenheid. Deze bevindingen ondersteunen het theoretische idee dat

individuen een geschiedenis meebrengen in een nieuwe relatie, en dat deze geschiedenis samenhangt met stabiele persoonlijkheidstreken (Epstein, 1991). Samengevat illustreert dit het complexe proces waarmee persoonlijkheid de kwaliteit van latere hechte sociale relaties kan beïnvloeden op zowel de korte als op de lange termijn.

Persoonlijkheid en Persoonlijke Relaties: Patronen van Differentiële Vatbaarheid

Persoonlijkheid en de vatbaarheid voor de invloed van delinquentie van de beste vriend. In hoofdstuk 6 onderzochten we de mogelijke modererende rol van persoonlijkheid (overcontrollers, undercontrollers en resilients) in de longitudinale associaties tussen delinquentie van adolescenten en hun beste vrienden. Cross-lagged modellen werden geschat op data verzameld bij adolescenten en hun beste vrienden gedurende drie jaar, van 13 tot 15 jaar. De resultaten lieten zien dat delinquentie van overcontrollers werd voorspeld door de delinquentie van hun beste vriend, terwijl dit niet het geval was bij delinquentie van undercontrollers of resilients. Daarbij was de delinquentie van undercontrollers en resilients voorspellend voor de delinquentie van hun beste vrienden, maar gold dit niet voor de delinquentie van overcontrollers. Deze bevindingen suggereren dat individuen met verschillende persoonlijkheidstypen op een verschillende manier vatbaar zouden kunnen zijn voor de delinquentie van hun beste vriend, en dat individuen met verschillende persoonlijkheidstypen verschillen in hun mogelijkheid om invloed te hebben op de delinquentie van hun vrienden.

Persoonlijkheid en verschillende negatieve effecten van uitgemaakte romantische relaties op relatiekwaliteit. In hoofdstuk 7 onderzochten we of individuen met verschillende persoonlijkheidstypen verschilden in hun vatbaarheid voor bepaalde aspecten van romantische relaties. In een 10-jarige longitudinale studie onderzochten we of de modererende rol van persoonlijkheid van in adolescenten het effect van relatiebreken op de latere kwaliteit van romantische relaties zou modereren. Onze resultaten liet significantie interactie-effecten zien tussen persoonlijkheidstypen en de frequentie van relatiebreken op toekomstige relatiekwaliteit van romatische relaties. Met meer relatiebreken rapporteerden undercontrollers minder commitment en exploratie in hun huidige romantische relatie. Een dergelijk verband werd niet gevonden voor resilients of overcontrollers. Deze bevindingen suggereren dat voor undercontrollers, maar niet voor resilients of overcontrollers, eerdere verbroken relaties slecht kunnen zijn voor de kwaliteit van huidige romantische relaties, wat ondersteuning biedt voor de differentiële vatbaarheidshypothese.

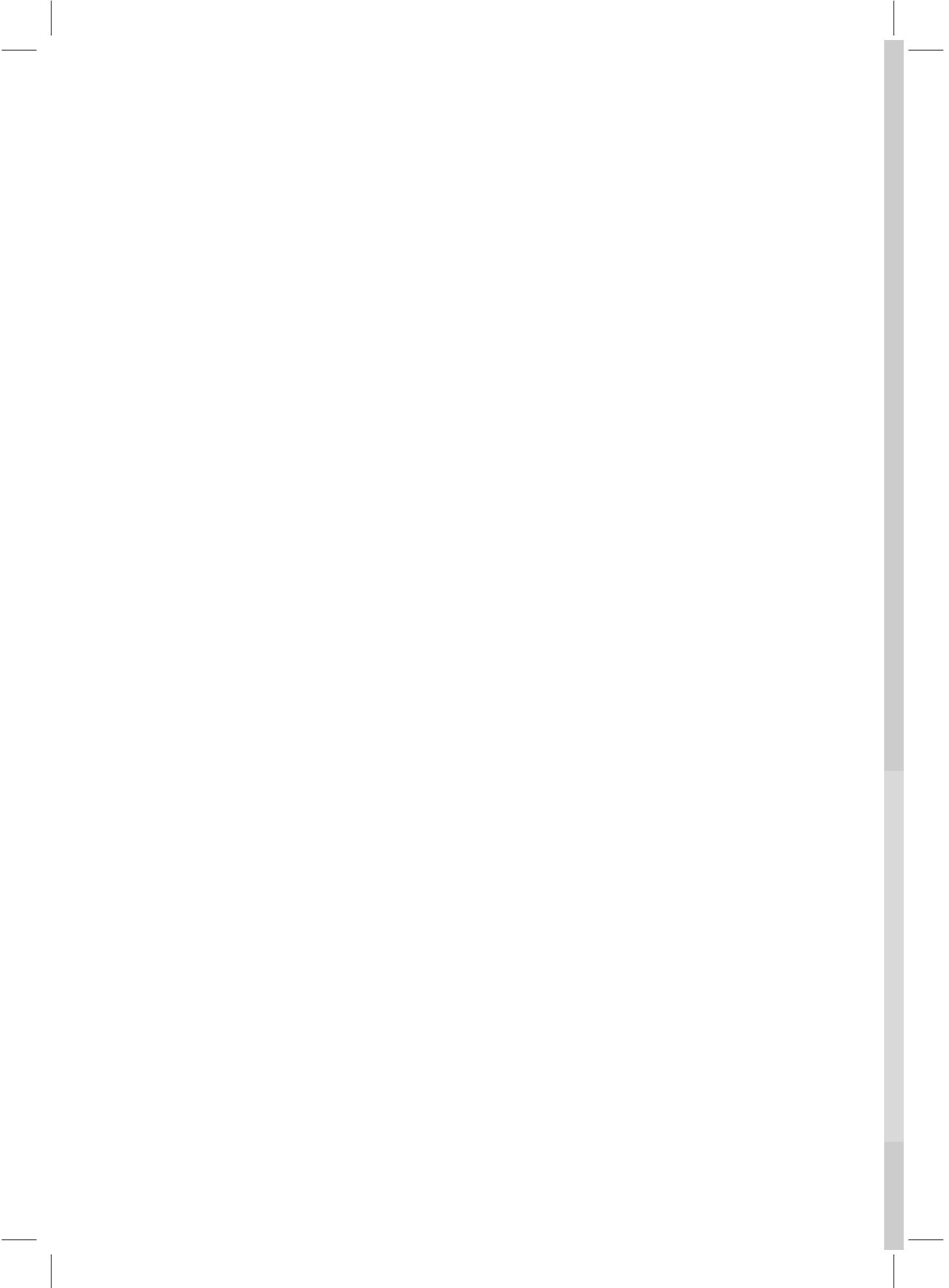
Persoonlijkheid en differentiële effecten van de kwaliteit van romantische relaties op angst en delinquentie. In hoofdstuk 8 onderzochten we interactie-effecten tussen de persoonlijkheidstypen van adolescenten en de kwaliteit van romantische relaties in de jongvolwassenheid op delinquentie en angst in de jongvolwassenheid. Data kwamen van

twee leeftijdscohorten die gedurende 10 jaar werden gevolgd: van 12 tot 21 jaar, en van 16 tot 25 jaar. Onze resultaten toonden significante interactie effecten tussen de persoonlijkheid van adolescenten en de kwaliteit van romantische relaties in de jongvolwassenheid op probleemgedrag. De associaties tussen waargenomen steun van romantische partners en de relatieve afname in angstsymptomen was sterker voor overcontrollers dan voor resilients. Daarnaast was meer waargenomen negatieve interactie met de romantische partner gerelateerd aan relatieve toenamen in delinquentie van undercontrollers, maar niet van overcontrollers of van resilients.

Concluderende Opmerkingen

Samenvattend suggereren onze bevindingen dat de persoonlijkheid van adolescenten samenhangt met en voorspellend is voor verschillende belangrijke ontwikkelingsuitkomsten. De persoonlijkheid van adolescenten hing namelijk samen met internalizerende en externalizerende problemen op een intrapersoonlijk niveau, en met conflict gedrag in beste vriendschappen en de kwaliteit van beste vriendschappen en romantische relaties op een interpersoonlijk niveau, zowel cross-sectioneel als longitudinaal. Bovendien was de sterkte van deze associaties tussen persoonlijkheid en het welzijn van jongeren stabiel over ontwikkelingsfasen. Deze bevindingen dragen bij aan bestaande literatuur door de voortdurende associaties tussen persoonlijkheid van adolescenten en diverse belangrijke aspecten van ontwikkeling te illustreren.

Zowel individuele als omgevingskenmerken zijn van belang om te verklaren hoe een individu zich ontwikkelt. Resultaten van studies naar interacties tussen de persoonlijkheid van jongeren en hun relationele omgevingen suggereren dat individuen met minder veerkrachtige persoonlijkheden in het bijzonder meer kwetsbaar zijn voor relationele eigenschappen dan veerkrachtige jongeren. Deze bevindingen ondersteunen een interactionistisch perspectief, dat stelt dat de uitkomst van ontwikkeling van individuen afhangt van de dynamische wisselwerking tussen aangeboren eigenschappen en omgevingsinvloeden (Magnusson & Stattin, 2006). Concluderend, de persoonlijkheid van adolescenten hangt direct samen met de ontwikkeling van individuen (probleemgedrag en relaties met vrienden), en indirect (relaties met partners), via de invloed op en interactie met sociale omgevingen.





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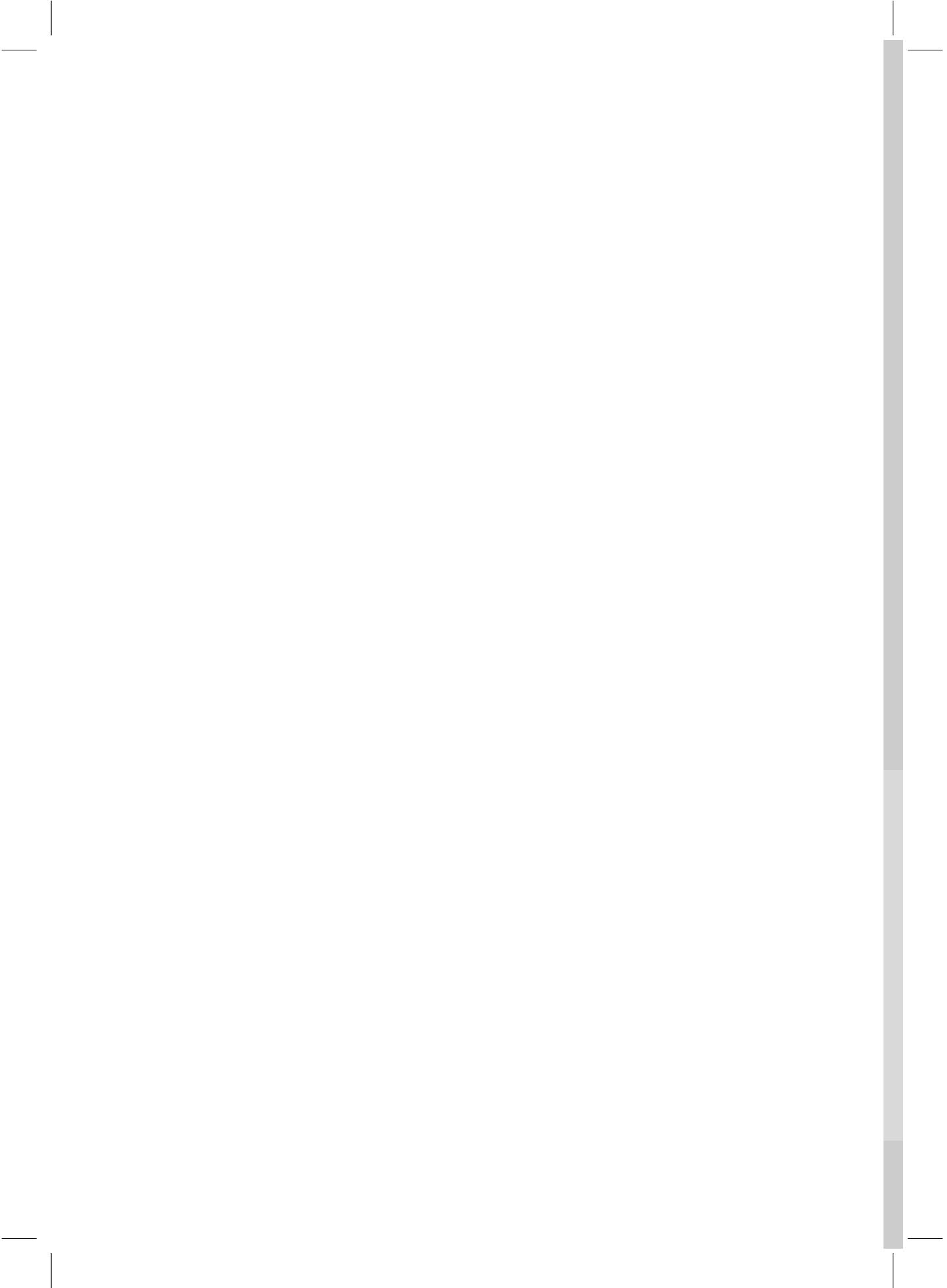
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ABOUT THE AUTHOR

CURRICULUM VITAE

Rongqin Yu was born in Zhejiang, at the southeast coast of China. At age 12, her journey outside of parents' house started as she began boarding schooling for junior and high school educations. Afterwards, she went to Jilin University, located in the northeast of China, for her bachelor study of education from 2000 to 2004. She fell in love with the -37 degree winter there so she continued her master study in the same university and studied applied psychology. She earned her first master degree in 2007. Afterwards, she started her journey of studying abroad. Attracted by the lovely tulip flowers in the Netherlands and the beautiful city Maastricht, and with the generous support of an UM (University of Maastricht) High Potential Scholarship, she entered a research master program in psychopathology, Maastricht University, The Netherlands. In 2009, she went to Department of Psychiatry, University of Oxford, United Kingdom, where she did her research master internship. She received her second master degree in psychopathology in 2009. Right afterwards, she started her PhD project in Research Center Adolescent Development, Utrecht University. During this period, she conducted several longitudinal studies some of which are presented in this dissertation. She also gained experience as a teacher by giving workshops to research master students. She enjoyed several international activities. She was selected for participation in 2010 summer school of European Association of Research in Adolescence (EARA) in, Örebro, Sweden. During her PhD study, she organized and participated in several international conferences. She was also invited to be one of the guest-editors for a special issue on "Youth sexual and romantic development" in European Journal of Developmental Psychology. In addition, she was invited for reviewing article for international journals such as Journal of Early Adolescence and International Journal of Behavioral Development. With the support of Youth and Identity Funding, she continues her work as a post-doctoral researcher at Department of Youth and Family, Utrecht University.

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