

## **The Development of Personality and Problem Behaviour in Adolescence**

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Spheres [1952], c/o Beeldrecht Amsterdam 2006

Cover design: Martijn Bok, Kerkrade, The Netherlands

Printing: Alberts Drukkerij VOF, Gulpen, The Netherlands

ISBN-10: 90-393-4397-7

ISBN-13: 978-90-393-4397-5

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**The Development of Personality and Problem Behaviour in Adolescence**

**Ontwikkeling van Persoonlijkheid en Probleemgedrag tijdens de Adolescentie**  
*(met een samenvatting in het Nederlands)*

**PROEFSCHRIFT**

ter verkrijging van de graad van doctor aan de Universiteit Utrecht  
op gezag van de rector magnificus, prof.dr. W.H. Gispen,  
ingevolge het besluit van het college voor promoties  
in het openbaar te verdedigen  
op vrijdag 24 november 2006 des middags te 12.45 uur

door

Joyce Akse  
geboren op 19 maart 1979 te Heerlen, Nederland

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## **Chapter 1**

### **GENERAL INTRODUCTION**



*Every person is unique. However, no individual is so exquisitely unique as to form a personality type (Block, 1971).*

The development of adolescents' personality is one of the two key subjects of this dissertation. Whether personality can grow or develop, lies at the heart of the conceptualization of personality. Central to most personality definitions lies the assumption that personality remains constant over time. Although it has long been thought that personality was stable, at least past the age of 30 (Costa & McCrae, 1994), recent studies have found meaningful changes in personality during all phases of life (Roberts & DelVecchio, 2000; Roberts, Walton, & Viechtbauer, 2006a). In this dissertation, the personality development of adolescents is studied. Adolescence is a period of life in which many changes occur, such as attending a new school or having new friendships or romantic relationships. Probably, these changes lead to personality change (e.g., Asendorpf & Van Aken, 2003a; Cyranowski, Frank, Young, & Shear, 2000; Srivastava, John, Gosling, & Potter, 2003). Therefore, we assume that adolescents' personality can develop.

The development of adolescents' problem behaviours is the second major subject of this dissertation. We consider it important to study this subject, since problem behaviours can limit the daily functioning of adolescents, leading to psychopathological disorders later in life (Angold, Costello, & Erkanli, 1999; Overbeek, Vollebergh, Meeus, Engels, & Luijpers, 2001), and since the prevalence of problem behaviours is higher in adolescence than at other ages (Krueger, 1999).

Both these major subjects are clearly related to each other; as Krueger, Caspi and Moffitt (2000) point out 'where problem behaviours are concerned, personality clearly matters'. This statement highlights the importance of the study of the interrelatedness of personality and problem behaviours. Therefore, studies on the development of problem behaviour should also focus on personality development.

Hence, the present dissertation focuses on the associations between the development of personality and the development of problem behaviours in adolescence. It elaborates on previous studies by focusing on data from adolescents and in employing longitudinal data and advanced methodological techniques. In this introduction we will provide some background information on the psychological concept of personality (§1.1.1), on adolescent internalizing and externalizing problem behaviours (§1.1.2, §1.1.3) and on the associations between adolescent personality and problem behaviours (§1.1.4). Next, this chapter will introduce the research aims of this dissertation (§1.2.1) and the specific research questions (§1.2.2) that are addressed in the various studies. Finally, the design of the project (§1.3) will be briefly presented and an outline (§1.4) will be provided on the further contents of this dissertation.

## **1.1. Main Concepts**

This dissertation focuses on two major concepts, namely the development of adolescent personality and the development of adolescent problem behaviours. These concepts will be introduced in the following paragraphs.

### **1.1.1 Personality**

Personality can be defined as 'the dynamic organization within the individual of those psychophysical systems that determine his unique adjustments to his environment' (Allport, 1937). In personality research two main approaches can be distinguished. The first approach is the person-centred (typological) approach, which focuses on the patterning and organization of personality dimensions within a person. The second approach is the variable-centred (dimensional) approach, which focuses on differences among individuals on a given personality dimension. Despite the growing recognition of the need for a person-oriented approach to understanding human development, most investigations of individual differences in personality have been variable-centred (Bergman & Magnusson, 1997). However, both approaches contribute important insights into the understanding and development of personality (e.g., Dubas, Gerris, Janssens, & Vermulst, 2002; Hart, Burock, London, Atkins, & Bonilla-Santiago, 2005; Robins, John, Caspi, Moffitt, & Stouthamer-Loeber, 1996; Van Leeuwen, Mervielde, Braet, & Bosmans, 2004), hence it cannot be argued that one of the two approaches is superior to the other. It is clear that typological and dimensional frameworks can co-exist and fruitfully inform each other (Robins & Tracy, 2003).

*In this dissertation, both the person-centred approach as well as the variable-centred approach are used.*

*Person-centred approach.* The overarching assumption of the person-centred approach is that personality dimensions should not be studied in isolation. Instead, personality researchers should focus on the total constellation of personality dimensions that define each person and the way these dimensions work together as a dynamic, integrated system. A central goal of this approach is to identify groups or subsets of individuals (e.g., personality types) who have similar configurations of dimensions and thus share the same basic personality structure. Individuals occupying the same cluster are assumed to have a similar etiology and similar personality dynamics (Asendorpf, 2002a; Robins & Tracy, 2003).

One important typology in personality research is the typology of Block and Block (1980). They describe personality in terms of two continuous dimensions: ego-resiliency and ego-control. Ego-resiliency refers to the tendency to respond flexibly rather than rigidly to changing situational demands, particularly stressful

situations; ego-control refers to the tendency to contain emotional and motivational impulses versus the tendency to express them (overcontrol vs. undercontrol; e.g., Block, 1971; Block & Block, 2006; Funder & Block, 1989; Letzring, Block, & Funder, 2005). When searching for a personality typology, Block and Block found five personality types in men (i.e., ego-resilients, vulnerable overcontrollers, unsettled overcontrollers, belated adjusters and anomic extraverts) and six personality types in women (i.e., females prototypes, cognitive copers, hyperactive feminine repressives, dominating narcissists, vulnerable undercontrollers and lonely independents) in a small sample of adolescents and adults. For a detailed description of the male and female personality types, see also Pulkkinen (1996) and York and John (1992).

Robins et al. (1996) studied the personality dimensions of Block and Block cross-sectionally and found ego-resiliency to have an inverted U-shaped relation with ego-control, on the basis of which they identified three personality types: resilient, overcontrollers and undercontrollers. Resilient reflected a high level of ego-resiliency and a medium level of ego-control; overcontrollers and undercontrollers both reflected a low level of ego-resiliency; however, they differed markedly on ego-control: high and low respectively. Additionally, Robins et al. (1996) found that these personality types had a specific profile on the dimensions of the Big Five dimensions. In general, the resilient had a generally well-adjusted profile, with above average scores on all five dimensions. They were significantly more conscientious, emotionally stable and open to experience than the other types, significantly more extraverted than overcontrollers and significantly more agreeable than undercontrollers. The only dimension on which resilient were not highest was agreeableness; overcontrollers were the most agreeable of the three types. Overcontrollers were also low on extraversion and emotional stability. Undercontrollers were distinguished by their low levels of agreeableness and conscientiousness; they were also low on emotional stability and openness to experience. These aforementioned Big Five profiles of the three personality types have been replicated in many subsequent studies (Asendorpf, Borkenau, Ostendorf, & Van Aken, 2001; Asendorpf & Van Aken, 1999; Dubas et al., 2002; Hart, Hofmann, Edelstein, & Keller, 1997; Robins et al., 1996; Schnabel, Asendorpf, & Ostendorf, 2002). Consequently, Asendorpf, Borkenau, Ostendorf and van Aken (2001) and Dubas et al. (2002) investigated whether the personality types could be constructed directly on the basis of the Big Five dimensions: this appeared to be possible. These three personality types have been replicated in many studies using different informants, methods and statistical techniques (see: Asendorpf, 2006b; Asendorpf & Van Aken, 1999; Caspi & Shiner, 2006), although some studies have recently questioned the number of personality types and the

reliability of specific informants and personality measures (Asendorpf, 2006a; Herzberg & Roth, 2006; McCrae, Terracciano, Costa, & Ozer, 2006a, 2006b; Rammstedt, Riemann, Angleitner, & Borkenau, 2004).

The main disadvantages of the person-centred approach are that data on inter-individual differences are lost in the transition from individual personality structure to personality types and that the type approach was always less predictive than a continuous dimensions approach in cross-sectional studies (only in long-term predictions was the type approach equally predictive; Asendorpf, 2003; Caspi, 2000). However, the main advantage of this approach is that information on individuals' personality structure as a whole is preserved, with respect to the definition of the types. Other advantages of using the person-centred approach are that they provide a descriptive efficiency as well as conceptual clarity and that they can be used very efficiently as independent and moderator variables (Robins & Tracy, 2003).

*Variable-centred approach.* By means of the variable-centred approach an individual's personality structure is studied using a trait perspective on personality (Allport, 1937; Funder, 1991). A personality trait or dimension can be defined as a psychological organismic structure underlying a relatively enduring behavioural disposition, i.e., a tendency to respond in certain ways under certain circumstances (Tellegen, 1988). The importance of personality dimensions has been well established, since research has documented many psychological, social, and health-related effects (Roberts, Robins, Trzesniewski, & Caspi, 2003).

One of the most important personality dimension taxonomies is the Big Five (John & Srivastava, 1999; McCrae & Costa, 1997), which has attracted much interest over the past years. The Big Five dimensions are five relatively independent and broad dimensions that explain a major portion of inter-individual differences in personality (Goldberg, 1990, 1992). They do not represent a particular theoretical perspective, but are derived from analyses of the natural-language terms people use to describe themselves and others (Digman, 1990; Goldberg, 1990, 1992; McCrae & Costa, 1997; Robins, John, & Caspi, 1994).

The Big Five perspective faces some disadvantages. For example, the formulation of the Big Five is a-theoretic in its origin, the exact number of factors seems somewhat arbitrary, it ignores the individuals' personality structure as a whole and while constructing the dimensions, factor analysis was the only statistical technique that was relied on (Asendorpf, 2003; Block, 1995). However, one of the primary advantages of the Big Five framework is its ability to organize previous research findings on the development of personality dimensions into a manageable number of conceptually different domains (Roberts et al., 2003), which

greatly facilitates the accumulation and communication of empirical findings by offering a standard vocabulary, or nomenclature (John & Srivastava, 1999). The Big Five dimensions have been found in numerous studies using different instruments, languages, cultures and age-group samples, such as adolescents, and they have been related to several other personality models (e.g., Asendorpf & Van Aken, 2003a; Branje, Van Lieshout, & Gerris, in press; Costa & McCrae, 1992; McCrae & Terracciano, 2005; Van Lieshout, 2000).

The Big Five dimensions are extraversion, agreeableness, conscientiousness, emotional stability and openness to new experience. Extraversion refers to the individual's outer-directed interpersonal behaviour and describes those who experience positive affect and those who are generally active, assertive, energetic and sociable. Agreeableness refers to a quality of interaction preference ranging from compassion to antagonism and describes those who are altruistic, trusting, modest and warm. Conscientiousness assesses task and goal-directed behaviour, persistence, organization and socially prescribed impulse control and describes those who are self-controlled, planful and rule-following. Emotional stability, or its converse neuroticism, contrasts even-temperedness and a positive emotional adjustment with the experience of anger, hostility, irritability, sadness and worry. Finally, openness to experience refers to the active seeking and appreciation of life experiences and describes those who are original, complex, creative and open to new ideas (Asendorpf & Van Aken, 2003b; Dubas et al., 2002; Goldberg, 1990; Huey Jr. & Weisz, 1997; John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994; John & Srivastava, 1999; Roberts, Robins et al., 2003).

*Development of personality.* Personality characteristics have long been regarded as biologically based endogenous dispositions that show continuity over time. It was thought that personality was set in childhood and adolescence, and became fully crystallized by the age of 30 (Costa & McCrae, 1994). However, more recent studies suggest that developmental change of personality continues to occur during the entire life course (Roberts & DelVecchio, 2000; Roberts, Walton, & Viechtbauer, 2006a). Hence, in addition to remarkable levels of continuity, research reveals that personality shows important and systematic changes that are meaningfully connected to particular life experiences and contexts (Roberts, Caspi, & Moffitt, 2003).

In this dissertation, we focus on the personality development during adolescence. However, although adolescence has often been described as a period of 'storm and stress', it has proved to be more of a period in which various types of problems are more likely to arise than at other ages (Arnett, 1999). Generally, adolescents face a period of pervasive change in physical, cognitive, emotional,

and social competencies and concerns (Rice, 1999; Roberts, Caspi, & Moffitt, 2001; Steinberg & Silk, 2002). It is a transitional period in which individuals attend a new school or get a new job, have new or changing friendships or romantic relationships and have changing relationships with their parents. It is not unlikely that these changes, and the stressors that accompany them, have an impact on personality and could lead to personality change (Asendorpf & Van Aken, 2003a; Cyranowski et al., 2000; Pervin, 1994; Rice, 1999; Srivastava et al., 2003; Steinberg & Silk, 2002). Similarly, these changes could also lead to problem behaviours or to changes in problem behaviours.

Personality continuity can be measured using several statistical indices, such as intra-individual differences in consistency, ipsative consistency, consistency in personality type membership, rank-order consistency and mean-level consistency. Existence of consistency in personality according to one of these indices does not rule out the possibility of change according to one of the other indices. Each of these methodological approaches addresses a different question, and these questions are not always statistically or conceptually related to each other (Asendorpf & Weinert, 1990; Roberts & DelVecchio, 2000). Obviously, these approaches can also be applied to research on problem behaviours as well as to other psychological phenomena.

*In this dissertation, only consistency in personality type membership, rank-order consistency and mean-level consistency are studied.*

In this section, we will specifically focus on consistency in personality type membership, rank-order consistency and mean-level consistency. To our knowledge, stability and change in personality type membership based on the personality theory of Block and Block (1980) have been investigated in three studies only (Asendorpf & Van Aken, 1999; Hart, Atkins, & Fegley, 2003; Van Aken & Dubas, 2004). Overall, the stability of personality type membership appeared to be low to moderate in childhood and early adolescence (Asendorpf et al., 2001; De Fruyt, Mervielde, & Van Leeuwen, 2002). However, no studies have been reported on the stability and change of personality type membership during the course of adolescence.

Second, rank-order continuity in personality is most often indexed by the correlation between personality scores across two points in time (i.e., test-retest correlations). These differential, or rank-order, continuity estimates reflect the degree to which the relative ordering of individuals on a given personality dimension is maintained over time. Rank-order continuity is influenced by maturational or experiential factors that differentially affect people, as well as measurement error (Fraley & Roberts, 2005; Roberts & DelVecchio, 2000; Roberts et

al., 2003; Shiner & Caspi, 2003). Two contradictory predictions have been proposed about the rank-order consistency of personality dimensions. The classical trait perspective argues that personality dimensions in adulthood are biologically based 'temperaments' that are not susceptible to the influence of the environment and thus do not change over time (McCrae et al., 2000). From this 'essentialist' perspective, we would expect the test-retest correlations to be high, even in adolescence. In contrast, the 'contextual' perspective emphasizes the importance of life changes and role transitions in personality development and suggests that personality should be fluid, prone to change, and yield low test-retest correlation coefficients, particularly during adolescence (Lewis, 1999). Existing longitudinal studies do not support either of these extreme positions. It is now known that the rank-order consistency of personality dimensions is moderate in magnitude, that it increases as age increases, and that it only peaks after the age of 50 (Fraley & Roberts, 2005; Roberts & DelVecchio, 2000; Roberts et al., 2003; Shiner & Caspi, 2003). However, it is not yet known whether the rank-order stability of personality changes within specific periods of life, such as adolescence.

Finally, personality continuity can be measured by assessing mean-level changes in personality. Mean-level change refers to changes in the average level of personality dimensions in the population and reflects whether groups of people increase or decrease on dimensions over time. If groups of people show reliable mean-level change of personality over time, then personality is inconsistent in showing normative changes (Roberts et al., 2006a, 2006b). This type of change is thought to result from maturational or historical processes shared by a population and is typically assessed by mean-level differences in specific dimensions over time, which indicate whether the sample as a whole is increasing or decreasing on a dimension (Roberts, Robins et al., 2003). Personality development is also clearly present in adolescence. For example, Branje, Van Lieshout and Gerris (in press) found a mean-level increase in extraversion, agreeableness, conscientiousness and openness in girls and a decrease in extraversion and openness in boys. Both rank-order and mean-level consistency rely on population indices to judge whether personality changes.

### ***1.1.2 Problem Behaviours in Adolescence***

In this dissertation, the term problem behaviour refers to symptoms that are not as high in severity and in number as psychiatric disorders; in other words, the problem behaviours that are investigated here are sub-clinical. Over the last two decades more and more research has been done on problem behaviours in childhood and adolescence (Wenar & Kerig, 2000). It is important to study problem behaviours during adolescence, since it can limit the daily functioning of

adolescents, since certain problem behaviours during adolescence can be precursors of later psychiatric disorders (Angold et al., 1999; Overbeek et al., 2001) and since the prevalence of problem behaviours is higher in adolescence than in other age cohorts (Krueger, 1999).

Problem behaviours can be divided into two major components, namely internalizing and externalizing problem behaviours (Krueger, Caspi, Moffitt, & Silva, 1998). Internalizing problem behaviours, such as depressive and anxious feelings, are behaviours that are directed inwardly. These problem behaviours are likely to result from the interaction between environmental conditions (such as poor social relationships or a large amount of stress) and individual predispositions (such as personality dimensions, genes, intelligence or cognitive characteristics): depressive and anxious feelings can occur when individuals who are predisposed toward internalizing problems (e.g., individuals with an overcontrolling personality type) are exposed to chronic or acute stressors that can precipitate a depressive reaction (Brozina & Abela, 2006; Steinberg, 2002). In this dissertation, we will focus on environmental conditions (Chapter 2) as well as on individual predispositions (Chapter 3 and 5). More specifically, the environmental condition under study in chapter 2 is parental rejection: we will investigate whether the association between parental rejection and problem behaviour is stronger in adolescents who cannot respond flexibly in highly stressful situations. The individual predispositions studied in chapter 3 and 5 are the Big Five personality dimensions.

During adolescence, internalizing problem behaviour increases and eventually it stabilizes (Van der Valk, Spruijt, De Goede, Maas, & Meeus, 2005). The course of internalizing problems differs for boys and girls: until early adolescence there are no clear gender differences in internalizing problem behaviour; however, girls increase from early adolescence onwards, whereas boys remain relatively stable (Bongers, Koot, Ende, & Verhulst, 2003; Compas, Hinden, & Gerhardt, 1995). More specifically, the prevalence of depression shows a dramatic rise between 13 and 15 years of age, after which a peak is present at 17 and 18 years; in the late teens and early twenties the prevalence declines (Wenar & Kerig, 2000); additionally, girls seem to be more likely to experience depression than boys (Nolen-Hoeksema, 2001; Van der Valk et al., 2005), although this difference has not been found consistently (e.g., Kovacs, 2001). Furthermore, anxious feelings have a high prevalence during adolescence (Costello & Angold, 1995), although its exact development depends on the specific anxiety symptoms under study (Craske, 1997).

*In this dissertation, the internalizing problem behaviours that are investigated are depressive and anxious feelings.*

The other major component of problem behaviour in adolescence is externalizing problem behaviour, which are problem behaviours that are directed outwardly. These problem behaviours can occur due to the factors that may also cause internalizing problem behaviours (Steinberg, 2002). In contrast to internalizing problem behaviours, the mean level of externalizing problem behaviours is higher in boys than in girls (Coie & Dodge, 1998; Meeus, Branje, & Overbeek, 2004). Males consistently display more physical and serious forms and females tend to use more indirect forms of externalizing problem behaviours (Lagerspetz & Björkqvist, 1994). Generally, when adolescents grow older, they show less and less externalizing problem behaviours (Nagin & Tremblay, 1999). Although most adolescents become well-adjusted adults, the majority of adolescents become involved in some form of aggression or delinquency. Several studies even suggest that these behaviours are normative during adolescence (Arnett, 1999; Compas et al., 1995; Moffitt, 1993; Moffitt & Caspi, 2001). These externalizing problem behaviours seem to be both stable (Coie & Dodge, 1998) and transient during adolescence (Compas et al., 1995). An explanation for this seemingly contradictory development can be explained by two different pathways, namely a life-course persistent pathway, in which early conduct problems in childhood escalate and manifest as delinquency in adolescence, and an adolescence-limited pathway, in which previously well-adjusted adolescents experiment with delinquent behaviour (Moffitt, 1993; Moffitt & Caspi, 2001). Aggressive behaviour decreases from early adolescence onwards for both boys and girls, although it decreases in a larger amount and in a faster rate in boys than in girls (Bongers et al., 2003). The level of delinquency seems to increase during early and middle adolescence, until the age of 17, after which it decreases (Bongers et al., 2003; Coie & Dodge, 1998; Compas et al., 1995; Meeus et al., 2004; Moffitt, 1993; Van der Valk et al., 2005).

*In this dissertation, the externalizing problem behaviours that are investigated are aggression and delinquency.*

### ***1.1.3 Co-occurrence of Internalizing and Externalizing Problem Behaviours during Adolescence***

Internalizing and externalizing problem behaviours often co-occur during adolescence. The co-occurrence is even higher than could be accounted for by the rate of the occurrence of the individual problem behaviours in the general population (Angold et al., 1999; Krueger et al., 2000). When co-occurrence is present, it frequently implies greater impairment and a worse outcome over time (Angold et al., 1999; Keiley, Lofthouse, Bates, Dodge, & Pettit, 2003; Lilienfeld, 2003; Youngstrom, Findling, & Calabrese, 2003).

Ever since the idea of co-occurrence originated (Feinstein, 1970), its application to problem behaviours has sparked disagreement and sharp controversy (Lilienfeld, 2003). First of all, co-occurrence was seen as a methodological artefact; however, it is present at all levels of severity of problem behaviours and it has been found by means of different measurement techniques. Second, co-occurrence was thought to be due to the assignment of individuals to groups with certain problem behaviours; however, the criteria of the problem behaviours do not overlap. Therefore, despite possible disagreements and controversies, co-occurrence is established as being an important research issue of problem behaviours (Angold et al., 1999; Lilienfeld, 2003).

Although the co-occurrence of adolescent internalizing and externalizing problem behaviours has been widely studied (e.g., Angold et al., 1999; Ben-Amos, 1992; Meller & Borchardt, 1996), the nature of the longitudinal associations is not yet clear (Beyers & Loeber, 2003). Several theories on the mechanisms of the co-occurrence of these problem behaviours have been proposed, such as failure, acting out, stability, mutual influences, independence and multivariate models (Krueger & Markon, 2006; Overbeek et al., 2001). However, it is not clear which of these models describe the co-occurrence of internalizing and externalizing problem behaviours best.

In this dissertation, we will specifically focus on the failure, acting out and stability models, since it was suggested that these models should be complemented with the person-centred approach (e.g., Wiesner, 2003; obviously, this approach could also be applied to the other models). Both the failure and acting out theories suggest that one problem behaviour constitutes a risk factor for the other; however, they differ in the manner in which internalizing and externalizing problem behaviours predict each other. The failure theory holds that externalizing problems predict internalizing problems; disruptive behaviour may result in rejection and a lack of support by important others, which lead to worries, anxious and depressive feelings (Burke, Loeber, Lahey, & Rathouz, 2005; Capaldi, 1992). On the other hand, the acting out theory claims that internalizing problems predict externalizing problems; underlying depressive feelings are acted out by displaying externalizing problem behaviour (Carlson & Cantwell, 1980; Gold, Mattlin, & Osgood, 1989).

In addition to the 'failure' and 'acting out' theories, another theory has been proposed to explain the co-occurrence of depressive feelings and delinquency. The stability perspective states that the co-occurrence of internalizing and externalizing problem behaviours is caused by non-specific risk factors, such as family history of offending, parent-child relationships or life events (Fergusson, Lynskey, & Horwood, 1996), which lead to separate but associated problem behaviours (Krueger, 1999; Krueger et al., 1998; Overbeek et al., 2001). This implies that there

are no uni-directional or bi-directional relations between the problem behaviours over time and that neither problem behaviour affected the other over time.

*In this dissertation, the stability, the acting out and the failure model are investigated to examine the associations between internalizing and externalizing problem behaviours.*

#### **1.1.4 Associations between Personality and Problem Behaviours in Adolescence**

Although problem behaviours are more likely to occur in adolescence than in other periods of life, it is not yet clear how these problem behaviours come about. However, as previously noted, personality may play an important role in the development of problem behaviours (Krueger et al., 2000; Krueger & Tackett, 2003; Shiner & Caspi, 2003). In the following sections, the associations of both adolescent personality types and dimensions with adolescent problem behaviours are described.

*Associations between personality types and problem behaviour.* The significant association between personality types and problem behaviours is well-established, since many cross-sectional studies have demonstrated clear differences in psychosocial functioning that conceptually endorse the three aforementioned personality types (i.e., overcontrolling, undercontrolling and resilient types) in children and adolescents. Overall, overcontrollers were found to be more prone to higher levels of internalizing problems and undercontrollers were found to be more prone to higher levels of externalizing problems. The resilient personality type exhibited the most preferred psychosocial adjustment, implying lower levels of internalizing and externalizing problem behaviour compared to the level of problem behaviour of the other two personality types (e.g., Asendorpf et al., 2001; De Fruyt et al., 2002; Dubas et al., 2002; Hart et al., 2005; Robins et al., 1996).

Although the associations between personality types and problem behaviours are well-established, as explained above, fewer studies have addressed the relationship of changes in personality with changes in internalizing and externalizing problem behaviours. With respect to personality type membership, no study has yet examined the change in these three personality types with concurrent change in internalizing problem behaviours during adolescence. There are a number of reasons why it is important to study these associations: (a) the personality type membership is related to problem behaviours (e.g., Dubas et al., 2002; Robins et al., 1996), (b) the personality type membership is only moderately stable and thus is open for change (e.g., Asendorpf & Van Aken, 1999), (c) internalizing problem behaviours have a high prevalence in adolescence (e.g., Costello & Angold, 1995) and its level changes during adolescence (e.g., Treffers, 2000), (d) the search for a developmental typology of internalizing problem

behaviours has gained interest; several internalizing trajectories are already found (Van Lang, Ferdinand, Ormel, & Verhulst, 2006), and finally, (e) personality maturations may parallel a decrease in anxious feelings (Caspi, Roberts, & Shiner, 2005). Therefore, it appears worthwhile to study the associations between change in personality type membership and internalizing problem behaviours.

*In this dissertation, the associations between change in personality type membership and change in anxious feelings are investigated.*

*Associations between personality dimensions and problem behaviours.* Previous studies of adolescent personality dimensions and problem behaviours have focused on mean-level and rank-order associations. When focusing on mean-level associations between personality dimensions and problem behaviour, (relatively) low levels of conscientiousness and emotional stability (John et al., 1994) as well as a (relatively) low level of extraversion were found in internalizers (Asendorpf et al., 2001). In externalizers, (relatively) low levels of agreeableness and conscientiousness and an increased level of extraversion were found (Asendorpf et al., 2001; John et al., 1994).

When focusing on the cross-sectional rank-order associations between personality dimensions and problem behaviour in childhood and adolescence, extraversion was found to be negatively related to internalizing problems and to be positively related to externalizing problems (Huey Jr. & Weisz, 1997; Paunonen, 1998). Agreeableness was found to be positively related to internalizing problems (Krueger, 1999) and to be negatively related to externalizing behaviours (Asendorpf & Van Aken, 2003b; Ehrler, Evans, & McGhee, 1999; Huey Jr. & Weisz, 1997; Krueger, 1999; Paunonen, 1998). Conscientiousness, then, was found to be negatively related to externalizing behaviours (Asendorpf & Van Aken, 2003; Ehrler et al., 1999; Huey & Weisz, 1997; Paunonen, 1998). Emotional stability was found to be negatively related to both internalizing problems (Ehrler et al., 1999; Huey & Weisz, 1997) and externalizing problems (Paunonen, 1998). Finally, no consensus has been reached about whether openness was positively or negatively related to externalizing problem behaviours (Caspi, Roberts, & Shiner, 2005; Ehrler et al., 1999; Krueger, 1999; Paunonen, 1998). Although the relations between the Big Five personality dimensions and the broad internalizing and externalizing components of problem behaviour are well established, the relations between the Big Five dimensions and *specific* problem behaviours, such as depressive and anxious feelings (internalizing) and aggression and delinquency (externalizing), are not yet clear.

Although many cross-sectional studies have been performed in order to investigate the associations between personality and problem behaviours, fewer

longitudinal studies examined whether the Big Five personality dimensions are useful in predicting which adolescents are likely to develop problem behaviours over time. One of the rare longitudinal studies in this regard has been conducted by Huey and Weisz (1997). They found that extraversion negatively predicted internalizing problems and positively predicted externalizing problems, that agreeableness as well as conscientiousness negatively predicted externalizing problem behaviours and, finally, that emotional stability negatively predicted internalizing problem behaviours.

Additionally, although it is already known that contextual and experiential factors could affect personality (Asendorpf, 2002b; Asendorpf & Van Aken, 2003a; Lehnart & Neyer, in press; Neyer & Asendorpf, 2001), only one longitudinal study known to the author investigated whether problem behaviours could predict changes in personality. In a study by Ge and Conger (1999) it was found that emotional and behavioural problems predicted change in personality dimensions, as measured by the Multidimensional Personality Questionnaire (Tellegen et al., 1988), during adolescence. To our knowledge, no longitudinal study has investigated the associations between the Big Five dimensions and specific problem behaviours in a full recursive design. Obviously, it is important to study the bi-directionality between personality and problem behaviour over time (Fraley & Roberts, 2005), since previous studies found that personality affected problem behaviour (Huey & Weisz, 1997) and vice versa (Ge & Conger, 1999). However, these studies did not investigate the bi-directionality of the associations between personality and problem behaviour. Therefore, a study in which a full recursive design is used, is highly recommended (Fraley & Roberts, 2005).

*In this dissertation, the longitudinal associations between personality dimensions and aggression and anxious feelings are investigated in a full recursive design.*

*Associations between adolescent personality and co-occurrence of internalizing and externalizing problem behaviours.* Although several models have been proposed concerning the co-occurrence of internalizing and externalizing problem behaviours, namely the stability, acting out and failure models (see §1.1.3), the results of previous studies have been inconsistent with regard to the *nature* of the co-occurrence of internalizing and externalizing problem behaviours during adolescence (Beyers & Loeber, 2003; Wiesner, 2003). Obviously, it is not yet clear which of the models can best describe the co-occurrence of internalizing and externalizing problem behaviours for adolescents.

Possibly, these aforementioned studies lack a potential key factor underlying the co-occurrence of depression and delinquency, namely a person's personality (Wiesner, 2003). Indeed, personality dimensions have been shown to account

directly for patterns of co-occurrence; for example, neuroticism has been found to be a potential vulnerability factor for the co-occurrence of internalizing and externalizing problem behaviours in a sample of (young) adults (Khan, Jacobson, Gardner, Prescott, & Kendler, 2005; Krueger & Markon, 2006). However, it was also noted that the patterning of individual differences in personality or the configurations of personality dimensions could have unique relevance to understanding the patterning of psychopathology (Krueger, 2005; Krueger et al., 2000). Consequently, the co-occurrence of internalizing and externalizing problem behaviours could differ between the personality types and the personality types could clarify the co-occurrence of internalizing and externalizing problem behaviours.

*In this dissertation, the moderation of personality type membership is investigated in the longitudinal co-occurrence of internalizing and externalizing problem behaviours.*

## **1.2 Research Aims and Outline of this Dissertation**

### **1.2.1 Research Aims**

The main purpose of this dissertation is to contribute to the understanding of the development of personality and the development of problem behaviours during adolescence. More specifically, this dissertation elaborates on previous studies by investigating longitudinal associations between adolescents' personality, using both a person-centred and a variable-centred approach, and several specific internalizing and externalizing problem behaviours.

### **1.2.2 Research Questions and Contents**

This dissertation comprises four studies, each of which addresses a part of the overall research interest. The first study examines the personality type differences on the associations between perceived parental rejection, depressive feelings and aggression. The second study focuses on the associations between stable and changing personality groups and changes in the level of anxious feelings. The third study investigates differences between stable personality groups on the co-occurrence of depressive feelings and delinquency. Finally, the fourth study focuses on the associations between personality dimensions, aggression and anxious feelings. In the following section the research questions of these studies are presented.

*I. What are the associations between perceived parental rejection, depressive feelings and aggression during adolescence? Are these associations moderated by personality type membership? (Chapter 2)*

The first study examines the cross-sectional associations between perceived parental rejection, depressive feelings and aggression. This study investigates the impact of perceived parental rejection on depressive feelings as well as on aggression by means of structural equation modelling. Furthermore, this study assesses whether this impact differs for three distinctive personality types. Before we address this issue, we will first examine whether the personality questionnaire used in this study, is appropriate for constructing personality types. Next, the possible moderating effects of the personality type by gender groups are examined on the associations between perceived parental rejection, depression and aggression.

*II. What is the stability or changeability of personality type membership during adolescence? Is change in personality type membership related to change in anxiety level? (Chapter 3)*

The second study examines the associations between personality type membership and anxious feelings over time. Two-wave longitudinal data reported by adolescents themselves are used. Three stable and six changing personality groups are constructed using k-means cluster analysis. Stability and change in personality type membership are examined by means of general loglinear models, whereas the associations between changes in personality type membership and anxiety level are investigated using repeated measures analyses and difference scores.

*III. What is the nature of the longitudinal associations between depressive feelings and delinquency during adolescence? Are these associations moderated by stable personality groups? (Chapter 4)*

The third study examines the nature of the longitudinal associations between depressive feelings and delinquency. Three-wave longitudinal data reported by adolescents themselves are used. This study investigates which of several co-occurrence models, namely a stability, an acting out or a failure model, best explains the co-occurrence of depressive feelings and delinquency by means of structural equation modelling. Furthermore, three stable personality groups are constructed using k-means cluster analyses and they are validated by means of repeated measures analyses. Finally, this study assesses whether these longitudinal associations differ between stable personality groups; two competing hypotheses are tested in this regard. The first hypothesis states that co-occurrence in

overcontrollers will be best described by an acting out model, whereas the co-occurrence in undercontrollers will be best described by a failure model; the second hypothesis claims that the stability of depressive feelings as well as delinquency, including the co-occurrence of depressive feelings and delinquency, is higher in resilient than in overcontrollers and undercontrollers.

*IV. What are the longitudinal associations between the Big Five personality dimensions and problem behaviours during adolescence? Is personality hierarchically superior to problem behaviour during adolescence? (Chapter 5)*

The fourth study examines the longitudinal associations between the Big Five personality dimensions on the one hand and the problem behaviours aggression and anxious feelings on the other. We examine whether personality is hierarchically superior to problem behaviours by means of structural equation modelling in a four-wave full recursive design. When hierarchical superiority of personality over problem behaviour is present, the following assumptions should be met. The first assumption states that the rank-order stabilities of the Big Five personality dimensions are larger than the rank-order stabilities of the aggressive and anxious problem behaviours; the second assumption states that personality is a better predictor of problem behaviour than the reverse. Additionally, we address differences between and within early and middle adolescent age groups using multi-group age group models.

### **1.3 Project Design**

The results presented in this dissertation are based on data collected as part of the CONflict And Management Of Relationships study (CONAMORE; Meeus et al., 2002). Its main purpose is to investigate the relationships of adolescents with their parents and peers as well as the adolescents' emotional and behavioural states. CONAMORE is a longitudinal research project with a total of five measurement waves conducted annually. This design provides information about stability and change in the development of individuals over time. Since the data are gathered in (junior-)high schools, only adolescents from the general population participated.

From the first wave onward, the sample was designed to contain two age cohorts, namely early and middle adolescents. The total longitudinal sample consists of 1,331 adolescents and demonstrates a very small attrition. In this dissertation, only the data of the first four waves are presented. A conceptual overview of the concepts and measures used in this dissertation is given in Table 1

and a more detailed description of the research project and the participants can be found in the Method-sections of chapters 2, 3, 4 and 5.

**Table 1.** Concepts and measures used in this dissertation

Concepts	Measures	Chapter
<i>Personality</i>	Big Five questionnaire (Goldberg, 1992)	2, 3, 4, 5
Person-centred approach		2, 3, 4
Variable-centred approach		5
<i>Problem Behaviours</i>		
Depressive feelings	Children's Depression Inventory (CDI; Kovacs, 1985)	2, 4
Anxious feelings	Screen for Child Anxiety Related Emotional Disorders (SCARED; Birmaher et al., 1997)	3, 5
Aggression	Aggression questionnaire (Björkqvist et al., 1992)	2, 5
Delinquency	Delinquency questionnaire (Baerveldt et al., 2003)	4
<i>Perceived Parental Rejection</i>	Level of Expressed Emotion questionnaire (LEE, hostile criticism; Gerlsma & Hale 1997)	2

#### 1.4 Outline of this Dissertation

After the current introduction, five chapters follow containing four empirical studies and a general discussion. The empirical studies all differ in their specific focus and research questions and are all based on data from the research project CONAMORE. Finally, the last chapter of this dissertation comprises a summary of the four empirical studies and discusses their theoretical and methodological implications and limitations. Also, a reference list, a summary (in English and in Dutch), acknowledgements (in Dutch) and a curriculum vitae (in English and in Dutch) are presented as the closing sections of this dissertation.



## **Chapter 2**

### **PERSONALITY, PERCEIVED PARENTAL REJECTION AND PROBLEM BEHAVIOUR IN ADOLESCENCE <sup>1</sup>**

<sup>1</sup> Akse, J., Hale III, W. W., Engels, R. C. M. E., Raaijmakers, Q. A. W., & Meeus, W. H. J. (2004). Personality, perceived parental rejection and problem behavior in adolescence. *Social Psychiatry and Psychiatric Epidemiology*, 39, 980-988.

### **Abstract**

*Background:* It has been well documented that adolescents run a heightened risk for developing depression and aggression, when they feel rejected by their parents and that parental rejection has different effects for gender in developing depression and aggression. Whether personality in combination with gender plays a role in the association between parental rejection, depression and aggression has not yet received much attention. *Method:* This was a cross-sectional study using data from the CONflict And Management Of Relationships study (CONAMORE). 1142 early and middle adolescents completed questionnaires about parental rejection, depression, aggression and personality. The associations between the variables were tested in multi-group moderation models using structural equation modeling. *Results:* Perceived parental rejection was associated with depression and aggression in most of the combined personality type and gender groups. Personality type and gender moderated the associations between perceived parental rejection, depression and aggression. Several clear differences between the combined personality type and gender groups were found on these associations. *Conclusion:* Several clear moderating effects of the personality type x gender groups were found on associations between perceived parental rejection, depression and aggression. Future research should focus on these specific combinations instead of using either personality types or gender separately.

## **2.1 Introduction**

It has been well documented that adolescents run a heightened risk for developing internalizing and externalizing problem behaviour, such as depression and aggression, when feeling rejected by their parents (Buehler & Gerard, 2002; Chang, Schwartz, Dodge, & McBride-Chang, 2003; Chen, Liu, & Li, 2000; Forehand & Nousiainen, 1993; Ge, Best, Conger, & Simons, 1996; Harold & Conger, 1997; Khaleque & Rohner, 2002; Koestner, Zuroff, & Powers, 1991; Muris, Schmidt, Lambrechts, & Meesters, 2001; Rapee, 1997; Rothbaum & Weisz, 1994). Parental rejection can lead adolescents to negatively evaluate themselves and their future; evaluations which, in turn, can make them vulnerable for depression (Kim et al. 2003; Nolan et al., 2003). Additionally, it has been shown that parental rejection tends to increase a child's learning of socially unacceptable behaviour, such as externalizing behaviour (Ge et al., 1996; Rothbaum & Weisz, 1994). Furthermore, it is known that adolescent problem behaviours such as depression and aggression have a high co-occurrence (e.g., Verhulst, 2000; Wenar & Kerig, 2000) and that parental rejection has different effects on gender. Girls value engagement in personal relationships more than boys: when feeling rejected, it seems to be that parental engagement is absent and in these circumstances girls are more likely to feel depressed (Feinberg et al., 2000; Gjerde et al., 1988). In contrast, boys are more likely to react with externalizing behaviour to stressors, such as feelings of rejection, than girls (Ge et al., 1996; Rothbaum & Weisz, 1994).

In addition to gender, other variables may play a role in the relationship between perceived parental rejection and adolescent depression and aggression. The personality of the adolescent is a possible moderator in this respect. This is suggested by the findings of O'Connor and Dvorak (2001) which is the first study in which it was shown that personality moderates the association between parental behaviour and adolescent problem behaviour. In some personality types ineffective parenting did not result in adolescent problem behaviour, whereas in other types it did. Moreover, there is recent evidence that parental behaviour may have little influence on the development of problems in children with particular personality characteristics (O'Connor & Dvorak, 2001; Rothbaum & Weisz, 1994).

In this study we use the personality typology of J. H. Block and J. Block (1980) to describe the adolescent's personality. Block and Block described personality in terms of two continuous concepts: ego-control and ego-resiliency. Ego-control refers to the tendency to contain emotional and motivational impulses versus the tendency to express them (undercontrol vs. overcontrol), whereas ego-resiliency refers to the tendency to respond flexibly rather than rigidly to changing situational demands, particularly stressful situations. Block and Block assumed

that both extremely high and low levels of ego-control could be related to high and low levels of ego-resiliency (Asendorpf & Van Aken, 1999; Block & Block, 1980; Dubas et al., 2002; Hart et al., 1997; Robins et al., 1996; Van Lieshout et al., 1998). Since Robins et al. (1996) found ego-resiliency to have an inverted U-shaped relation with ego-control they identified three personality types: resilient, overcontrollers and undercontrollers. Resilient reflected a high level of ego-resiliency and a medium level of ego-control; overcontrollers and undercontrollers both reflected a low level of ego-resiliency; however, they differed markedly on ego-control.

Robins et al. (1996) not only described the personality types in terms of the personality typology of Block and Block (1980), but also in terms of the Big Five personality dimensions (John et al., 1994) based on the scales of the California Child Q-set (CCQ; Block and Block 1980). The Big Five personality dimensions represent five personality factors: Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Openness to Experience (Digman, 1990; McCrae & Costa, 1995). In their study, Robins et al. (1996) found that overcontrollers had lower Extraversion scores than both resilient and undercontrollers; that undercontrollers were less agreeable than both resilient and overcontrollers; that resilient were more, and undercontrollers were less conscientious than overcontrollers; and, finally, that resilient had higher scores on Emotional Stability and Openness to Experience than both overcontrollers and undercontrollers.

Robins et al. (1996) were able to describe the types in terms of the Big Five personality dimensions, thus raising the question of whether it was possible to construct the personality types directly on the basis of the Big Five personality dimensions. Using a k-means clustering procedure or an inverse factor analysis, several studies have shown this to be possible (Asendorpf et al., 2001; Asendorpf & Van Aken, 1999; Dubas et al., 2002; Hart et al., 1997; Van Lieshout et al., 1998). Moreover, these studies demonstrated differences in the psychosocial functioning of each of the three personality types. Adolescent resilient exhibited a better psychosocial adjustment as compared to overcontrollers and undercontrollers (Dubas et al., 2002). Adolescent overcontrollers appeared to be more vulnerable to higher levels of internalizing problems and introversion than resilient and undercontrollers (Dubas et al., 2002; Robins et al., 1996). Adolescent undercontrollers were found to be more prone to externalizing problems and moodiness than the other personality types (Hart et al., 1997). Undercontrollers also showed high levels of co-occurrence of internalizing and externalizing problem behaviours (Dubas et al., 2002; Robins et al., 1996; Van Aken et al., 2002).

In light of the aforementioned, the main goal of this study is to investigate whether personality moderates the association between perceived parental

rejection, depression and aggression. In order to meet this goal, we will try to answer the following research questions. The first research question examines whether perceived parental rejection is related to depression and aggression. Since many previous studies have asserted these associations are present, we expect to find perceived parental rejection is associated with depression and with aggression.

Our second research question examines whether the three personality types can be constructed by means of the shortened version of the Big Five questionnaire (Gerris et al., 1998; Goldberg, 1992). Given that the construction of the types has been possible with the 100-item version of the Big Five questionnaire (Dubas et al., 2002), we expect that the construction of the types will also be possible by means of the shortened version of the Big Five questionnaire, since the shortened version was highly correlated with the 100-item version ( $r > .75$ ; J. Dubas, personal communication, February 10, 2003). Additionally, we expect that the constructed personality types will be related to problem behaviour in the same manner as in the aforementioned studies.

Finally, we will study whether personality moderates the association between perceived parental rejection, depression and aggression. In light of the findings of O'Connor and Dvorak (2001), we expect that personality will moderate the effects of parental behaviour and adolescent internalizing and externalizing problems. However, since they did not specifically study perceived parental rejection we cannot form any precise hypotheses.

## **2.2 Method**

### **2.2.1 Participants**

Participants in this study were drawn from the Conflict and Management Of Relationships study (CONAMORE; Meeus et al., 2002). CONAMORE is an ongoing longitudinal study of Dutch adolescents that examines their relationships with parents and peers as well as their emotional states (Meeus et al., 2002). The participating adolescents were students from high schools located in the province of Utrecht, The Netherlands.

The present study only used cross-sectional data from the first measurement of CONAMORE. From a total of 1329 adolescents we selected only those students who had completed the questionnaires about depression, aggression, perceived parental rejection and the Big Five questionnaire. The sample consisted of 607 girls (53.2%) and 535 boys (46.8%). Two age groups were represented: 550 early adolescents (48.2%;  $M = 12.4$ ;  $SD = .56$ ) and 592 middle adolescents (51.8%;  $M = 16.7$ ;  $SD = .80$ ).

### **2.2.2 Procedure**

Twelve high schools in Utrecht participated in this study. The students of these high schools received a letter well in advance of the actual test administration. In this letter the aims of the study were described and the students were informed about the option of not participating. Fewer than 1% of the students decided not to participate.

The administration was performed in the homeroom study period, during which the students could fill out the questionnaire anonymously. The research assistants, who attended the administration, gave verbal instructions about the questionnaires; a written instruction was also included. Students who were absent on the day of testing were not assessed. At the end of the homeroom study period, the research assistants collected the questionnaires. These assistants additionally conducted the data entry so as to ensure that the data remained anonymous.

### **2.2.3. Measures**

*Perceived parental rejection.* The questionnaire for perceived parental rejection was derived from the hostile criticism subscale of the Level of Expressed Emotion questionnaire (Gerlsma & Hale, 1997; Gerlsma et al., 1992). The study by Gerlsma and Hale (1997) showed that the hostile criticism subscale was predictive of depression in both psychiatric patients and healthy controls. Additionally, it was noted in this study that the hostile criticism subscale is reflective of a person's perception of being rejected by others.

The hostile criticism subscale consisted of three items: My parents 'are very critical of me', 'try to change me' and 'get annoyed when I want something from them' in the last three months. The three items were scored on a 4-point scale, ranging from 'false', 'more or less false', 'more or less true' to 'true'. Reliability and construct validity have been shown to be strong (Gerlsma & Hale, 1997). The internal consistency of this measure was .82.

*Depression.* The Children's Depression Inventory (CDI) is a self-report questionnaire which is used as a screen for (subclinical) depressive symptomatology in children and adolescents (Kovacs, 1985). The CDI consists of 27 items; sample questions include 'I'm sad all the time', 'It will never end right for me' and 'I do everything wrong'. The items were scored on a 3-point scale, ranging from 'false', 'a bit true' to 'very true'. The internal consistency of the CDI was .92.

*Aggression.* Aggression was measured by a self-report questionnaire, originally developed by Björkqvist et al. (1992). Hale et al. (2003) analysed this questionnaire, which appeared to consist of two subscales: a subscale for aggression and a subscale for withdrawal. In the present study only the subscale for aggression was used. This subscale consisted of 17 items; examples of these

items are: When I'm mad at a classmate I will 'call the other names', 'hit or kick' and 'curse'. The items were scored on a 4-point scale, ranging from 'never', 'sometimes', 'often' to 'very often'. The internal consistency of the aggression questionnaire was .93.

*Personality.* The personality dimensions Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Openness to Experience were measured using the shortened Dutch version of the Big Five questionnaire (Gerris et al., 1998; Goldberg, 1992). This questionnaire contained 30 items, such as: talkative (Extraversion), sympathetic (Agreeableness), systematic (Conscientiousness), nervous (Emotional Stability) and creative (Openness to Experience). The adolescents judged whether the 30 items applied to themselves on a 7-point scale, ranging from 'absolutely agree' to 'absolutely disagree'. Internal consistencies were high with alphas of .80 for Extraversion, .87 for Agreeableness, .83 for Conscientiousness, .82 for Emotional Stability and .77 for Openness to Experience. A factor analysis (Principal Components Analysis, Oblique-rotation) was conducted with which five unique factors were identified, which accounted for 60 per cent of the total variance.

### **2.2.3. Strategy of Analyses**

In order to answer the first research question we tested a model in Analysis of Moment Structures (AMOS) by means of structural equation modeling, which was based on maximum likelihood estimation (Arbuckle, 1995). On the basis of previous findings (Buehler & Gerard, 2002; Chang et al., 2003; Chen et al., 2000; Forehand & Nousiainen, 1993; Ge et al., 1996; Hale et al., 2003; Harold & Conger, 1997; Khaleque & Rohner, 2002; Koestner et al., 1991; Muris et al., 2001; Rapee, 1997; Rothbaum & Weisz, 1994) we assumed there was an association between perceived parental rejection and depression, between perceived parental rejection and aggression and between depression and aggression.

To answer the second research question we used the Big Five scale scores to construct the personality types and performed a K-means clustering procedure in the same manner as was conducted by Dubas et al. (2002). Because outliers have been found to have a great impact on the results of a cluster analysis (Lorr, 1983), we omitted all the adolescents whose scores were outliers on any of the Big Five subscales in accordance with Dubas et al. (2002). Additionally, in line with Dubas et al. (2002) we set the cluster number to three, converted all personality dimension scores to z-scores and used the same cluster centers. To examine whether the three clusters differed on the Big Five dimensions, we used multivariate analyses of variance (MANOVA) with subsequent post hoc tests on univariate effects.

To answer the third research question we tested a restricted and nonrestricted 6-group moderation model – personality type by gender – in AMOS (Arbuckle, 1995). The restricted moderation model, in which no differences between the six groups in the value of the parameter estimates were allowed, differed significantly from the nonrestricted moderation model, in which all possible differences between the six groups in the value of the parameter estimates were allowed, as measured by chi-square difference tests. The fit of the model was assessed by several fit indices:  $\chi^2$ , GFI, NFI and RMSEA. Values of the Goodness-of-Fit Index (GFI) close to 1 and values of the Normed Fit Index (NFI) close to 0.95 are indicative of a good fit (Bentler, 1989). Values of the Root Mean Square Error of Approximation (RMSEA) that are less than .05 indicate a good fit (Byrne, 2001).

## **2.3 Results**

### ***2.3.1 Associations between Perceived Parental Rejection, Depression and Aggression***

The means and standard deviations of perceived parental rejection, depression and aggression for the total sample are presented in Table 1. The scores of the total sample on these variables are rather low, which is in line with the fact that it is drawn from a non-clinical population.

The zero order correlations between perceived parental rejection and depression ( $r = .26$ ;  $p < .01$ ) and between perceived parental rejection and aggression ( $r = .20$ ;  $p < .01$ ) demonstrate that these variables are significantly associated with each other. When adolescents feel rejected by their parents, it is likely that they also feel depressed and aggressive. Furthermore, depression and aggression are positively related to each other ( $r = .26$ ;  $p < .01$ ). Adolescents, who feel depressed, are likely to report aggressive behaviour also. The correlations between these constructs are useful for further testing our hypotheses.

We performed structural equation modeling to study the relations between perceived parental rejection and depression ( $\beta_1 = .20$ ;  $z > 1.96$ ), between perceived parental rejection and aggression ( $\beta_2 = .25$ ;  $z > 1.96$ ) and between depression and aggression ( $r = .23$ ;  $z > 1.96$ ) in the total sample, using AMOS (Arbuckle, 1995). The model, in which depression and aggression are each statistically predicted by perceived parental rejection fits the data very well (Figure 1;  $\chi^2 (2) = 3.55$ ,  $p = .17$ , GFI = .998, NFI = .980, RMSEA = .026). This means that perceived parental rejection is statistically predictive of both depression and aggression separately and that depression and aggression co-occur.

**Table 1.** Means and standard deviations of perceived parental rejection, depression and aggression for the total sample, gender and personality types

	Total	Gender		Personality types		
	(N = 1142)	Boys (N = 535)	Girls (N = 607)	R (N = 403)	O (N = 318)	U (N = 421)
Perceived parental rejection	3.84 (2.08)	4.12 (2.04) <sup>x</sup>	3.59 (2.09) <sup>y</sup>	3.42 (1.82) <sup>a</sup>	3.89 (2.16) <sup>b</sup>	4.20 (2.20) <sup>b</sup>
Depression	31.61 (6.23)	30.98 (6.59) <sup>x</sup>	32.16 (5.85) <sup>y</sup>	29.91 (4.21) <sup>a</sup>	33.39 (6.95) <sup>b</sup>	31.89 (6.84) <sup>c</sup>
Aggression	25.77 (7.40)	27.63 (8.72) <sup>x</sup>	24.14 (5.50) <sup>y</sup>	25.21 (7.13) <sup>a</sup>	24.81 (6.56) <sup>a</sup>	27.04 (8.05) <sup>b</sup>

Note. a, b, c: Means with different superscripts are significantly different at  $p < .01$ .

x, y: Means with different superscripts are significantly different at  $p < .001$ .

R: resilients; O: overcontrollers; U: undercontrollers.

### 2.3.2. Construction and Validation of Personality Types

We used the k-means clustering procedure to construct the personality types on the basis of the Big Five dimensions (Dubas et al., 2002). The means of the clusters on the Big Five characteristics are presented in Figure 2.

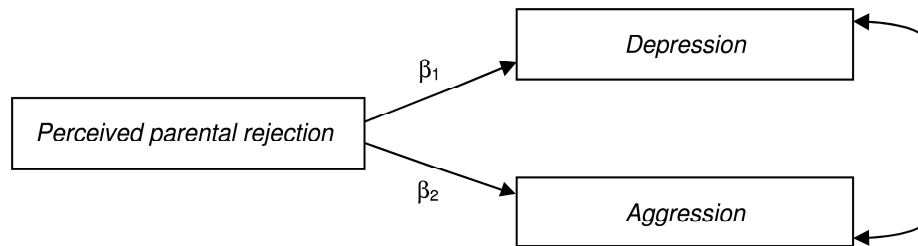


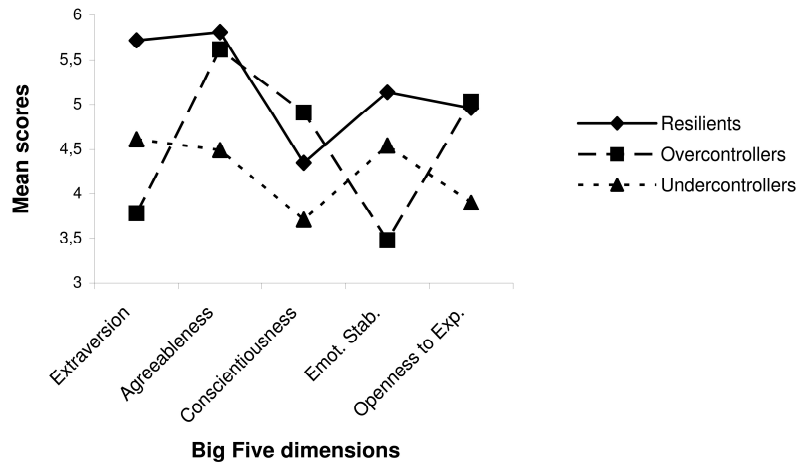
Figure 1. Hypothesized relationship between perceived parental rejection, depression and aggression.

Multivariate analyses of variance (MANOVA) with Tukey post hoc tests on the univariate effects were used to examine whether the clusters differed from each other on the Big Five personality characteristics. The MANOVA was significant and Tukey post hoc tests revealed that each type was significantly different from the other type on each dimension with one exception: resilient and overcontrollers were not significantly different from each other on Openness to Experience.

Following Dubas et al. (2002) we checked the replicability of the personality types by dividing the sample at random in two subsamples, rerunning the cluster analyses for each subsample and calculating the degree of correspondence of individuals being assigned to clusters of the total sample and of the subsamples. The kappa coefficients (Cohen 1960) for both replication samples were excellent: .96 and .97. Thus, we were confident that our types were replicable. We used the types from the total sample in all further analyses.

In our sample we found 35.3% resilient, 27.8% overcontrollers and 36.9% undercontrollers. The distribution of the genders differed significantly in the three personality types: there were more girls in the resilient group (57.1%) and in the overcontroller group (61.6%) than boys, whereas there were more boys (57.0%;  $\chi^2(2) = 29.13, p < .001$ ) in the undercontroller group than girls.

After constructing the personality types, we focused on validating the types. We performed a MANOVA to look for significant differences between the genders and types. A main effect for gender and type on depression (gender:  $F(1, 1142) =$



**Figure 2.** Big Five personality profiles of the personality types (Resilients: N=403; Overcontrollers: N=318; Undercontrollers: N=421).

Note. Emot. Stab. = Emotional Stability; Openness to Exp. = Openness to Experience

12.67,  $p < .001$ ; type:  $F(2, 1142) = 26.39$ ,  $p < .001$ ) and aggression (gender:  $F(1, 1142) = 56.06$ ,  $p < .01$ ; type:  $F(2, 1142) = 5.59$ ,  $p < .001$ ) was found. These analyses revealed that girls scored higher on depression than boys, whereas boys scored higher on aggression than girls. In terms of personality types, Tukey post hoc tests revealed that overcontrollers scored higher than resilient on depression; undercontrollers scored higher than resilient, but lower than overcontrollers. With regard to aggression, undercontrollers scored higher than both resilient and overcontrollers.

### 2.3.3. Structural Equation Modeling and Multi-Group Analyses

The main goal of the present study was to investigate the moderation role of personality on the association between perceived parental rejection, depression and aggression. We tested a six-group model, as we were not only interested in the effects of personality types but also in the effects of gender. These six groups were resilient boys ( $n = 173$ ), overcontroller boys ( $n = 122$ ), undercontroller boys ( $n = 240$ ), resilient girls ( $n = 230$ ), overcontroller girls ( $n = 196$ ) and undercontroller girls ( $n = 181$ ). We tested whether the model (displayed in Figure 1) differed for the above six groups. For these multi-group analyses we compared two models: a restricted model, in which all estimated parameters were required to be equal

across groups, and a non-restricted multi-group model, in which these parameter estimates were allowed to differ across the groups. Model comparisons tests for the two 6-group multi-group models demonstrated that the non-restricted model fit the data better than the restricted model ( $\Delta\chi^2 = 59.08$ ;  $\Delta df = 15$ ;  $p(d) = .001$ ). The non-restricted model fitted well ( $\chi^2(12) = 9.21$ ,  $p > .05$ , GFI = .995, NFI = .961, RMSEA = .000) and therefore we concluded that the personality type  $\times$  gender groups are different from each other, which makes it feasible to take a specific look at the differences between them.

When examining the six groups separately, most of the standardized regression weights between perceived parental rejection, depression and aggression were significant (Asendorpf & Van Aken, 2003). We found three different kinds of significant differences between the six groups, namely gender differences within types, type differences within genders and combined type  $\times$  gender differences, as summarized in Table 2. Because the combined type  $\times$  gender differences represent differences between groups with a different type and a different gender we cannot attribute the differences to a specific personality type or gender. Therefore, these differences are not further reported and described.

On the path perceived parental rejection - depression ( $\beta_1$ ) a significant gender difference within types was present between male ( $\beta_1 = .10$ ) and female overcontrollers ( $\beta_1 = .35$ ), and a significant type difference within genders was present between resilient ( $\beta_1 = .28$ ) and overcontroller girls ( $\beta_1 = .35$ ). This shows that perceived parental rejection was a better predictor for depression in female overcontrollers than in male overcontrollers. Furthermore, in girls, perceived parental rejection was a better predictor for depression in overcontrollers than in resilient.

On the path perceived parental rejection - aggression ( $\beta_2$ ) no gender differences within types were found. A significant type difference within genders was present, namely between resilient ( $\beta_2 = .27$ ) and overcontroller boys ( $\beta_2 = .03$ ). This shows that in boys perceived parental rejection was less predictive of aggression in overcontrollers than in resilient.

We also found these kinds of significant differences in the co-occurrence of depression and aggression. First of all, we found gender differences within all three types: the co-occurrence of depression and aggression was systematically stronger in boys (resilient,  $r = .31$ ; overcontroller,  $r = .38$ ; undercontroller,  $r = .36$ ) than in girls (resilient,  $r = .12$ ; overcontroller,  $r = .13$ ; undercontroller,  $r = .30$ ) for all three personality types. Also type differences within genders were found: co-occurrence was stronger in undercontroller girls ( $r = .30$ ) than in resilient girls ( $r =$

**Table 2.** Parameter values and significant differences between the type x gender groups on the three paths

		Perceived parental rejection – Depression ( $\beta_1$ )	Perceived parental rejection – Aggression ( $\beta_2$ )	Depression – Aggression
Group		Parameter values		
Boys	R	.24*	.27*	.31*
	O	.10	.03	.38*
	U	.14*	.14*	.36*
Girls	R	.28*	.17*	.12
	O	.35*	.23*	.13
	U	.40*	.19*	.30*
Gender differences within types				
Oc.g. > Oc.b.				Re.b. > Re.g.
				Oc.b. > Oc.g.
				Uc.b. > Uc.g.
Type differences within genders				
Oc.g. > Re.g.		Re.b. > Oc.b.		Uc.b. > Re.b.
				Uc.g. > Re.g.
Combined type x gender differences				
Oc.g. > Re.b.				Oc.b. > Re.g.
Oc.g. > Uc.b.		Re.b. > Uc.g.		Oc.b. > Uc.g.
Uc.g. > Oc.b.				Uc.b. > Re.g.
				Uc.b. > Oc.g.

\*:  $z > 1.96$ .

Note. Re.b. = Resilient boys, Oc.b. = Overcontroller boys, Uc.b. = Undercontroller boys, Re.g. = Resilient girls, Oc.g. = Overcontroller girls, Uc.g. = Undercontroller girls.

.12) and co-occurrence was stronger in undercontroller boys ( $r = .36$ ) than in resilient boys ( $r = .31$ ).

Additional analyses were conducted to study whether personality in combination with age had a moderating effect. Multigroup analyses with a six group model (three personality types x two age groups) revealed only one significant between group difference on the paths between parental rejection and depression and between parental rejection and aggression.

## **2.4 Discussion**

The purpose of the present study was to examine whether personality moderates the association between perceived parental rejection, depression and aggression. In order to do so, we examined three research questions. The first research question focused on whether perceived parental rejection is related to depression and aggression. In this study, we demonstrated that the relation existed in the way we expected: perceived parental rejection was associated with both depression and aggression. These findings are in agreement with previous studies that have also demonstrated that a problematic relationship with parents could be one of the antecedents of developing these problem behaviours (Buehler & Gerard, 2002; Chang et al., 2003; Chen et al., 2000; Forehand & Nousiainen, 1993; Ge et al., 1996; Harold & Conger, 1997; Khaleque & Rohner, 2002; Kim et al., 2003; Koestner et al., 1991; Muris et al., 2001; Nolan et al., 2003; Rapee, 1997; Rothbaum & Weisz, 1994).

The second research question examined whether the three personality types could be constructed by means of the shortened version of the Big Five questionnaire (Goldberg, 1992). We demonstrated that the three personality types, constructed by means of the shortened version of the Big Five questionnaire, were very similar to the personality types constructed in the study of Dubas et al. (2002), in which the 100-item version of the Big Five questionnaire was used. The similarities in findings was not only present in the profile of the personality types, but also in relation to problem behaviour (Dubas et al. 2002; but see also Asendorpf & Van Aken, 1999; Hart et al., 1997; Robins et al., 1996; Van Lieshout et al., 1998). Consequently, the shortened version of the Big Five questionnaire can be adequately used to construct the three personality types.

The third research question examined whether the association between perceived parental rejection, depression and aggression was moderated by the adolescents' personality. We found that perceived parental rejection was associated with depression and with aggression in most personality type x gender groups and that several clear differences on the associations were present between these groups. Therefore, we can affirm the final research question since personality proved to be a moderator on the associations between perceived parental rejection, depression and aggression.

### ***2.4.1. Perceived Parental Rejection, Depression and Personality***

Perceived parental rejection proved to be more strongly associated with depression in female overcontrollers than in male overcontrollers. Although it is not yet known from previous research what the effects of perceived parental

rejection exactly are on the development of depression in the six groups we studied, we think that our findings can be explained in line with previous research. In general, this gender difference can be explained by the view that women value engagement in personal relationships more than men do. When this engagement is absent, as is the case in rejection, girls are more likely to feel depressed compared to boys (Feinberg et al., 2000; Gjerde et al., 1988). However, we should note that this gender difference was only significant in overcontrollers; the personality type that is most prone to develop depression compared to the other types. Since the undercontrollers and resilients are not as prone to developing depression as overcontrollers, it is possible that this might help to explain the absence of gender differences in these types.

Additionally, it was found that perceived parental rejection proved to be more strongly associated with depression in overcontroller girls than in resilient girls. Since overcontrollers in general are more prone to develop depression than the other types (Dubas et al., 2002; Hart et al., 1997; Robins et al., 1996; Van Lieshout et al., 1998), our finding that overcontroller girls are more depressed when feeling rejected than one of the other groups is in line with previous research. However, we should note that this personality difference was only significant in girls; the gender that is the most prone to developing depression. Additionally, previous studies have shown that resilients are by definition able to deal with demanding situations, such as parental rejection, in a more flexible way than overcontrollers (Olsson et al., 2003), which could explain the specific difference between overcontroller and resilient girls. Therefore, in light of these previous findings, it is quite reasonable that perceived parental rejection proved to be better associated with depression in overcontroller girls than in resilient girls.

#### ***2.4.2. Perceived Parental Rejection, Aggression and Personality***

As was noted in the results section, perceived parental rejection was less associated with aggression in overcontroller boys than in resilient boys. Although previous studies have not yet demonstrated differences between the combined personality types and gender groups in relation to perceived parental rejection and aggression, the present findings are congruent with studies of personality types and studies of gender groups. In general, it has been found that parents who are rejecting and non-responsive increase their children's acquisition of, and motivation to use, socially unacceptable behaviours, such as externalizing behaviour. In respect to gender, it is known that boys are more genetically predisposed than girls to react to stresses, such as parental rejection, with externalizing behaviour (Ge et al., 1996; Rothbaum & Weisz, 1994). Since girls are not as prone as boys to develop aggression this might explain the absence of a type

difference in girls. In respect to personality, it is known from previous studies that overcontrollers are less prone to develop aggression compared to resilient (Asendorpf & Van Aken, 1999; Dubas et al., 2002; Robins et al., 1996). Hence, the finding that perceived parental rejection is less associated with aggression in overcontroller boys than in resilient boys is in agreement with previous research.

#### ***2.4.3. Depression, Aggression and Personality***

The association between depression and aggression was significantly stronger in undercontrollers than in resilient, for both gender groups. Previous research has claimed that undercontrollers have a higher co-occurrence of depression and aggression than the other personality types (Dubas et al., 2002; Robins et al., 1996; Van Aken et al., 2002) and the findings of the present study replicated this. It is known that undercontrollers are very impulsive and have academic and behavioural problems, such as aggression, which could be a possible cause for serious conflicts with other people. The negative feelings that are related to these conflicts might cause a depressive mood in the undercontrollers (Dubas et al., 2002).

Additionally, all the male personality types demonstrated a significantly stronger co-occurrence than their female counterparts; boys displayed more co-occurring aggression and depression than girls. A tentative explanation of this finding might be that boys are more likely to display aggressive behaviour as a result of an underlying depression than girls (Capaldi, 1992; Gjerde et al., 1988).

#### ***2.4.4. Limitations and Future Research***

In addition to the aforementioned findings, a few limitations of the present study need to be considered. The first limitation is that the relationships between perceived parental rejection, depression and aggression are not unidirectional. Some studies have suggested that parental rejection could be caused by problem behaviour in adolescents (Coyne, 1976a; Coyne, 1976b). We recommend that longitudinal data should be used in future studies to examine the bi-directional relationships between perceived parental rejection and problem behaviours.

The second limitation is that our findings are solely based on adolescent self-reports. The adolescents not only filled in questionnaires about personality, depression and aggression, but also the questionnaire about perceived parental rejection. Therefore, we do not know whether the parents themselves thought they rejected their child. Since internalizing behaviours might be more difficult to observe to others (Achenbach et al., 1987) and since parents might answer questions about parenting in a socially desirable manner, we were more interested

in the feelings and opinions of the adolescents themselves (O'Connor & Dvorak, 2001).

A final limitation of this study is that only subclinical levels of adolescent depression and aggression were assessed. Although the data reported here can be used as a baseline for clinical populations, they do not meet clinical criteria and the results of this study should not be equated with those from studies of adolescents with psychiatric disorders (Gjerde et al., 1988; Kim & Smith, 1998).

## **2.5 Conclusion**

An important contribution of the present study was that it is not only important to examine the effects of either personality type or gender on the association between perceived parental rejection, depression and aggression, but it is also important to examine both personality types and gender together in one design. Since we found clear moderating effects of the combined personality type and gender groups and several clear differences between these combined groups on the aforementioned associations, future research should focus on these combinations instead of using either personality types or gender separately.



### **Chapter 3**

#### **STABILITY AND CHANGE IN PERSONALITY TYPE MEMBERSHIP AND ANXIETY IN ADOLESCENCE <sup>1,2</sup>**

<sup>1</sup> Published in an adjusted version as:

Akse, J., Hale III, W. W., Engels, R. C. M. E., Raaijmakers, Q. A. W., & Meeus, W. H. J. (2005). Verandering van persoonlijkheidstypen en angst gedurende de adolescentie [Change in personality types and anxiety during adolescence]. *Nederlands Tijdschrift voor de Psychologie [Dutch Journal of Psychology]*, 60, 174-186.

<sup>2</sup> Akse, J., Hale III, W. W., Engels, R. C. M. E., Raaijmakers, Q. A. W., & Meeus, W. H. J. (in press). Stability and change in personality type membership and anxiety in adolescence. *Journal of Adolescence*.

### **Abstract**

Although the stability and changeability of personality has long been debated, many studies now agree that personality changes over the life course. Although the changes in rank-order and mean-level stability are well established, the stability in personality type membership during adolescence is not yet clear. Little research has been conducted on the associations between change in personality type membership and anxiety. A total of 827 adolescents (10 – 20 years) completed personality and anxiety questionnaires on 2 waves of the CONflict And Management Of RElationships study (CONAMORE). We found that the stability in personality type membership was moderate. The change from undercontroller to overcontroller was the most frequently occurring change. Furthermore, the stability in type membership was related to stability in anxiety level and change in type membership was related to anxiety change. More specifically, the resilient-overcontroller group demonstrated an increase in anxiety level, whereas the overcontroller-resilient group demonstrated a decrease.

### **3.1 Introduction**

‘In most of us, by the age of thirty, the character has set like plaster, and will never soften again.’ This is a statement of William James (in Costa & McCrae, 1994; James, 1890, pp. 125-126) about the stability of personality. Based on an examination of the rank-order consistency of the Big Five personality traits, Costa and McCrae (1994) concluded that personality was stable for people over age 30. However, the existence of rank-order consistency in personality, which refers to the relative placement of individuals within a group, does not rule out the possibility of other types of change, such as individual-level change, mean-level change or change in personality profiles (Asendorpf, 1992; Roberts, Caspi, & Moffitt, 2001; Roberts & DelVecchio, 2000; Roberts, Walton, & Viechtbauer, 2006a).

Although the stability and changeability of personality has long been debated, more and more studies now agree that personality changes over the life course (e.g., Lenzenweger, 1999; Lenzenweger, Johnson, & Willett, 2004; Roberts & DelVecchio, 2000; Roberts, Walton, & Viechtbauer, 2006a; Robins, Fraley, Roberts, & Trzesniewski, 2001; Santor, Bagby, & Joffe, 1997; Seivewright, Tyrer, & Johnson, 2002; Srivastava, John, Gosling, & Potter, 2003). As mentioned above, personality can change in several ways. For example, Roberts and DelVecchio (2000) found that the rank-order continuity of personality traits increased until the age of 50. Furthermore, in a meta-analysis by Roberts, Walton and Viechtbauer (2006a) was demonstrated that the mean level of personality traits changed across the life course; e.g., social dominance (facet of extraversion), emotional stability and openness increased during adolescence. Since rank-order and mean-level consistency are found to change, the specific constellations or profile of individuals on several personality traits could change as well (Morizot & LeBlanc, 2005) as could their personality type. The current study examines the continuity of the personality type membership in adolescence.

In general, adolescence is a period of pervasive change in physical, cognitive, emotional, and social competencies and concerns (Rice, 1999; Roberts, Caspi & Moffitt, 2001; Steinberg & Silk, 2002). It is a period in which individuals attend a new school or get a new job, have new or changing friendships or romantic relationships and have changing relationships with their parents. It is not unlikely that these changes and the stressors that accompany them have an impact on personality and could lead to personality change (Asendorpf & Van Aken, 2003a; Cyranowski, Frank, Young, & Shear, 2000; Pervin, 1994; Rice, 1999; Srivastava et al., 2003; Steinberg & Silk, 2002).

In personality research two major approaches can be distinguished. The first approach is the variable-centred approach, which focuses on differences among

individuals on a given personality trait. An important taxonomy of personality traits has attracted much interest over the past years, namely the Big Five personality dimensions (John & Srivastava, 1999). One of the primary advantages of the Big Five framework is its ability to organize previous research findings on the development of personality traits into a manageable number of conceptually different domains (Roberts, Robins, Trzesniewski, & Caspi, 2003). However, an important disadvantage is that it ignores the individuals' personality structure as a whole (Asendorpf, 2003). The second approach in personality research is the person-centred approach, which focuses on the patterning and organization of traits within a person. Some advantages of this approach are that information on individuals' personality structure as a whole is preserved, at least in part, in the definition of the types and that it provides a descriptive efficiency as well as conceptual clarity (Robins & Tracy, 2003). The main disadvantages are that data on interindividual differences are lost in the transition from individual personality structure to personality types and that the types appear to have little utility for predictions from personality (Asendorpf, 2003). However, although both approaches have some advantages as well as disadvantages, they both add important insights into the understanding of personality (Caspi & Shiner, 2006). The current study replicates and extends recent work on the person-centred approach of personality (e.g., Dubas, Gerris, Janssens, & Vermulst, 2002; Hart, Hofmann, Edelstein, & Keller, 1997; Robins, John, Caspi, Moffitt, & Stouthamer-Loeber, 1996).

The personality typology of Block and Block (1980) is used to investigate stability and change in personality type membership in the present study. Block and Block describe personality in terms of two continuous concepts: ego-control and ego-resiliency. Ego-control refers to the tendency to contain emotional and motivational impulses versus the tendency to express them (overcontrol vs. undercontrol), whereas ego-resiliency refers to the tendency to respond flexibly rather than rigidly to changing situational demands, particularly stressful situations (e.g., Block & Block, 2006; Funder & Block, 1989; Huey & Weisz, 1997; Letzring, Block, & Funder, 2005).

Robins et al. (1996) studied the personality typology of Block and Block and found ego-resiliency to have an inverted U-shaped relation with ego-control and identified three distinct personality types: resilients, overcontrollers and undercontrollers. Resilients reflected a high level of ego-resiliency and a medium level of ego-control; overcontrollers and undercontrollers both reflected a low level of ego-resiliency; however, they differed markedly on ego-control: high and low respectively. Additionally, Robins et al. (1996) demonstrated that these personality types exhibited a specific profile on the Big Five dimensions: resilients had a

generally well-adjusted profile, with above average scores on all five dimensions. They were significantly more conscientious, emotionally stable and open to experience than the other types, significantly more extraverted than overcontrollers and significantly more agreeable than undercontrollers. The only dimension on which resilients were not highest was agreeableness; overcontrollers were the most agreeable of the three types. Overcontrollers were also low on extraversion and emotional stability. Undercontrollers were distinguished by their low levels of agreeableness and conscientiousness. Undercontrollers were also low on emotional stability and openness to experience. Consequently, it appeared that the personality types could be directly constructed on the basis of the Big Five questionnaire (Dubas et al., 2002). The personality types of Block and Block (1980) have been replicated in many studies using different informants, different methods and different statistical techniques (see: Asendorpf, Borkenau, Ostendorpf, & Van Aken, 2001), although the debate about the replicability of these personality types using an inverse factor analysis appears to be not settled yet (Asendorpf, 2006a; McCrae, Terracciano, Costa, & Ozer, 2006a; McCrae, Terracciano, Costa, & Ozer, 2006b).

Furthermore, it was demonstrated that these personality types differed in their psychosocial functioning. Compared to the other types, overcontrollers appeared to be more vulnerable to higher levels of internalizing problems and undercontrollers were found to be more prone to externalizing problems and moodiness and showed high levels of co-occurrence of internalizing and externalizing problem behaviours, whereas resilients exhibited the best psychosocial adjustment (Akse, Hale, Engels, Raaijmakers, & Meeus, 2004; Dubas et al., 2002; Hart et al., 1997; Robins et al., 1996; Van Aken & Dubas, 2004).

To our knowledge, stability and change in personality type membership based on the Block and Block typology in childhood and adolescence has been investigated in three studies only. Asendorpf and Van Aken (1999) found a moderate personality type stability in a 2-wave study: about 50% of 100 German children maintained their personality type membership over a 4-year time interval. Next, in a 2-wave study by Hart, Atkins and Fegley (2003) stability and change were described in three personality types over a 2-year period in childhood. They found that about 50% of several independent samples remained their type membership in both waves, while the other half changed. In a 3-wave study by Van Aken and Dubas (2004), stability and change of personality type membership were described in early adolescents over a 2-year period. They found that about 40% of the sample had the same personality type in three waves, whereas about 60% changed from one personality type to another over three waves. These findings seem to be in favour of the idea that the stability of personality type

membership is low to moderate in childhood and adolescence (Asendorpf et al., 2001). Furthermore, Morizot and LeBlanc (2005) identified a developmental personality typology using data from a prospective longitudinal study of a representative sample of men assessed on four occasions (at 14, 16, 30 and 40 years of age). Although they reported promising findings about four developmental types and their associations with antisocial behaviour, they did not study a developmental typology on the basis of the Big Five personality dimensions in a sample with both genders and they did not examine the associations between the developmental typology and internalizing problem behaviours, which leaves the door wide open for studies that do address these issues, such as the present.

Generally, many studies have addressed the relationship between personality, personality disorders and internalizing problem behaviours (e.g., Block, Gjerde, & Block, 1991; Santor et al., 1997), such as anxiety, fewer have addressed the relationship between change in personality and anxiety. With respect to personality type membership, no study has yet examined the change in Block and Block's personality types with concurrent change in anxiety during adolescence. There are a number of reasons why it is important to study these associations: (a) personality type membership is related to problem behaviours (e.g., Dubas et al., 2002; Robins et al., 1996), such as anxiety, (b) personality type membership is only moderately stable and can thus change (Asendorpf & Van Aken, 1999), (c) anxiety has a high prevalence in adolescence (Costello & Angold, 1995) and its level changes during adolescence, dependent of the specific anxiety (Treffers, 2000), (d) the search for a developmental typology of internalizing problem behaviours has gained interest; several internalizing trajectories are already found (Van Lang, Ferdinand, Ormel, & Verhulst, 2006), and (e) personality maturations may parallel a decrease in anxiety (Caspi, Roberts, & Shiner, 2005). Since personality types are helpful in advancing theory and research in personality (Hart, Burock, London, Atkins, & Bonilla-Santiago, 2005), the personality types can contribute to the understanding of how change in personality is linked to change in problem behaviour. Therefore, it appears worthwhile to study the associations between change in personality type membership and anxiety.

In light of the aforementioned, we formulated the following three research questions and associated hypotheses. The first research question examines the stability of the personality type membership in adolescence. In line with Asendorpf and Van Aken (1999), Hart et al. (2003) and Van Aken and Dubas (2004), we hypothesize that personality type membership will demonstrate a low to moderate stability (about 50%) over two waves.

Our second research question is also derived from the study of Hart et al. (2003), in which was found that the change from overcontrollers to

undercontrollers and from undercontrollers to overcontrollers occurred less often than other personality type changes in childhood. In the current study, we will try to replicate their findings in an adolescent sample.

Our final research question examines whether personality type membership is concurrently related to anxiety and whether change in personality type membership is related to change in anxiety level. We hypothesize that stable overcontrollers will have a higher level of anxiety than stable undercontrollers and resilient, as suggested by Robins et al. (1996) and Van Aken and Dubas (2004). Finally, we expect that when personality type membership changes to a type which is prone to anxiety, such as overcontrollers, the anxiety level will most likely increase. When personality type membership changes to a type that is not prone to anxiety, such as resilient, the anxiety level will most likely decrease.

### **3.2 Method**

#### ***3.2.1. Procedure and Sample Characteristics***

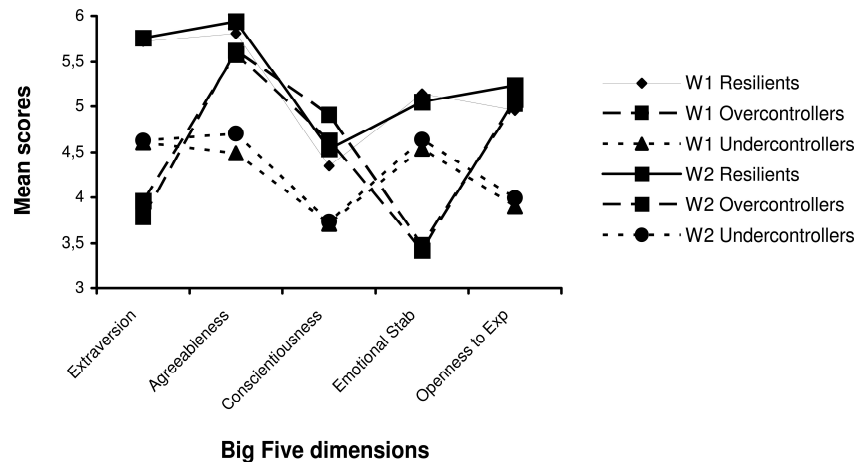
Participants in this study were drawn from the CONflict And Management Of Relationships study (CONAMORE), which is an ongoing longitudinal study of Dutch adolescents that examines their relationships with parents and peers as well as their emotional states (Meeus et al., 2002). For this study, the first two annual waves of CONAMORE were used, collected between 2001 - 2003. The participating adolescents were students from one of 12 participating high schools located in the province of Utrecht, The Netherlands. In the first wave, 906 adolescents filled in the Big Five questionnaire and the questionnaire about anxiety. The longitudinal sample consisted of 889 adolescents: 472 girls (53.1%) and 417 boys (46.9%). Two age groups were represented: 541 early adolescents (60.9%;  $M_{age} = 12.35$ ;  $SD = .54$ ; range = 10 – 15 years) and 348 middle adolescents (39.1%;  $M_{age} = 16.66$ ;  $SD = .80$ ; range = 16 – 20 years).

Before participation in the study, both students and their parents received written information describing the aims of the study and, if the student elected to participate, were required to provide written informed consent; less than 1% elected not to participate. Written informed consent was also obtained for all the participating schools. The administration was performed in the homeroom study period, during which the students could fill out the questionnaires anonymously. The research assistants, who attended the administration, gave verbal instructions about the questionnaires; written instructions were also included. The research assistants collected the completed questionnaires and conducted the data entry to ensure that the data remained anonymous. Students who were absent on the day

of testing were invited for a second administration or received the questionnaire by regular mail.

### 3.2.2. Measures

**Anxiety.** The Screen for Child Anxiety Related Emotional Disorders (SCARED) is a self-report questionnaire, which is used to measure symptoms of DSM-IV linked anxiety disorders in children and adolescents (Birmaher et al., 1997; Hale, Raaijmakers, Muris, & Meeus, 2005). Generally, it has a good reliability as measured by the internal consistency and test-retest reliability and it shows good concurrent and discriminant validity (Birmaher et al., 1997; Muris & Steerneman, 2001; Muris, Merckelbach, Van Brakel, & Mayer, 1999). The SCARED consisted of 38 items and contained five subscales, namely panic symptoms (13 items), social anxiety symptoms (4 items), separation anxiety symptoms (8 items), generalized anxiety symptoms (9 items) and school phobia (4 items). In this study, overall anxiety was measured, so the subscales were not investigated separately. Sample items included 'When frightened, it is hard to breathe', 'I don't like to be with people I don't know', 'I get scared when I sleep away from home', 'I worry about others not liking me' and 'I get headaches or stomach aches when I am at school'. The items were scored on a 3-point scale, ranging from 'hardly ever', 'sometimes' to 'often'. In this study, the Cronbach's alpha was .94 at wave 1 and .90 at wave 2.



**Figure 1.** The three personality types on the Big Five subscales in two waves.

*Note.* Emotional Stab = Emotional Stability; Openness to Exp = Openness to Experience; W1 = wave 1; W2 = wave 2

*Personality.* The personality dimensions Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Openness to Experience were measured using the shortened Dutch version of Goldberg's Big Five questionnaire (Gerris et al., 1998; Goldberg, 1992). Generally, it has a good reliability and construct validity, such as convergent and divergent validity (e.g., John & Srivastava, 1999; Smith & Snell, 1996). This questionnaire contained 30 items, such as: talkative (Extraversion), sympathetic (Agreeableness), systematic (Conscientiousness), worried (Emotional Stability) and creative (Openness to Experience). The adolescents judged whether the 30 items applied to themselves on a 7-point scale, ranging from 'absolutely agree' to 'absolutely disagree'. Cronbach's alphas were high: .82, .80, .84, .78 and .66 respectively at wave 1 and .84, .80, .85, .81, and .70 respectively at wave 2.

We used the k-means clustering procedure to construct the personality types on the basis of the Big Five dimensions (Akse et al., 2004; Dubas et al., 2002) in both waves ( $N = 889$ ; Figure 1). This clustering procedure computes a mean for every individual and assigns the individual's profile to one of the three clusters on the basis of the correspondence between the cluster centre and the individual's mean. The means within a cluster must correspond highly with each other, whereas the means between the clusters must differ highly from each other. Based on the findings of previous research in which three personality types were repeatedly found, we set the cluster number to three. Prior to the first set of cluster analyses, all dimensions scores were converted to z-scores. For the initial cluster centres we used a priori cluster centres derived from previous work on personality types (Van Aken & Dubas, 2000). More specifically, initial cluster centres for resilient types were set at 0.5 on all Big Five dimensions. For the overcontrollers, the initial cluster centres were 0.5 for conscientiousness and agreeableness, and -0.5 for extraversion, emotional stability and openness. Finally, the initial cluster centres for undercontrollers were -0.5 for conscientiousness, agreeableness and openness, 0 for emotional stability and 0.5 for extraversion (Dubas et al., 2002).<sup>1</sup> In both waves we selected only those adolescents who scored within two standard deviations of the cluster centre, which they belonged to, leaving a group of 827 adolescents (Dubas, personal communication, July, 12, 2004). Since a more strict criterion would lead to a major decline in respondents, we chose the criterion of two standard deviations.<sup>2</sup> Following Dubas et al. (2002) we checked the replicability of the personality types by dividing each of the three samples randomly in two subsamples, rerunning the cluster analyses for each subsample and calculating the degree of correspondence of individuals being assessed to clusters of the total sample and of the subsamples. The kappa coefficients (Cohen, 1960) for the replication samples in each wave were excellent: .83 and .79 in wave 1 and .85 and .85 in wave 2.

### **3.2.3. Strategy of Analyses**

To answer research question 1 examining the stability of the type membership in adolescence and research question 2 examining whether the change from undercontroller to overcontroller and from overcontroller to undercontroller would be the smallest change, we performed general log-linear analyses (GLLM). The models tested here consisted of four factors (personality type at wave 1 ( $P_1$ ), personality type at wave 2 ( $P_2$ ), gender (G) and age (A)), interaction terms and covariates. The covariates were used to determine whether specific personality groups or combinations of personality groups occurred more or less often than others. The fit of the model was assessed by the likelihood ratio ( $L^2$ ), an approximation of the chi square test ( $\chi^2$ ), with associated degrees of freedom ( $df$ ). This goodness-of-fit measure is highly sample size dependent: with large samples it is very difficult to find a model that adequately and parsimoniously describes the empirical data (Miller, Acton, Fullerton, & Maltby, 2002; Tabachnik & Fidell, 2001; Von Eye & Niedermeier, 1999). Since the Bayesian Information Criterion (BIC) is a fit index that takes sample size into account, we will use this index to assess the fit. When comparing several models, the model with the smallest (or largest negative) absolute value of the BIC is the preferred model (Raftery, 1985).

To answer the final research question we used ANOVAs to investigate whether anxiety changed in the total adolescent sample and in the nine personality groups over the two measurement waves. Repeated measures analyses with personality groups as between-subjects factor were performed in order to determine whether the personality groups differed in their mean anxiety level. Gender and age were entered as covariates controlling for possible gender and age group effects. Additionally, we conducted oneway ANOVAs with Bonferroni post hoc tests on the difference scores for each personality group in order to determine whether the increase or decrease in anxiety differed between the personality groups.

## **3.3 Results**

The means, standard deviations and the retest coefficients of the Big Five dimensions are presented in Table 1 for the total sample and the two age groups. We tested whether early and middle adolescents differed on the Big Five dimensions by means of a repeated measures ANOVA with age group as between-subjects factor. We found that the within-subjects effects of the separate Big Five dimensions were not significantly different between the age groups (range of  $F$ s (1, 825) = .34 – 2.36;  $p > .05$ ), indicating that the development of the separate Big Five dimensions was the same in both age groups. Furthermore, extraversion ( $F$  (1, 825)

**Table 1.** Means and standard deviations of the Big Five dimensions on two waves and the correlations between the Big Five dimensions for the total sample and both age groups.

	Extraversion		Agreeableness		Conscientiousness		Emotional Stability		Openness	
	Wave 1	Wave 2	Wave 1	Wave 2	Wave 1	Wave 2	Wave 1	Wave 2	Wave 1	Wave 2
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Total (N = 827)	4.79 (1.07)	4.83 (1.07)	5.26 (.78)	5.44 (.71)	4.24 (1.07)	4.29 (1.11)	4.48 (1.03)	4.38 (1.01)	4.63 (.88)	4.81 (.85)
Early (n = 502)	4.87 (1.01)	4.87 (1.04)	5.19 (.81)	5.34 (.77)	4.22 (1.02)	4.26 (1.06)	4.60 (1.04)	4.46 (1.02)	4.51 (.89)	4.70 (.88)
Middle (n = 325)	4.66 (1.13)	4.75 (1.10)	5.38 (.73)	5.58 (.59)	4.27 (1.14)	4.35 (1.17)	4.29 (.98)	4.25 (.99)	4.82 (.83)	4.98 (.78)
	Wave 1 – Wave 2		Wave 1 – Wave 2		Wave 1 – Wave 2		Wave 1 – Wave 2		Wave 1 – Wave 2	
	<i>r</i>		<i>r</i>		<i>r</i>		<i>r</i>		<i>r</i>	
Total (N = 827)	.57**		.44**		.65**		.51**		.60**	
Early (n = 502)	.50**		.41**		.57**		.43**		.55**	
Middle (n = 325)	.67**		.49**		.75**		.62**		.66**	

= 6.23;  $p < .05$ ) and emotional stability ( $F(1, 825) = 17.45$ ;  $p < .001$ ) appeared to decrease over two waves since the mean levels were lower in middle than in early adolescents, whereas agreeableness ( $F(1, 825) = 23.19$ ;  $p < .001$ ) and openness ( $F(1, 825) = 28.88$ ;  $p < .001$ ) appeared to increase over two waves, since the mean levels were higher in middle than in early adolescents. Next, the rank-order stability of the Big Five dimensions appeared to increase from early to middle adolescents in extraversion ( $p < .001$ ), conscientiousness ( $p < .001$ ), emotional stability ( $p < .001$ ) and openness ( $p < .05$ ); no significant change occurred in agreeableness.

By means of the k-means clustering procedure we found 304 resilients in wave 1, of which 58.6% remained their type membership in wave 2, whereas 17.8% changed to overcontroller and 23.7% changed to undercontroller in the longitudinal sample. Furthermore, we found 217 overcontrollers in wave 1 of which 62.7% remained their type membership in wave 2, 24.0% changed to resilient and 13.4% changed to undercontroller. Finally, we found 306 undercontrollers in wave 1 of which 51.3% remained their type membership in wave 2, 22.5% changed to resilient and 26.1% changed to overcontrollers. Because participants might be assigned to the same personality type at the two measurement times simply as a result of chance and not as a function of personality continuity, we calculated the kappa coefficient which corrects for chance agreement, as was also done in Asendorpf and Van Aken (1999; kappa = .30). The Cohen's kappa in the current study was .38.

Furthermore, the distribution of the types differed within the genders: there were more male resilients and male undercontrollers than male overcontrollers in wave 1 (33.7%, 42.7%, 23.6% respectively), whereas there were more male undercontrollers than male resilients and male overcontrollers in wave 2 (39.4%, 30.8%, 29.8% respectively). Also, there were more female resilients than female overcontrollers and female undercontrollers in wave 1 (39.5%, 28.6%, 32.0% respectively), whereas there were more female resilients and female overcontrollers than female undercontrollers in wave 2 (40.8%, 35.1%, 24.0% respectively; Table 2).

Additionally, the distribution of the types differed within the age categories: there were more resilients and undercontrollers than overcontrollers in the younger group in wave 1 (37.1%, 41.8% and 21.1% respectively), whereas the personality types of the younger adolescents in wave 2 were more evenly distributed (resilients: 35.8%, overcontrollers: 27.3%, undercontrollers: 37.5%). However, there were more resilients and overcontrollers than undercontrollers in the older group in both waves (36.3%, 34.2% and 29.5% respectively in wave 1; 37.5%, 40.9% and 21.5% respectively in wave 2).

**Table 2.** The nine personality groups composed of the original three personality types measured on the two waves

		Wave 2			Total
		R	O	U	
Wave 1	R	1	2	3	304
		178	54	72	
		(58.6%) <sup>1</sup>	(17.8%)	(23.7%)	
	O	4	5	6	217
		52	136	29	
		(24.0%)	(62.7%)	(13.4%)	
	U	7	8	9	306
		69	80	157	
		(22.5%)	(26.1%)	(51.3%)	
	Total	299	270	258	827

Note. <sup>1</sup>: Percentages within cells sum up to 100% within rows.

### 3.3.1. Stability and Change of Personality Type Membership

While a small majority of students (56.9%) remained their type membership over both waves, the remaining adolescents (43.1%) were classified differently from wave 1 to wave 2. Hence, nine personality patterns occurred (Table 2): three groups that reflected the same type membership over the two waves, namely 'stable resilient'(RR), 'stable overcontrollers' (OO) and 'stable undercontrollers' (UU), and six groups that reflected a change in their type membership, namely 'resilient-overcontrollers' (RO), 'resilient-undercontrollers' (RU), 'overcontroller-resilients' (OR), 'overcontroller-undercontrollers' (OU), 'undercontroller-resilients' (UR) and 'undercontroller-overcontrollers' (UO).

General log-linear analyses (GLLM) were conducted to investigate longitudinal change in the three personality types with gender and age as additional co-varying variables. Hence, a cross-table analysis was performed on a 3 x 3 x 2 x 2-table, of which Table 2 (3 x 3-table) is a simplified version. In GLLM, the BIC can be used to determine whether a model fits the data well; the smaller the BIC, the better the fit. The null model (i.e., model 1) included the main effects for personality type at both waves ( $P_1, P_2$ ), gender (G) and age (A) and all 2-way ( $P_1 \times G, P_1 \times A, P_2 \times G, P_2 \times A, G \times A$ ) and 3-way interactions ( $P_1 \times G \times A, P_2 \times G \times A$ ). However, the interaction term assessing stability and/or change of the type membership on both waves ( $P_1 \times P_2$ ) was not included in the null model. This model ( $L^2(16, N = 827) = 202.66, p < .001$ ; BIC = 95.18) had a high BIC, and since

only models that have a low BIC have a good fit in GLLM, this model did not fit the data well.

Therefore, in the second model the interaction term assessing stability and/or change of type membership on wave 1 and 2 ( $P_1 \times P_2$ ) was added, which increased the fit significantly; this model fit the data well ( $L^2(12, N = 827) = 13.99, p > .05$ ; BIC = -66.62). We also tested whether the fit would increase even more when adding the interaction term between the types on wave 1 and 2 and gender ( $P_1 \times P_2 \times G$ ;  $L^2(8, N = 827) = 11.73, p > .05$ ; BIC = -42.01) or age ( $P_1 \times P_2 \times A$ ;  $L^2(8, N = 827) = 4.19, p > .05$ ; BIC = -49.55); but, although the fit increased somewhat, this did not lead to a more negative BIC than the BIC of model 2; therefore, model 2 remained the best fitting model. Since the interaction between the personality types on both waves improved the fit of the null model significantly ( $\Delta L^2 = 188.67, \Delta df = 4, \Delta BIC = 161.80$ ), we can conclude that the stability in personality type membership differed between the personality groups over two waves.

**Table 3.** Log-linear models of stability and change in personality

Models	$L^2$	df	p	BIC
1. Null model	202.66	16	< .001	95.18
2. Model 2 ( $P_1 \times P_2$ added to null model)	13.99	12	> .05	-66.62
A. Model 1 + Covariate '9 separate changes'	52.00	15	< .001	-48.77
B. Model 1 + Covariate 'Stability vs. Change'	25.68	15	< .05	-75.09
C. Model 1 + Covariate 'Stability – Change – UO'	24.63	15	> .05	-76.14

To test our first hypothesis, we examined the interaction more specifically by using specified covariates instead of relying only on interaction effects. Several covariates were defined to study the stability and change of type membership. In the first analysis (i.e., model A in Table 3) the covariate was defined as each personality group being an independent entity; this means that every cell of the  $3 \times 3$ -table was defined separately and that each of the nine transitions in personality had a different frequency. This model fit the data well and, compared to the null model, the fit increased significantly ( $\Delta L^2 = 150.66, \Delta df = 1, \Delta BIC = 143.95$ ). In the second analysis (i.e., model B in Table 3), the covariate was defined as the stable groups being one collective entity and the changed groups being another collective entity; this means that groups 1, 5 and 9 were combined to form the 'stable' groups and that the remaining groups were combined to form the 'changing' groups. This model also fit the data well and, compared to the null model as well as to model A, the fit increased significantly ( $\Delta L^2 = 176.98, \Delta df = 1, \Delta BIC = 170.27$ ;  $\Delta L^2 = 150.66, \Delta df =$

0,  $\Delta\text{BIC} = 26.32$  respectively). While other hypothetical models were also tested using covariates, none of these models had an equally good fit as model B. Therefore, we can conclude that the nine personality patterns could be divided into 2 large groups, namely the personality groups that remained their type membership and the personality groups that changed their type membership. The groups that remained their type membership occurred more frequently than the groups that changed. However, both stability (56.9%) and change (43.1%) in personality type membership were found. Since we found a moderate stability of personality type membership, our first hypothesis was supported.

To test our second hypothesis, we examined whether the change from overcontroller to undercontroller and the change from undercontroller to overcontroller occurred less often than other changes. We tested several covariates with the stable personality groups as one entity, the overcontroller-undercontroller group and/or undercontroller-overcontroller group as another, and the remaining changed groups as a third entity (Table 3). We will only describe the final best fitting model, which is model C. Model C is defined as the stable groups being one separate entity, the undercontroller-overcontroller group being the second separate entity and the overcontroller-undercontroller group combined with the remaining changing groups as the third entity. This model ( $\text{BIC} = -76.14$ ) had a more negative BIC and thus fit the data better than the null model ( $\text{BIC} = 95.18$ ) and than model B ( $\text{BIC} = -75.09$ ). Inspection of Table 1 shows that the cell frequency of the change from undercontroller to overcontroller (26.1%) is higher than that of the other changes (mean cell frequency = 20.3%). Therefore, we can conclude that the change in type membership from undercontroller to overcontroller occurred more frequently than all the other changes in type membership. In an additional model, defined as the stable groups being one separate entity, the overcontroller-undercontroller group being the second separate entity and the undercontroller-overcontroller group combined with the remaining changing groups as the third separate entity, we tested whether the change from overcontroller to undercontroller occurred less often than the other personality changes, but this was not the case. The fit indices of the models, that were defined with the covariates, are presented in Table 3. Since we expected to find that both the change from undercontroller to overcontroller and from overcontroller to undercontroller occurred less often than other changes, our findings did not support the second hypothesis.

### ***3.3.2. Stability and Change in Personality Type Membership and Anxiety Level***

The means, standard deviations and effect sizes of anxiety for the total sample and the nine personality groups are presented in Table 4. Differences between the

nine personality groups and anxiety for the two waves were determined by an ANOVA with repeated measures for anxiety, personality groups as between subjects factor and gender and age groups as covariates; Bonferroni post hoc tests were included.

The ANOVAs demonstrated that anxiety ( $F(1, 816) = 1516.54, p < .001, \eta^2 = .65$ ) was significantly higher in wave 1 compared to wave 2. Gender ( $F(1, 816) = 24.97, p < .001, \eta^2 = .03$ ) also showed significant effects: girls were more anxious than boys. Furthermore, no significant age differences were found. More importantly, the personality groups ( $F(8, 816) = 22.85, p < .001, \eta^2 = .18$ ) showed significant effects. Since we found many significant differences between the personality groups on anxiety across the waves, we inspected the individual group means for possible homogenous subsets. It appeared that personality groups that scored highest on anxiety were the personality groups that consisted of overcontrollers in wave 1 or 2 but not resilients, whereas the personality groups that scored lowest on anxiety consisted of resilients in wave 1 or 2, but not overcontrollers. On the basis of these differences in means across waves on anxiety we constructed three subsets (Table 4). Subset 1 consisted of personality groups that were overcontroller on wave 1 or 2, but were not resilient on either wave (i.e., OO, OU, UO). Subset 3 consisted of personality groups that were resilient on wave 1 or 2, but were not overcontroller on either wave (i.e., RR, RU, UR) and the remaining personality groups were grouped into subset 2 (i.e., UU, RO, OR). We repeated the repeated measures ANOVA in the same way as described above, but now with the personality subsets as between subjects factor. This ANOVA showed the same results on anxiety, gender and age, and additionally showed significant effects for the personality subsets ( $F(2, 822) = 85.04; p < .001, \eta^2 = .17$ ): subset 1 scored significantly higher on anxiety than subset 2 ( $p < .001$ ) and 3 ( $p < .001$ ) and subset 2 scored significantly higher on anxiety than subset 3 ( $p < .001$ ). This means that the subset in which adolescents were overcontroller but not resilient in wave 1 or 2 showed significantly more anxiety than the subset in which adolescents were resilient but not overcontroller in wave 1 or 2, while the subset with stable undercontrollers and personality groups that were resilient and overcontroller in wave 1 and 2 showed an intermediate level of anxiety.

Additionally, the ANOVAs demonstrated that the interactions anxiety x gender and anxiety x age were not significant, whereas the interaction anxiety x personality groups was significant ( $F(8, 816) = 3.10, p < .01, \eta^2 = .03$ ; Figure 2). Since it is not possible to compare all the changes in the personality groups with each other in a single repeated measures analysis, we calculated difference scores, subtracting the anxiety score on wave 1 from the anxiety score on wave 2, followed by a oneway ANOVA with the personality groups as between subjects factor and

**Table 4.** Descriptives of anxiety for total sample, gender, age, personality groups and subsets on the two waves

		Wave 1		Wave 2	T – test	Effect size	Retest coefficients	Mean scores across waves	Mean subset scores across waves
		N	M (SE)	M (SE)	p	$\eta_p^2$	r	M (SE)	M (SE)
Total		827	49.48 (.43)	49.32 (.33)	> .05	.01	.48*	49.40 (.38)	
Gender	Boys	386	47.86 (.62) <sup>a</sup>	47.57 (.46) <sup>a</sup>	> .05	.03	.36*	47.72 (.54)	
	Girls	441	50.43 (.48) <sup>b</sup>	50.43 (.43) <sup>b</sup>	> .05	.00	.60*	50.43 (.46)	
Age	Early adolescents	502	49.32 (.52)	48.79 (.43)	> .05	.05	.43*	49.06 (.48)	
	Middle adolescents	325	49.09 (.58)	49.57 (.47)	> .05	-.05	.57*	49.33 (.50)	
Personality groups	Subset 1						.58*		54.90 (.51) <sup>a</sup>
	Stable overcontrollers (OO)	136	55.52 (.91)	55.38 (.71)	> .05	-.00	.60*	55.45 (.68)	
	Overcontroller-undercontrollers (OU)	29	54.20 (1.96)	52.20 (1.53)	> .05	.17	.52*	53.20 (1.47)	
	Undercontroller-overcontroller (UO)	80	51.89 (1.17)	53.54 (.92)	> .05	-.15	.58*	52.72 (.88)	
	Subset 2						.31*		48.79 (.49) <sup>b</sup>
	Stable undercontrollers (UU)	157	49.43 (.85)	48.84 (.66)	> .05	.07	.28*	49.14 (.64)	
	Resilient-overcontrollers (RO)	54	46.46 (1.43)	50.72 (1.12)	< .001	-.54	.54*	48.59 (1.07)	
	Overcontroller-resilients (OR)	52	49.39 (1.46)	46.56 (1.14)	< .05	.32	.35*	47.97 (1.09)	
	Subset 3						.24*		45.53 (.44) <sup>c</sup>
	Undercontroller-resilients (UR)	69	48.70 (1.27)	45.54 (.99)	> .05	.30	.00	47.12 (.95)	
	Resilient-undercontrollers (RU)	72	44.68 (1.43)	46.35 (.97)	> .05	-.20	.22	45.52 (.93)	
	Stable resilients (RR)	178	45.08 (.79)	44.75 (.62)	> .05	.05	.52*	44.92 (.59)	

Note. <sup>a, b, c</sup>: Means with different superscripts are significantly different at  $p < .05$  or better; \*:  $p < .01$ .

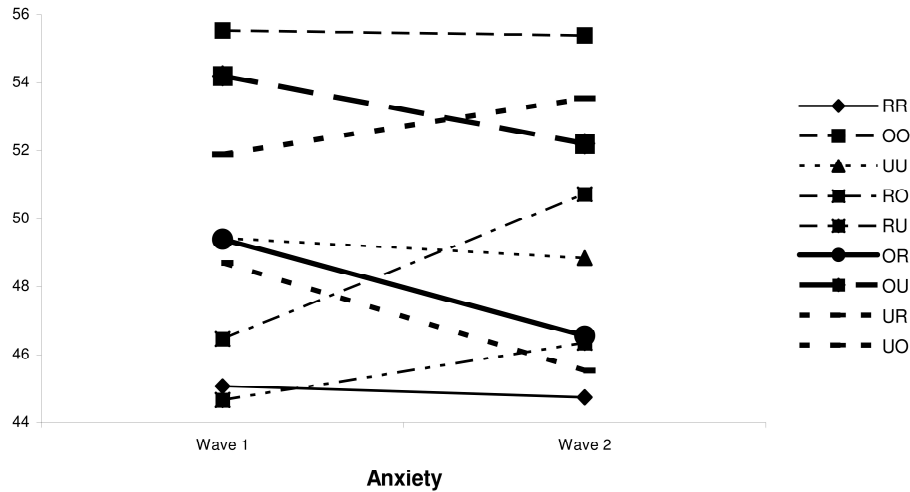


Figure 2. Nine personality groups on anxiety in wave 1 and 2.

the difference scores of anxiety as the dependent variable. We found a significant difference in change between the resilient-overcontroller group and the overcontroller-resilient group ( $p < .05$ ): the resilient-overcontroller group increased in their level of anxiety across the waves, whereas the overcontroller-resilient group decreased in their level of anxiety. No significant differences between other groups were found.

Additional analyses were conducted to study whether the change in anxiety level was significant within the total group, genders, age groups and personality groups. For each group t-tests were performed and effect sizes (i.e., partial eta squared or  $\eta_p^2$ ) were calculated. Although we did not find any significant differences or effect sizes within the total group, boys, girls, young and middle adolescents, we did find significant changes within the personality groups on the change in anxiety level. First, the personality groups that remained their type membership demonstrated no significant changes in anxiety. Second, although only two personality groups showed a significant change in anxiety level, namely the resilient-overcontroller group and the overcontroller-resilient group, four personality groups demonstrated a small to medium effect size, namely the resilient-overcontroller group, the overcontroller-resilient group, the resilient-undercontroller group, and the undercontroller-resilient group. These small to medium effect sizes indicated that the anxiety level actually changed from wave 1 to 2 in these personality groups. More specifically, the personality groups that

changed to resilient, such as the overcontroller-resilient group and the undercontroller-resilient group, showed a decrease in anxiety level, whereas the personality groups that changed to non-resilient, such as the resilient-overcontroller group and the resilient-undercontroller group, showed a significant increase in anxiety level.

Since there could be some overlap in content between the Big Five dimension emotional stability and anxiety, we tested whether emotional stability on wave 1 predicted anxiety on wave 2, controlling for the relation between emotional stability and anxiety on wave 1. We found that emotional stability on wave 1 predicted anxiety on wave 2 ( $\beta = -.21, p < .001$ )<sup>3</sup>, when controlling for the co-occurrence of emotional stability and anxiety on wave 1. The squared multiple correlation of anxiety was .27, which implies that more than 70% of the variance in anxiety is explained by other variables than emotional stability. In other words, the content overlap between emotional stability and anxiety probably is rather low.

### **3.4 Discussion**

The purpose of this study was to examine the stability of personality type membership in adolescence and whether change in personality type membership was related to change in anxiety level. In order to do so, we examined three research questions. The first research question focused on the stability of personality type membership during adolescence. As expected, we demonstrated that type membership remained the same for a small majority of adolescents, whereas the type membership changed for a large minority of adolescents. These findings are congruent with several studies that also demonstrated a moderate stability in personality type membership (Asendorpf & Van Aken, 1999; Hart et al., 2003; Van Aken & Dubas, 2004). Since adolescence is a period in which several changes in many developmental domains occur (Rice, 1999; Steinberg & Silk, 2002), personality type membership seems to be one of the domains that is also prone to change.

The second research question examined whether the findings of Hart et al. (2003), that the personality change from overcontroller to undercontroller and from undercontroller to overcontroller occurred less frequently than other personality changes, could be replicated. However, this was not demonstrated in the current study. According to our findings the change from overcontroller to undercontroller occurred as often as other personality changes. Moreover, the change from undercontroller to overcontroller occurred *more* frequently than other personality changes. Although we did not expect this finding, the following explanation might be given. It is known that undercontrollers are very impulsive and often have

academic and behavioural problems, which could be a possible cause for serious conflicts with other people. The negative feelings that are related to these conflicts might cause a negative mood (Akse et al., 2004; Dubas et al., 2002), which could lead them to exhibit more overcontrolling characteristics and could ultimately lead to an overcontrolling personality. Indeed, these findings are in contrast with Hart et al. (2003), but it should be noted that in their study these individual type membership changes were not tested explicitly; they only described the frequencies of the nine possible personality changes in their samples. Obviously, more research is needed to replicate our findings and, as Hart et al. (2005) point out, to examine what processes or characteristics of these adolescents account for the changes in their personality type membership.

The third and final research question examined whether personality change was associated with change in anxiety level. We would like to point out that, although one of the Big Five dimensions, i.e., emotional stability, is associated with anxiety, personality and anxiety should be considered as distinguishable concepts. We acknowledge that personality aspects, such as emotional stability, could make a person more prone to developing problem behaviour, such as anxiety. However, according to the diathesis-stress model anxiety only develops when low levels of emotional stability occur simultaneously with certain environmental influences (e.g., Brozina & Abela, 2006; John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994; Koçkar & Gençöz, 2004; Muris, De Jong, & Engelen, 2004). In addition to emotional stability, the Big Five contains other dimensions, that are also related to problem behaviour (Ehrler, Evans, & McGhee, 1999).<sup>3</sup> Therefore, the associations we find in this study are not solely due to the associations between emotional stability and anxiety.

We found that stable overcontrollers were more anxious than stable undercontrollers and stable resilient and that stable undercontrollers were more anxious than stable resilient. This is in line with other studies that also found that overcontrollers generally have the highest level of internalizing problem behaviour (e.g., Robins et al., 1996; Van Aken & Dubas, 2004). These findings support our third hypothesis.

Additionally, we found that three personality subsets differed significantly from each other on the mean level of anxiety. This means that adolescents who were overcontroller, but were not resilient in either wave (i.e., subset 1), were most anxious compared to the other subsets. However, the subset in which the adolescents were resilient, but were not overcontroller in either wave (i.e., subset 3), were least anxious. Although resiliency is not a definite protective factor for developing anxiety, it suggests that adolescents who are classified as resilient but not as overcontrollers generally have a better ability to recover from negative

events (Olsson, Bond, Burns, Vella-Brodrick, & Sawyer, 2003), which could explain the lower anxiety level in this group.

#### ***3.4.1 Change in Personality Type Membership and Change in Anxiety Level***

Not only clear differences between the personality groups in the mean level of anxiety were found, also clear differences between the personality groups in the changes of anxiety level emerged. First of all, when type membership remained stable, the level of anxiety remained stable. Although the three stable personality groups exhibited a significantly different mean level of anxiety, their change in anxiety was the same (i.e., no change occurred).

Second, the resilient-overcontroller group increased in their level of anxiety, whereas the overcontroller-resilient group decreased in their level of anxiety, which suggests that when type membership changed to a personality type prone to internalizing problems, the anxiety level increased. The opposite seemed also true: when type membership changed to a type that is resilient, the anxiety levels decreased. Our findings also suggest that when personality changed in the opposite direction, the level of anxiety changed in the opposite direction. Although we only found a significantly different change of anxiety between the resilient-overcontroller group and the overcontroller-resilient group, a similar pattern appeared to be present between the resilient-undercontroller group, in which the anxiety level increased, and undercontroller-resilient group, in which the anxiety level decreased; and also between the overcontroller-undercontroller group, in which the anxiety level decreased, and undercontroller-overcontroller group, in which the anxiety level increased (Figure 2). In these latter groups an opposite change in type membership seemed also to be related to an opposite change in anxiety, although not significant. Obviously, in order to confirm this pattern of opposites, more research is needed.

Third, it is noteworthy that the differences between the personality groups in change of anxiety level are particularly present in the resilient and overcontroller groups, which were also important personality features in the discussion of the personality subsets, suggesting that the overcontroller and resilient aspects of personality are especially important in anxiety development, as can be expected on the basis of prior research (e.g., Dubas et al., 2002; Robins et al., 1996).

#### ***3.4.2 Additional Findings***

*Gender, age and anxiety.* Boys and girls demonstrated clear differences in anxiety level. We found that girls were more anxious than boys, which is congruent with findings of several other studies (e.g., Hale, Raaijmakers, Muris, & Meeus, 2005; Muris, De Jong, & Engelen, 2004; Norton, Buhr, Cox, Norton, & Walker,

2000). We did not find any differences between the age groups in anxiety level. This is in contrast with findings of Verhulst and Verheij (2000) and Wenar and Kerig (2000), who claim that the level of anxiety is higher in older than in younger adolescents; however, in the study by Allsopp and Williams (1991) no age differences were detected. Finding significant differences in anxiety level between age groups in adolescence could depend on the specific anxiety that is studied: e.g., separation anxiety symptoms are likely to decrease during adolescence, whereas social anxiety symptoms are likely to increase (Craske, 1997). Furthermore, both gender and age did not demonstrate any differences in the change of anxiety level, which means that anxiety develops in the same way for both genders and both age groups. Thus, on the basis of these findings we would suggest that although the mean level of anxiety could be different, as is the case for boys and girls, the development or change in anxiety does not differ between the groups.

*Personality trait continuity.* On the basis of significant differences between early and middle adolescents on the Big Five dimensions, we demonstrated that agreeableness and openness increased, whereas extraversion and emotional stability decreased during adolescence, which is only partly in agreement with Roberts, Walton and Viechtbauer (2006a)'s meta-analysis. We also demonstrated that in addition to the differences between the early and middle adolescents on the mean levels of the Big Five dimensions, the development of the Big Five dimensions over two waves was the same in both age groups.

Furthermore, we found that the rank-order stability of the Big Five dimensions increased in extraversion, conscientiousness, emotional stability and openness during adolescence; however, no change occurred in agreeableness. In a meta-analysis of Roberts and DelVecchio (2001) was reported that the trait consistency of Big Five personality dimensions increased with age, including from childhood to adolescence and from adolescence to young adulthood. This process of an increase in trait consistency also occurs during adolescence, at least so it seems for extraversion, conscientiousness, emotional stability and openness.

### **3.4.3 Limitations and Future Research**

In addition to the aforementioned findings, a few limitations of the present study need to be addressed. The first limitation is that our findings are solely based on adolescent self-reports, which could result in biased answers. However, since internalizing behaviours might be more difficult to observe to others (Achenbach, McConaughy, & Howell, 1987), we were more interested in the feelings and opinions of the adolescents themselves.

A second limitation of this study is that only subclinical levels of anxiety were assessed. Although the data reported here can be used as a baseline for clinical

populations, they do not meet clinical criteria and the results of this study should not be equated with those from studies of adolescents with psychiatric disorders (Gjerde, Block, & Block, 1988; Kim & Smith, 1998).

A final limitation is that the relationship between personality and anxiety is not causal. Since we measured the change in type membership and change in anxiety simultaneously, it is not possible to conclude that either change in type membership causes changes in anxiety or that anxiety change causes change in type membership. As Hart et al. (2005) point out more longitudinal research is needed to examine what causes adolescents to change their type membership and also what are the consequences of changes in type membership.

Finally, we suggest more research on the change in the personality types and its associations with problem behaviours. Since developmental personality types are known to differ in their mean level of externalizing problem behaviour (Morizot & LeBlanc, 2005), especially in undercontrollers, we suggest that studies on the association between personality type change and change in externalizing problem behaviour should be conducted as well.

### **3.5 Conclusions**

In this study a moderate stability of type membership was found during adolescence. An important finding was that besides the non-changing groups the change from undercontroller to overcontroller was the most frequently occurring change in type membership. Furthermore, specific changes in type membership were associated with specific levels of anxiety and specific changes in type membership were associated with specific changes in anxiety level. Generally, it appeared that stability in type membership was related to stability in anxiety level and that (contrary) change in type membership was related to (contrary) change in anxiety level. Finally, clear differences were found between early and middle adolescents on the rank-order and mean-level continuity of the Big Five personality dimensions.

## Footnotes

<sup>1</sup>: For a comparison between these initial cluster centres and Asendorpf (2006)'s cluster centres, see Akse, Hale, Engels, Raaijmakers, and Meeus (in press).

<sup>2</sup>: We calculated the stabilities of the personality types over the two waves using the more strict criterion of 1 SD (N = 538). We found the following stabilities: RR = 56.6%, OO = 64.4%, UU = 48.8%, RO = 18.0%, RU = 25.4, OR = 22.0%, OU = 13.6%, UR = 24.4% and UO = 26.9%. These stabilities resemble the stabilities using the 2 SD-criterion very closely. Therefore, we can conclude that the fairly liberal selection of a stability criterion did not influence the 2-wave personality type stability.

<sup>3</sup>: Additional analyses were performed using AMOS (Arbuckle, 1995) for the total sample (N = 827). We calculated the co-occurrence between emotional stability and anxiety on wave 1, the stability paths within emotional stability and within anxiety and the bidirectional crosspaths between the constructs. The fit of the model was low ( $\chi^2(1) = 112.80$ ,  $p < .001$ , NFI = .86, CFI = .86, RMSEA = .37, AIC = 138.80). We found that the wave 1 co-occurrence of emotional stability and anxiety was  $r = -.41$ , that the stability of emotional stability was  $\beta = .45$  and that the stability of anxiety was  $\beta = .40$ . Furthermore, we found that emotional stability on wave 1 predicted anxiety on wave 2 ( $\beta = -.21$ ,  $p < .001$ ) and that anxiety on wave 1 predicted emotional stability on wave 2 ( $\beta = -.14$ ,  $p < .001$ ). The squared multiple correlations were .27 for both emotional stability and anxiety. Furthermore, we performed a hierarchical regression analysis with anxiety on wave 2 as a dependent variable and anxiety and the Big Five dimensions on wave 1 as predictors. When controlling for anxiety ( $\beta = .38$ ,  $p < .001$ ) and emotional stability ( $\beta = -.16$ ,  $p < .001$ ) on wave 1, we found that extraversion was the only Big Five dimension that significantly predicted anxiety on wave 2 ( $\beta = -.11$ ,  $p < .01$ ).

## **Chapter 4**

### **CO-OCCURRENCE OF DEPRESSION AND DELINQUENCY IN PERSONALITY TYPES <sup>1</sup>**

<sup>1</sup> Akse, J., Hale III, W. W., Engels, R. C. M. E., Raaijmakers, Q. A. W., & Meeus, W. H. J. (in press). Co-occurrence of depression and delinquency in personality types. *European Journal of Personality*.

### **Abstract**

Although the co-occurrence between adolescent depression and delinquency has been well-studied, the nature of the longitudinal associations is not yet clear. To clarify this we examined whether personality type is a moderator in the longitudinal co-occurrence of depression and delinquency. A total of 338 young and middle adolescents completed questionnaires about depression, delinquency and personality in 3 yearly waves of the CONflict And Management Of Relationships (CONAMORE). We found that the stable overcontrollers showed the highest mean level on depression and that the stable undercontrollers showed the highest mean level on delinquency. Furthermore, we demonstrated that the longitudinal co-occurrence between depression and delinquency was best described by means of a stability model, in which personality type membership proved to be an important moderator. The three personality types differed significantly on the rank-order stability of both depression and delinquency.

#### **4.1 Introduction**

Co-occurrence is often used to describe the occurrence of two or more problem behaviours at the same point in time (Angold, Costello, & Erkanli, 1999). Co-occurrence is often used interchangeably with comorbidity, although both terms actually refer to two separate phenomena. The term co-occurrence refers to the identification of two or more psychopathological conditions in an individual (Keiley, Lofthouse, Bates, Dodge, & Pettit, 2003), whereas the term comorbidity is used to define valid coexistence of two or more categorically defined and distinct disorders, such as in DSM-IV (American Psychiatric Association, 1994). In the present study, we will investigate the co-occurrence of adolescent depression (internalizing problem behaviour) and delinquency (externalizing problem behaviour).

Internalizing and externalizing problem behaviours co-occur more often than chance rates (Krueger, Caspi, & Moffitt, 2000) and frequently imply greater impairment, poorer responses to treatment and worse outcome over time (Keiley et al., 2003; Youngstrom, Findling, & Calabrese, 2003), which makes it an important research topic. Although the co-occurrence between adolescent depression and delinquency has been widely studied (e.g., Angold, Costello, & Erkanli, 1999; Ben-Amos, 1992; Meller & Borchardt, 1996), the nature of the longitudinal associations is not yet clear (Beyers & Loeber, 2003). Several theories on the mechanisms of the co-occurrence of adolescent problem behaviours have been proposed. Two of these theories suggest that one problem behaviour constitutes a risk factor for the other; however, they differ in the manner in which internalizing and externalizing problem behaviours predict each other. The 'failure' theory holds that externalizing problems predict internalizing problems; disruptive behaviour may result in rejection and a lack of support by important others, which lead to worries, anxiety and depression (Burke, Loeber, Lahey, & Rathouz, 2005; Capaldi, 1992). For example, Burke et al. (2005) found that conduct disorder symptoms predicted subsequent depression symptoms, whereas the number of depression symptoms was not predictive of subsequent conduct disorder symptoms in adolescent boys. These results supported a failure model, whereby lack of skill and noxious behaviour lead to pervasive failures and vulnerability to depressed mood. On the other hand, the 'acting out' theory claims that internalizing problems predict externalizing problems; underlying depressive feelings are acted out by displaying externalizing problem behaviour (Carlson & Cantwell, 1980; Gold, Mattlin, & Osgood, 1989). It was pointed out that experiencing depressive feelings was frequently accompanied by other problems, especially 'acting out' behaviours. This led to the concept of masked depression, in which the accompanying behaviours

were thought to dominate or mask those behaviours that were associated with mood disturbances (Ben-Amos, 1992).

In addition to these two theories, another theory has been proposed to explain the co-occurrence of depression and delinquency. The stability perspective states that the co-occurrence of internalizing and externalizing problem behaviours is caused by non-specific risk factors, such as family history of offending, parent-child relationships or life events (Fergusson, Lynskey, & Horwood, 1996), which lead to separate but associated problem behaviours (Krueger, 1999; Krueger, Caspi, Moffitt, & Silva, 1998; Overbeek, Vollebergh, Meeus, Engels, & Luijpers, 2001). This implies that there are no uni-directional or bi-directional relationships between the problem behaviours over time.

The results of the previous studies have been inconsistent with regard to the nature of the co-occurrence between depression and delinquency during adolescence (Beyers & Loeber, 2003; Wiesner, 2003). For example, while one study found that the failure model applied to boys and that both the failure model and acting out model applied to girls (Wiesner, 2003), other studies have found that the stability model best applies to both genders (Krueger, 1999; Krueger et al., 1998; Overbeek et al., 2001). Obviously, it is not clear which of the models can best describe the co-occurrence between depression and delinquency for adolescents.

Possibly, these aforementioned studies miss a potential key factor underlying the co-occurrence between depression and delinquency, namely a person's personality (Wiesner, 2003). Indeed, personality traits have been shown to account directly for patterns of co-occurrence; neuroticism, for example, accounted for a substantial percentage of the co-occurrence between internalizing and externalizing problem behaviours (Krueger & Markon, 2006). However, it was also noted that the patterning of individual differences in personality or the configurations of personality traits could have unique relevance to understanding the patterning of psychopathology (Krueger, 2005; Krueger, Caspi, & Moffitt, 2000). Therefore, we will try to clarify the co-occurrence between depression and delinquency by testing whether different co-occurrence models are valid for different personality types.

In personality research two major approaches can be distinguished. The variable-centred approach focuses on differences among individuals on a given personality trait or dimension, whereas the person-centred approach focuses on the patterning and organization of traits within a person. Although both approaches add important insights into the understanding of personality, the present research replicates and extends recent work on personality types (e.g., Dubas, Gerris, Janssens, & Vermulst, 2002; Hart, Burock, London, Atkins, & Bonilla-Santiago, 2005; Robins, John, Caspi, Moffitt, & Stouthamer-Loeber, 1996;

Van Leeuwen, Mervielde, Braet, & Bosmans, 2004), especially the moderating role of personality types in the co-occurrence of depression and delinquency.

We will use the personality typology of Block and Block (1980) to describe the adolescents' personality, since a series of studies have shown systematic differences in depression and delinquency between the three personality types that Block and Block distinguish (Akse et al., 2004; Asendorpf & Van Aken, 1999; Dubas et al., 2002; Hart et al., 1997; Robins et al., 1996). Block and Block describe personality in terms of two continuous dimensions: ego-control and ego-resiliency. Ego-control refers to the tendency to contain emotional and motivational impulses versus the tendency to express them (overcontrol vs. undercontrol), whereas ego-resiliency refers to the tendency to respond flexibly rather than rigidly to changing situational demands, particularly stressful situations.

Robins et al. (1996) studied the personality typology of Block and Block and found ego-resiliency to have an inverted U-shaped relation with ego-control, on the basis of which Robins et al. identified three personality types: resilient, overcontrollers and undercontrollers. Resilient reflected a high level of ego-resiliency and a medium level of ego-control; overcontrollers and undercontrollers both reflected a low level of ego-resiliency; however, they differed markedly on ego-control: high and low respectively. Additionally, Robins et al. (1996) found that these personality types had a specific profile (for more information, see Robins et al., 1996) on the dimensions of the Big Five traits (Digman, 1990; McCrae & Costa, 1995). Consequently, Dubas et al. (2002) investigated whether the personality types could be constructed directly on the basis of the Big Five dimensions: this appeared to be possible. The personality types of Block and Block (1980) have been replicated in many studies using different informants, different methods and different statistical techniques (see: Asendorpf & Van Aken, 1999).

A number of studies has demonstrated differences in psychosocial functioning of adolescents endorsing the three personality types. Overcontrollers appeared to be more prone to higher levels of internalizing problems, undercontrollers were found to be more prone to higher levels of externalizing problems, whereas resilient exhibited the best psychosocial adjustment (Akse et al., 2004; Dubas et al., 2002; Hart et al., 2005; Robins et al., 1996; Van Aken & Dubas, 2004). Since these personality types show different vulnerabilities to internalizing and externalizing problem behaviours, and taking into account the suggestion made by Wiesner (2003) to complement the study of longitudinal co-occurrence between depression and delinquency with person-oriented approaches, it seems fruitful to investigate whether different co-occurrence models are valid for different personality types.

In light of the aforementioned, we formulated two research questions. The first research question examines the validity of the three stable personality groups. In line with earlier cross-sectional studies (e.g., Akse et al., 2004; Dubas et al., 2002; Robins et al., 1996), we examined whether the stable overcontrollers have the highest mean level of depression over time, whether the stable undercontrollers have the highest mean level of delinquency over time and whether the stable resilients exhibit the lowest levels of both depression and delinquency over time, indicating the best psychosocial adjustment.

The second research question investigates whether the longitudinal co-occurrence of depression and delinquency is present during adolescence and whether personality is a moderator in the longitudinal co-occurrence between depression and delinquency. Since the co-occurrence of depression and delinquency was present in other adolescent samples in general, we expect to find it in this study as well (Overbeek et al., 2001). Furthermore, as was mentioned earlier, the exact longitudinal associations are not yet clear (e.g., Beyers & Loeber, 2003; Wiesner, 2003) and personality types may moderate the longitudinal association between these internalizing and externalizing problem behaviours (Wiesner, 2003). We formulated two competing hypotheses to answer this question. Hypothesis 2a was derived from the typical pattern of depression and delinquency of the personality types. Since overcontrollers were prone to internalizing problem behaviours (e.g., Robins et al., 1996), it is possible that they develop delinquency through acting out their depressed mood. Furthermore, since undercontrollers were prone to externalizing problem behaviours (e.g., Robins et al., 1996), it is possible that they develop depression through failure experiences. Therefore, our hypothesis 2a states that co-occurrence in overcontrollers will be best described by an acting out model, whereas the co-occurrence in undercontrollers will be best described by a failure model. In contrast to hypothesis 2a, hypothesis 2b was derived from the stability perspective, which states that the co-occurrence of internalizing and externalizing problem behaviours is caused by non-specific risk factors. Since the personality types differ in the amount of non-specific risk factors (Hart, Atkins, & Fegley, 2003), we assume that the co-occurrence of depression and delinquency is different for the three personality types and that this difference is stable over time. Since it is known that ego-resiliency is related to stability in the overall environment (Asendorpf & Van Aken, 1991), we hypothesize that the stability of depression as well as delinquency, including the co-occurrence between depression and delinquency, is higher for resilients than for overcontrollers and undercontrollers.

## **4.2 Method**

### **4.2.1 Participants**

Participants in this study were drawn from the CONflict And Management Of RElationships study (CONAMORE), which is an ongoing longitudinal study of Dutch adolescents that examines their relationships with parents and peers as well as their emotional and behavioural states (Meeus et al., 2002). For this study, we used the first three waves of CONAMORE, collected yearly from 2001 onwards. The participating adolescents were students from 12 participating high schools located in the province of Utrecht, The Netherlands. The questionnaires about depression and delinquency and the personality questionnaire were filled in by 1,088 adolescents in the first wave. The attrition was extremely low, 0.9% from wave 1 to wave 2 and 4% from wave 2 to wave 3.

Before we started the administration of the questionnaires, both students and their parents received written information describing the aims of the study and, if the students decided to participate, they were required to provide written informed consent. Less than 1% elected not to participate. Written informed consent from the head masters of the participating schools was obtained. The administration was performed in the homeroom study period, during which the students could fill out the questionnaires anonymously. The research assistants, who attended the administration, gave verbal instructions about the questionnaires and a written instruction was included. The research assistants collected the completed questionnaires and conducted the data entry to ensure that the data remained anonymous. Students who were absent on the day of testing were invited for a second administration or received the questionnaire by regular mail.

### **4.2.2 Measures**

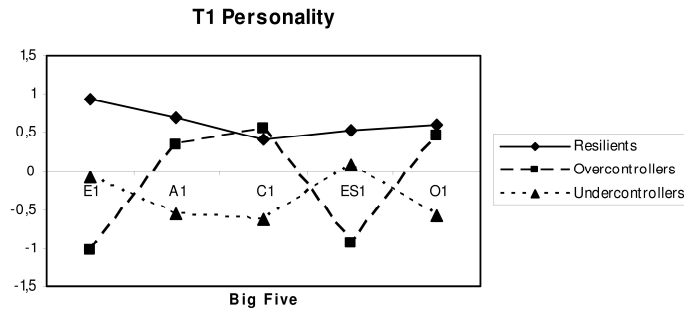
*Depression.* The Children's Depression Inventory (CDI) is a self-report questionnaire which is used as a screen for (subclinical) depressive symptomatology in children and adolescents (Kovacs, 1985). This scale has demonstrated convergent and discriminant validity, good internal consistency and adequate test-retest reliability in previous studies (e.g., Craighead, Smucker, Craighead, & Ilardi, 1998; Hodges, 1990). The CDI consists of 27 items; sample questions include 'I'm sad all the time', 'It will never end right for me' and 'I do everything wrong'. The items were scored on a 3-point scale, ranging from 'false', 'a bit true' to 'very true'. The internal consistency of the CDI was .93 in wave 1, .89 in wave 2 and .90 in wave 3.

*Delinquency.* The delinquency questionnaire is a self-report questionnaire which measures the frequency of several minor offences (Baerveldt, Van Rossem,

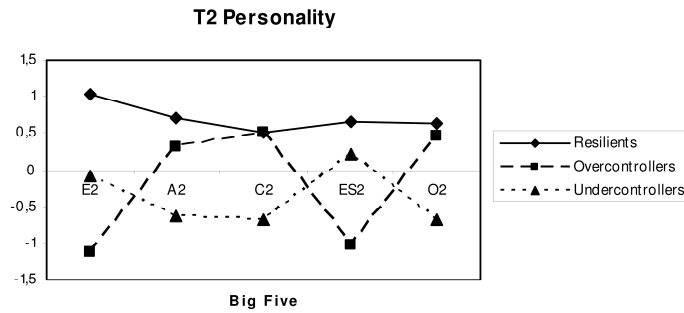
& Vermande, 2003). The use of self-report data is widespread in criminology, and it is a valid instrument when restricted to petty crime (Baerveldt, 2000). Adolescents were asked how many times they had committed 16 minor offences, such as being caught by the police for doing something, stealing a bike and deliberately damaging or breaking something in the street, in the past twelve months. The items were scored on a 4-point scale, ranging from 'never', 'once', 'two to three times' to 'four times or more'. The internal consistency of the delinquency questionnaire was .90 in wave 1, .84 in wave 2 and .85 in wave 3.

*Personality.* The personality dimensions Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Openness to Experience were measured using the 30-item Big Five questionnaire (Gerris et al., 1998; Goldberg, 1992). This questionnaire has a good reliability and construct validity (e.g., Smith & Snell, 1996).

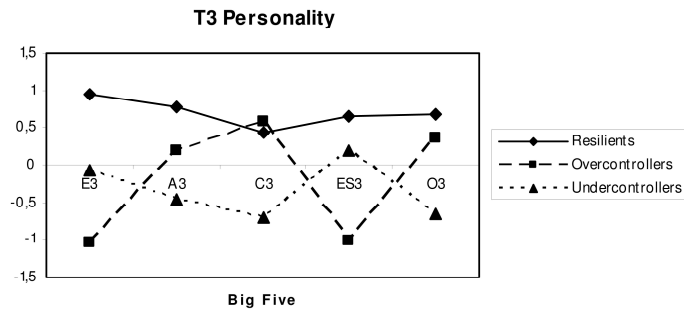
We used the k-means clustering procedure to construct the three personality types on the basis of the Big Five dimensions (Akse et al., 2004; Dubas et al., 2002) at the three waves (Figure 1a-c). This clustering procedure computes a mean for every individual and assigns the individual's profile to one of the three clusters on the basis of the correspondence between the cluster centre and the individual's mean. The means within a cluster should correspond highly with each other, whereas the means between the clusters must differ highly from each other. In the three waves we selected only those adolescents who scored within two standard deviations of the cluster centre (Dubas, personal communication, July, 12, 2004). Based on the findings of previous research in which three personality types were repeatedly found, we set the cluster number to three. Prior to the first set of cluster analyses, all dimensions scores were converted to z-scores. For the initial cluster centres we used a priori cluster centres derived from previous work on personality types (Van Aken & Dubas, 2000). More specifically, initial cluster centres for resilient types were set at 0.5 on all Big Five dimensions. For the overcontrollers, the initial cluster centres were 0.5 for conscientiousness and agreeableness, and -0.5 for extraversion, emotional stability and openness. Finally, the initial cluster centres for undercontrollers were -0.5 for conscientiousness, agreeableness and openness, 0 for emotional stability and 0.5 for extraversion (Dubas et al., 2002)<sup>1</sup>. Following Dubas et al. (2002), we checked the replicability of the personality types by dividing each of the three samples randomly in two subsamples, rerunning the cluster analyses for each subsample and calculating the degree of correspondence of individuals being assessed to clusters of the total sample and of the subsamples. The kappa coefficients (Cohen, 1960) for the replication samples in each wave were excellent: .94 and .95 in wave 1, .92 and .95 in wave 2, and .96 and .97 in wave 3.



*Figure 1a.* Big Five personality profiles of the personality types in T1 (Resilients: N = 114; Overcontrollers: N = 111; Undercontrollers: N = 113)



*Figure 1b.* Big Five personality profiles of the personality types in T2 (Resilients: N = 114; Overcontrollers: N = 111; Undercontrollers: N = 113)



*Figure 1c.* Big Five personality profiles of the personality types in T3 (Resilients: N = 114; Overcontrollers: N = 111; Undercontrollers: N = 113)

On the basis of the Big Five dimensions, we found three clusters that resembled the three personality types emerging in previous studies (e.g., Dubas et al., 2002; Robins et al., 1996). The resilient type in our study was characterized as being high on all five dimensions, as was found in other studies. Furthermore, the overcontroller type scored high on agreeableness, conscientiousness and openness and low on extraversion and emotional stability. Finally, the undercontroller type was characterized as mediocre on extraversion, agreeableness and emotional stability and as low on conscientiousness and openness. Although the undercontrollers are generally characterized as being low on agreeableness, we found them to be mediocre on this dimension. However, since they scored significantly lower on agreeableness than the other two clusters, we concluded that we replicated the three personality types in our sample (Figure 1a-c).

Of the 1088 adolescents in the first wave, 338 adolescents judged their personality type consistently over all three waves. Although it would have been interesting to investigate adolescents who judged their personality types differently over the waves as well<sup>2</sup>, we decided to focus only on those adolescents who judged their personality consistently over time.<sup>3</sup>

#### **4.2.3 Sample Characteristics**

The sample consisted of 338 adolescents: 186 girls (55%) and 152 boys (45%). Two age groups were represented: 197 early adolescents (58.3%;  $M_{\text{ageT1}} = 12.37$ ;  $SD = .55$ ) and 141 middle adolescents (41.7%;  $M_{\text{ageT1}} = 16.75$ ;  $SD = .92$ ).

Using the 338 adolescents that judged their personality type consistently over time, we found 114 stable resilient, 111 stable overcontrollers and 113 stable undercontrollers. The distribution of the genders differed within the personality types ( $\chi^2(2) = 24.54$ ,  $p < .001$ ): the percentage of girls was higher in the stable resilient (62.3%; adj. res. = 1.9) and stable overcontrollers (66.7%; adj. res. = 3.0) than the percentage of boys, whereas the percentage of boys was higher in the stable undercontrollers (63.7%; adj. res. = 4.9). Additionally, the distribution of the age groups differed within the types ( $\chi^2(2) = 16.07$ ,  $p < .001$ ): although the distribution of the younger and older adolescents were similar in the stable resilient (young: 50.9%; adj. res. = -2.0) and stable overcontrollers (young: 50.5%; adj. res. = -2.0), there were more younger (73.5%; adj. res. = 4.0) than older adolescents in the stable undercontroller group.

#### **4.2.4 Strategy of Analyses**

To answer the first research question, we used two separate repeated measures analyses with Bonferroni post hoc tests to investigate whether the adolescents as a whole group and the adolescents who judged their personality

consistently over time showed stable differences in their mean level of depression and delinquency over the three waves. In both ANOVAs personality groups were entered as a between subjects factor; gender and age were included as covariates.

In order to answer the second research question, we first tested the co-occurrence in the adolescent sample and in the personality groups using bivariate correlations. Since we used an arbitrary selection of measurement waves, we averaged the correlations over the waves for each personality group and problem behaviour. Additionally, we tested whether the correlations differed between the groups by means of their confidence intervals. Then, we tested our two competing hypotheses in a set of multi-group analyses in Analysis of Moment Structures (AMOS 5; Arbuckle, 1995). For the multi-group analyses we compared various models: to test the acting out / failure hypothesis, we tested a multi-group model, in which acting out was present for overcontrollers and in which failure was present for undercontrollers. In this model, the cross paths from depression in wave 1 and 2 to delinquency in wave 2 and 3 respectively were estimated for the stable overcontrollers, and set at zero for the stable resilient and stable undercontrollers. Additionally, the cross paths from delinquency in wave 1 and 2 to depression in wave 2 and 3 respectively were estimated for the stable undercontrollers and set at zero for the stable overcontrollers and stable resilient. To test the stability hypothesis, we tested a multi-group stability model for the three personality types in AMOS. In this model, we set the cross paths at zero for the three personality groups. Additional analyses were performed to test possible age group differences on the co-occurrence between depression and delinquency. For all abovementioned models, means and intercepts were estimated. The fit of the abovementioned models was assessed by several fit indices:  $\chi^2$ , CFI, RMSEA and AIC. The acting out / failure model and the stability model are compared with each other by using the  $\chi^2$ -comparison and the Akaike's Information Criterion (AIC). When comparing models by means of the AIC, the model with the lowest value is considered the best model (Kline, 1998).

### **4.3 Results**

The means and standard deviations of depression and delinquency for the total sample and the three stable personality groups are presented in Table 1. For the first research question, the repeated measures ANOVA demonstrated that depression ( $F(1, 333) = 775.92, p < .001, \eta = .70$ ) changed significantly over the three waves: depression increased from wave 1 to wave 2, whereas it decreased from wave 2 to 3. More importantly, the personality groups ( $F(2, 333) = 41.60, p < .001, \eta = .20$ ) showed significant effects on depression. Bonferroni post hoc tests showed

**Table 1.** Means and standard deviations on depression and delinquency for the total group, the genders, the age groups and the stable personality groups on three waves

		Depression				Delinquency		
		T1	T2	T3	T1	T2	T3	
		<i>N</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Total		338	31.77 (6.57)	32.20 (6.30)	32.10 (6.33)	18.58 (6.12)	17.88 (3.69)	18.03 (4.62)
Gender								
	Boys	152	31.39 (7.11)	32.05 (6.72)	31.43 (6.27)	19.93 (7.66) <sup>a</sup>	18.86 (4.45) <sup>a</sup>	19.28 (5.64) <sup>a</sup>
	Girls	186	32.08 (6.08)	32.33 (5.95)	32.66 (6.34)	17.47 (4.20) <sup>b</sup>	17.09 (2.70) <sup>b</sup>	17.01 (3.26) <sup>b</sup>
Age								
	Young	197	31.21 (6.46)	32.01 (6.57)	32.06 (6.42)	18.30 (7.00)	17.93 (4.05)	18.11 (5.10)
	Middle	141	32.55 (6.66)	32.48 (5.92)	32.17 (6.21)	18.96 (4.64)	17.82 (3.15)	17.91 (3.88)
Personality groups								
	Resilients	114	29.26 (3.17) <sup>a</sup>	29.71 (7.67) <sup>a</sup>	29.75 (6.75) <sup>a</sup>	17.96 (3.80) <sup>a</sup>	17.55 (3.28) <sup>a</sup>	17.81 (4.40) <sup>a</sup>
	Overcontrollers	111	34.87 (3.17) <sup>b</sup>	35.37 (7.70) <sup>b</sup>	35.60 (5.87) <sup>b</sup>	17.72 (4.99) <sup>a</sup>	17.13 (2.17) <sup>a</sup>	16.77 (1.85) <sup>a</sup>
	Undercontrollers	113	31.25 (3.28) <sup>c</sup>	31.61 (8.42) <sup>c</sup>	31.04 (4.58) <sup>a</sup>	20.04 (8.40) <sup>b</sup>	18.96 (4.87) <sup>b</sup>	19.48 (6.14) <sup>b</sup>

Note: a, b, c: Means with different superscripts are significantly different between the groups at  $p < .05$  or better

systematic differences on all three waves: the stable overcontrollers scored significantly higher on depression than both the stable resilient (s) (p < .001) and the stable undercontrollers (p < .001). Additionally, the stable resilient (s) scored significantly lower on depression than the stable undercontrollers (p < .05). Furthermore, gender (F (1, 333) = .27, p > .05,  $\eta$  = .00) and age (F (1, 333) = .47, p > .05,  $\eta$  = .00) did not show any significant effects. Finally, the ANOVAs demonstrated that the interactions of depression x gender, depression x age groups and depression x personality groups were not significant. This means that the change in depression did not differ significantly between the genders, age groups and personality groups over the three waves.

The second repeated measures ANOVA demonstrated that delinquency differed significantly over the waves (F (1, 333) = 536.84, p < .001,  $\eta$  = .62): delinquency decreased from wave 1 to wave 2, whereas it increased from wave 2 to 3. Furthermore, the personality groups showed significant effects (F (2, 333) = 7.22, p < .01,  $\eta$  = .04). Bonferroni post hoc tests showed that the stable undercontrollers scored significantly higher on delinquency than the stable resilient (s) (p < .05) and the stable overcontrollers (p < .01) in all three waves. The stable resilient (s) and the stable overcontrollers did not differ significantly from each other. Additionally, gender showed significant effects (F (1, 333) = 19.22, p < .001,  $\eta$  = .06): boys were more delinquent than girls. However, no significant age group differences were found. Finally, the ANOVAs demonstrated that the interactions delinquency x gender, delinquency x age groups and delinquency x personality groups were not significant.

The second research question investigates whether the longitudinal co-occurrence of depression and delinquency is present in the adolescent sample and in the three personality types. Bivariate correlational analyses were conducted in the total adolescent sample (N = 338) and were found to be significant, which indicated that the co-occurrence between depression and delinquency was present for the total adolescent sample (T1: r = .13, p < .05; T2: r = .18, p < .01; T3: r = -.01, p > .05; Table 2).<sup>4</sup> Additionally, we calculated the bivariate correlations for the three personality groups on three waves and then averaged these correlations for each personality group (stable resilient (s): r = .43; stable overcontrollers: r = .08; stable undercontrollers: r = .15). We found that the co-occurrence of depression and delinquency was significantly higher in stable resilient (s) compared to stable overcontrollers (z = 2.81) and to stable undercontrollers (z = 2.29) over time.

We must point out that since it could be expected that overcontrollers show a uniformly high level of depression and undercontrollers show a uniformly high level of delinquency, the weaker correlation between depression and delinquency

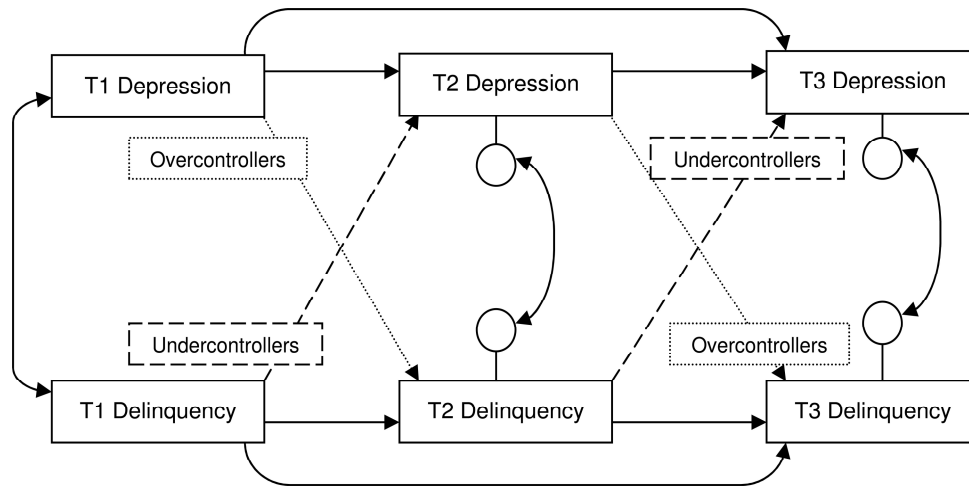
**Table 2.** Bivariate correlations between depression and delinquency in the total sample (N = 338) and in the three personality groups on the three waves

			Depression			Delinquency		
			Wave 1	Wave 2	Wave 3	Wave 1	Wave 2	Wave 3
Depression	Wave 1	Total	-	.52**	.47**	.13*	.08	.10
		Resilients	-	.53**	.61**	.27**	.53**	.11
		Overcontrollers	-	.51**	.41**	.19*	.00	-.04
		Undercontrollers	-	.34**	.29**	.13	.19*	.29*
	Wave 2	Total		-	.59**	.17**	.18**	.06
		Resilients		-	.57**	.41**	.55**	.47**
		Overcontrollers		-	.66**	.21*	.03	-.04
		Undercontrollers		-	.15	.17	.29**	.11
	Wave 3	Total			-	.06	.04	-.01
		Resilients			-	.24**	.28**	.47**
		Overcontrollers			-	.20*	.01	.03
		Undercontrollers			-	.02	.12	.02
Delinquency	Wave 1	Total				-	.43**	.33**
		Resilients				-	.65**	.57**
		Overcontrollers				-	.15	.19*
		Undercontrollers				-	.42**	.26**
	Wave 2	Total					-	.74**
		Resilients					-	.82**
		Overcontrollers					-	.65**
		Undercontrollers					-	.66**
	Wave 3	Total						-
		Resilients						-
		Overcontrollers						-
		Undercontrollers						-

for these two groups might be explained by a restriction of range compared to the resilient (we are grateful to one of the reviewers who pointed this out to us). When using the Gulliksen's adaptation of McNemar's formula to correct for possible range restrictions on the correlation between depression and delinquency and on their co-occurrence in the three personality groups (with the standard deviation of the resilient group as a reference point), we found that the correlations did not change a lot for depression or for the co-occurrence between depression and delinquency.<sup>5</sup> However, the correlations on delinquency seemed to change. When averaging the corrected correlations of the personality groups over the three waves, the mean corrected correlation of the undercontrollers ( $r = .22$ ) was lower compared to the uncorrected correlation ( $r = .45$ ); the mean corrected value of the undercontrollers was even lower than the mean corrected value of the overcontrollers ( $r = .35$ ). Additionally, the mean corrected correlation of the overcontrollers did not change compared to their mean uncorrected correlation ( $r = .33$ ). This suggests that the findings of the stability of delinquency might be due to range restrictions; however, our results concerning the co-occurrence between depression and delinquency and concerning the stability of depression appear to be not due to range restrictions. Furthermore, it appeared to be impossible to correct consistently for range restriction in AMOS (Bollen, 1989; Hox, personal communication, January, 26, 2006).

Since we found clear personality group differences on the correlations between depression and delinquency over the waves, we could further test our hypotheses using structural equation modelling. First, we tested whether any co-occurrence was present for the total adolescent sample. Since we tested this in a model which consisted only of co-occurrent relations, the fit of the model was bad ( $\chi^2(12) = 613.45, p < .001$ ; CFI = .02, RMSEA = .39, AIC = 643.45), which is due to the fact that the model is incomplete. However, the co-occurrence between depression and delinquency was present on wave 1 ( $\beta = .13, p < .05$ ) and 2 ( $\beta = .18, p < .01$ ), but not on wave 3 ( $\beta = -.01, p > .05$ ).

Second, in order to examine whether personality is a moderator in the longitudinal co-occurrence between depression and delinquency, we tested the acting out / failure model and the stability model in AMOS (Arbuckle, 1995; Figure 2a and 2b). Both the fit of the acting out / failure model, in which acting out was present for the stable overcontrollers and in which failure was present for the stable undercontrollers (Figure 2a;  $\chi^2(14) = 32.72, p < .01$ ; CFI = .97, RMSEA = .06, AIC = 166.72) and the fit of the stability model (Figure 2b;  $\chi^2(18) = 37.05, p < .01$ ; CFI = .97, RMSEA = .06, AIC = 163.05) were acceptable. When comparing the fit of the acting out / failure model and the stability model, we did not find a significant difference ( $\Delta\chi^2 = 4.33, \Delta df = 4, p > .05$ ), which implies that the most parsimonious

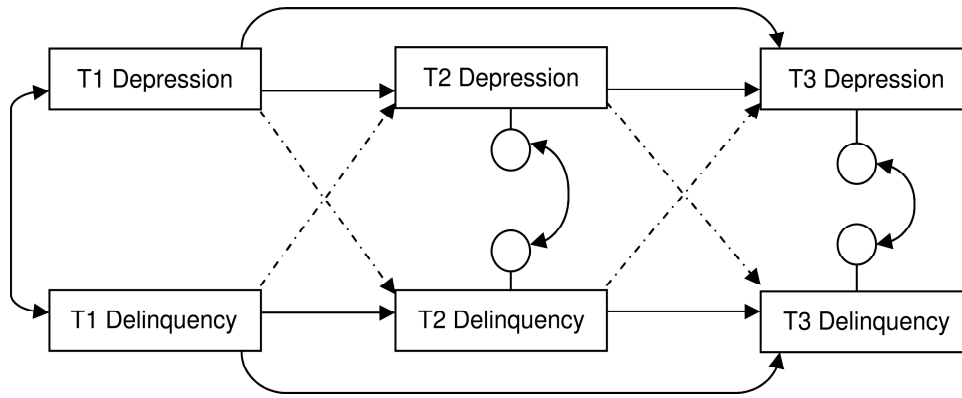


**Figure 2a.** A multi-group acting out / failure model

*Note.* The cross paths from depression to delinquency (.....) refer to acting out; the cross paths from delinquency to depression (-----) refer to failure.

model should be considered the best model; this is the stability model (Duncan, Duncan, Strycker, Li, & Alpert, 1999). Also, the AIC was lowest in the stability model compared to the acting out / failure model. The stability model proved to describe the co-occurrence between depression and delinquency better than the acting out / failure model in these personality groups. Additionally, the acting out / failure model did not confirm the acting out / failure hypothesis: the paths from depression in wave 1 and 2 to delinquency in wave 2 and 3 respectively were not significant for overcontrollers and the paths from delinquency in wave 1 and 2 to depression in wave 2 and 3 respectively were not significant in undercontrollers. Table 3 summarizes the findings of both multi-group models.<sup>6</sup>

In inspecting the findings of the stability model, we first examined the parameter estimates between depression and delinquency on wave 1, 2 and 3. We found that the standardized regression weights were significant for the stable resilients on wave 1 and 2, for the stable overcontrollers on wave 1 and for the stable undercontrollers on wave 2. This indicates that the co-occurrence on wave 1 as well as the correlated change on wave 2 between depression and delinquency differ between the personality types; this was more present in the stable resilients than in the stable overcontrollers and undercontrollers.



**Figure 2b.** A multi-group stability model

*Note.* The cross paths in the stability model are set at zero for the three personality groups.

In order to describe the findings on the stability paths of depression and delinquency, we calculated the total stability effects separately for both problem behaviours. A total effect is the sum of the direct and indirect effects. Direct effects in a path model depict causal effects that are presumed to flow from one variable to another. Indirect or mediator effects involve one or more intervening variables that transmit some of the causal effects of prior variables onto subsequent variables. An indirect effect is calculated as the product of the direct effects of which it consists (Kline, 1998). When examining significant group differences on these total stability effects we calculated a 95% confidence interval for each group, separately for the problem behaviours.

The total stability effect of depression was highest in the stable resilient (.53 \* .33 + .44 = .61), followed by the stable overcontrollers (.51 \* .62 + .10 = .42) and the stable undercontrollers (.31 \* .07 + .29 = .31). When testing for non-overlapping confidence intervals, we found that the total effect of depression was significantly higher in the stable resilient (lower = .48, upper = .71) than in the stable undercontrollers (lower = .13, upper = .47). Both groups did not differ from the stable overcontrollers (lower = .25, upper = .56). We may conclude that the overall rank-order stability of depression was higher in the stable resilient than in the stable undercontrollers, with stable overcontrollers taking the intermediate position.

The total stability effect of delinquency was higher in the stable resilient (.56 \* .77 + .07 = .50) compared to total stability effect of the stable undercontrollers (.34 \* .70 + -.04 = .20) and the stable overcontrollers (.15 \* .63 + .09 = .18), although the

**Table 3.** Standardized regression weights for depression and delinquency on three waves for the three personality groups

		Stability model			Acting out / Failure model		
		R	O	U	R	O	U
Co-occurrence ( $\beta$ )							
	Depression T1 – Delinquency T1	.27**	.19*	.13	.27**	.19*	.13
	Depression T2 – Delinquency T2	.51*** <sup>a</sup>	.02 <sup>b</sup>	.20*	.51*** <sup>a</sup>	.02 <sup>b</sup>	.20*
	Depression T3 – Delinquency T3	-.06	.12	-.11	-.06	.11	-.11
Stability paths ( $\beta$ )							
	Depression T1 – T2	.53*** <sup>a</sup>	.51*** <sup>a</sup>	.31*** <sup>b</sup>	.53*** <sup>a</sup>	.51*** <sup>a</sup>	.29*** <sup>b</sup>
	Depression T1 – T3	.44*** <sup>a</sup>	.10 <sup>b</sup>	.29** <sup>b</sup>	.33*** <sup>a</sup>	.10 <sup>b</sup>	.06 <sup>b</sup>
	Depression T2 – T3	.33*** <sup>a</sup>	.62*** <sup>b</sup>	.07 <sup>c</sup>	.44*** <sup>a</sup>	.61*** <sup>b</sup>	.29** <sup>c</sup>
	Delinquency T1 – T2	.56*** <sup>a</sup>	.15 <sup>b</sup>	.34*** <sup>c</sup>	.56*** <sup>a</sup>	.15 <sup>b</sup>	.42*** <sup>c</sup>
	Delinquency T1 – T3	.07	.09	-.04	.07	.11	-.04
	Delinquency T2 – T3	.77*** <sup>a</sup>	.63*** <sup>b</sup>	.70*** <sup>a</sup>	.77*** <sup>a</sup>	.63*** <sup>b</sup>	.71*** <sup>a</sup>
Acting out paths ( $\beta$ )							
	Depression T1 – Delinquency T2	0	0	0	0	-.03	0
	Depression T2 – Delinquency T3	0	0	0	0	-.09	0
Failure paths ( $\beta$ )							
	Delinquency T1 – Depression T2	0	0	0	0	0	.15
	Delinquency T2 – Depression T3	0	0	0	0	0	.03

Note. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ ; R = Stable resilient, O = Stable overcontrollers, U = Stable undercontrollers; <sup>a, b, c</sup>: Groups differ at  $p < .05$

confidence intervals overlapped slightly (resilients: lower = .35, upper = .63; overcontrollers: lower = -.01, upper = .35; undercontrollers: lower = .01, upper = .37). We may conclude that the stability of delinquency was higher in the stable resilient compared to the stable undercontrollers and the stable overcontrollers.

Additional analyses were performed to test possible personality  $\times$  age group differences on the co-occurrence between depression and delinquency. We tested the stability model for six personality  $\times$  age groups, namely the early ( $n = 58$ ) and middle ( $n = 56$ ) resilient, the early ( $n = 56$ ) and middle ( $n = 55$ ) overcontrollers and the early ( $n = 83$ ) and middle ( $n = 30$ ) undercontrollers. The fit of the six-group stability model was good ( $\chi^2(36) = 57.73, p < .05$ ; CFI = .97, RMSEA = .04, AIC = 309.73), which means that this stability model fit the data well. We calculated confidence intervals for the total stability effects to test for significant differences between the personality  $\times$  age groups. In the early adolescents, the stability of delinquency in resilient ( $\beta = .57$ , lower: .37, upper: .72) was significantly higher than the stability in overcontrollers ( $\beta = .03$ , lower: -.23, upper: .29) and undercontrollers ( $\beta = .16$ , lower: -.06, upper: .36). Furthermore, the stability of the middle overcontrollers ( $\beta = .54$ , lower: .32, upper: .70) and middle undercontrollers ( $\beta = .70$ , lower: .46, upper: .85) was significantly higher than the stability in the early overcontrollers and undercontrollers. The middle resilient ( $\beta = .58$ , lower: .38, upper: .73) did not differ significantly from other groups. The stability on depression was not significantly different between the personality  $\times$  age groups (early resilient:  $\beta = .59$ , lower: .39, upper: .74; early overcontrollers:  $\beta = .32$ , lower: .06, upper: .54; early undercontrollers:  $\beta = .35$ , lower: .15, upper: .53; middle resilient:  $\beta = .61$ , lower: -.11, upper: .41; middle overcontrollers:  $\beta = .55$ , lower: .33, upper: .71; middle undercontrollers:  $\beta = .19$ , lower: -.18, upper: .52). Finally, we may conclude that the rank-order stability of delinquency is significantly higher in middle adolescent overcontrollers and undercontrollers compared to early adolescent overcontrollers and undercontrollers, whereas the early and middle adolescent resilient displayed no significant age differences. We did not find significant personality  $\times$  age group differences on the stability of depression.

#### **4.4 Discussion**

The main goal of the current study was to examine whether personality moderated the longitudinal co-occurrence of depression and delinquency. Our first research question focused upon the validity of the three stable personality groups. We demonstrated that the longitudinal personality group differences were similar to previous cross-sectional studies (e.g., Dubas et al., 2002; Hart et al., 1997; Robins et al., 1996): the stable overcontrollers showed the highest mean level of depression

(internalizing) over time and the stable undercontrollers showed the highest mean level of delinquency (externalizing) over time. The stable resilientts exhibited the lowest mean level of both problem behaviours, representing the best psychosocial adjustment compared to the other two personality groups. Although not explicitly described in the study by Van Aken and Dubas (2004), they found very similar personality group differences as found in the current study. Our findings indicate that when adolescents maintain their personality type membership over time, they also maintain the same level of internalizing and externalizing problem behaviours over time.

The second research question examined whether the longitudinal co-occurrence of depression and delinquency is present during adolescence and in the three personality groups. Furthermore, we examined whether personality type moderated the longitudinal co-occurrence between depression and delinquency. First, we demonstrated that the co-occurrence between depression and delinquency was present during adolescence, as was also found in a study by Overbeek et al. (2001). Second, we found that some co-occurrence was present in the personality groups. On the basis of these results we would suggest that the parallel development of depression and delinquency could be due to a third unknown factor. As hypothesized, the co-occurrence was significantly higher in the stable resilientts compared to the stable overcontrollers and undercontrollers. This finding could be explained by the finding that ego-resiliency is related to stability in the overall environment (Asendorpf & Van Aken, 1991). Since resilientts have a high level of ego-resiliency by definition, their overall environment could be more stable than the overall environment of overcontrollers and undercontrollers. Since the overall stability of the environment is thought to be higher in resilientts in comparison to overcontrollers and undercontrollers, also the stability of depression and delinquency appears to be higher in resilientts. Additionally, we also found the co-occurrence of depression and delinquency to be higher in resilientts than in the overcontrollers and undercontrollers. This could be due to the fact that the amount of non-specific risk factors is different in resilientts from the amount of non-specific risk factors in the other personality types (Hart et al., 2003).

Finally, we demonstrated that the longitudinal co-occurrence of depression and delinquency in the three personality groups was described more accurately in the stability model than in the acting out / failure model. We found that the co-occurrence of depression and delinquency differed between the personality groups and that it was more present in stable resilientts than in stable overcontrollers and stable undercontrollers. Additionally, we found clear differences between the stable personality groups on the longitudinal stability of depression and delinquency. Based on the total effects, the stable resilientts had a higher rank-order

stability on depression compared to the stable undercontrollers. Furthermore, the stable resilients seemed to have a higher rank-order stability on delinquency compared to the stable overcontrollers and undercontrollers. Combining the high rank-order stability with the low mean levels (based on the repeated measures analyses) of the resilients on both problem behaviours, this means that these low mean levels are stable over time. Since we found that the resilients are not prone to developing a depressive mood and that they desist from delinquency, this is probably due to the fact that the resilients have the best resources to recover from negative events (Olsson, 2003) and that they have the ability to adapt to and to succeed in difficult contexts (Hart et al., 1997).

However, the stable overcontrollers and stable undercontrollers were found to have specific but different patterns of internalizing and externalizing problem behaviour. The stable overcontrollers demonstrated a moderate rank-order stability on depression and a low rank-order stability on delinquency (compared to the other groups), based on the calculation of the total effects of both problem behaviours. Combining these rank-order stabilities with the high mean level of depression and the low mean level of delinquency (based on the repeated measures analyses) in this group, this suggests a particular internalizing pattern of problem behaviour. The undercontrollers demonstrated a moderate rank-order stability on delinquency and a low rank-order stability on depression (compared to the other groups), based on the calculation of the total effects of both problem behaviours. Combining these rank-order stabilities with the high mean level on delinquency and the low mean level of depression (based on the repeated measures analyses), this suggests a particular externalizing pattern of problem behaviour. Hence, these two personality groups have the exact opposite longitudinal pattern of problem behaviour. This pattern of opposites could be explained as follows. Hart et al. (2005) found that although overcontrollers and undercontrollers are remarkably similar in terms of physiological and cognitive processes, which could be due to their low levels of ego-resiliency (Asendorpf & Van Aken, 1999; Robins et al., 1996), they differ radically at the behaviour level (Hart et al., 2005), which could be due to their markedly different levels of ego-control, namely high for overcontrollers and low for undercontrollers (Asendorpf & Van Aken, 1999; Robins et al., 1996). In this respect, ego-control may play an important role in explaining the opposite patterns of the problem behaviours over time, especially for the personality groups that do not respond flexibly to their environment, such as the overcontrollers and undercontrollers.

Since we found that the longitudinal co-occurrence of depression and delinquency in the three personality groups was described more accurately in the stability model than in the acting out / failure model, this implies that the

associations between depression and delinquency maintain their stability over time in these personality groups. As Krueger (1999) and Krueger et al. (1998) point out, the co-occurrence of internalizing and externalizing problem behaviours may originate from general core psychopathological processes or non-specific risk factors (Fergusson et al., 1996; Wiesner, 2003). Possibly, the degree of ego-control is one of the common risk factors that could either lead to internalizing or to externalizing problem behaviour. Our results confirm this suggestion: we found that adolescents with an extreme high level of ego-control (overcontrollers) are prone to internalizing problem behaviours, whereas the adolescents with an extreme low level of ego-control (undercontrollers) are prone to externalizing problem behaviours.

Also, clear differences between the combined age x personality groups were found on the co-occurrence between depression and delinquency. We found that the rank-order stability of the stable resilient was the same in early and middle adolescents on depression and delinquency. However, the rank-order stability of the stable overcontrollers on depression seemed higher in the middle adolescents compared to the early adolescents, whereas the rank-order stability of the stable undercontrollers seemed lower in the middle adolescents than in the early adolescents. Furthermore, the rank-order stability of the undercontrollers on delinquency increased to an even higher level than the rank-order stability of the stable resilient. The rank-order stability of the stable overcontrollers also increased, but it did not reach the level of the stable resilient. These findings suggest that the rank-order stability increases in the problem behaviour to which a specific personality group is most prone. More specifically, the stable overcontrollers are prone to depression (Dubas et al., 2002; Robins et al., 1996): the middle adolescent overcontrollers seemed to demonstrate a higher rank-order stability on depression than early adolescent overcontrollers. Furthermore, the stable undercontrollers are more prone to delinquency (Dubas et al., 2002; Robins et al., 1996): the middle adolescent undercontrollers show a higher rank-order stability on delinquency than early adolescent undercontrollers. These findings are consistent with studies on trait consistency, which claim that traits become increasingly consistent with age (Roberts & DelVecchio, 2000). Caution in interpreting these results should be warranted (Kline, 1998), since the personality x age groups are quite small. This issue should be tested in a larger sample.

Additionally, these findings demonstrate that the co-occurring problem behaviours do not constitute risk factors for each other in adolescents. Although the stable overcontrollers were prone to internalizing problem behaviour (Dubas et al., 2002; Robins et al., 1996), they did not develop delinquency through acting out their depressed mood, which would be expected on the basis of Carlson and

Cantwell's study (1980). Furthermore, although the stable undercontrollers were prone to externalizing problem behaviour (Dubas et al., 2002; Robins et al., 1996), they did not develop depression through failure, which was hypothesized on the basis of the studies by Capaldi (1992) and by Beyers and Loeber (2003). An explanation for the different findings could be that the definitions of co-occurrence that were used in these studies differed from the definition we used in the current study. It should be noted that the aforementioned studies of longitudinal co-occurrence of internalizing and externalizing problem behaviour did not use personality type membership as a moderator. Our findings underline the importance of including personality in future studies of co-occurrence between internalizing and externalizing problem behaviour.

This is one of the first studies that examines the differences between the three personality groups in their rank-order stability of the co-occurrence between depression and delinquency. Changing in rank-order or the position relative to others in the group is unrelated to whether the group members show mean-level change (Asendorpf, 1992; Caspi, Roberts, & Shiner, 2005; Roberts, Caspi, & Moffitt, 2001; Roberts & DelVecchio, 2000). The current study presents an important contribution to this issue, since the rank-order consistencies on internalizing and externalizing problem behaviours that we found were explicitly combined with the mean levels of the personality groups which we found in the repeated measures analyses.

In conclusion, we found the stability model to be the best fitting model to explain the co-occurrence of depression and delinquency in a general adolescent population, which is in line with the study by Overbeek et al. (2001). We extended Overbeek et al. (2001)'s study by employing personality type membership as a moderator in the co-occurrence of these problem behaviours, as was suggested by Wiesner (2003). Since we found clear personality group differences in the stability co-occurrence model, we concluded that personality type is an important moderator in the longitudinal co-occurrence of depression and delinquency.

*Limitations and future research.* In addition to the aforementioned findings, a few limitations of the present study need to be addressed. The first limitation is that our findings were solely based on adolescent self-reports, which could result in biased answers. Obviously, collecting data from multiple informants would improve our understanding of the associations between depression and delinquency during adolescence. However, since internalizing behaviours might be more difficult to observe by others (Achenbach, McConaughy, & Howell, 1987), we were specifically interested in the feelings and opinions of the adolescents themselves.

The second limitation of this study is that we did not examine possible moderator effects of gender in the structural equation modelling analyses. Although clear gender differences in the rank-order consistency of depression and delinquency were found (Wiesner, 2003) and since it was already found that personality type x gender proved to be an important moderator (Akse et al., 2004), we could not perform these multi-group analyses, since the personality x gender groups would be too small to get reliable results (Kline, 1998). This issue should be tested in a larger sample.

## Footnotes

<sup>1</sup>: During the review process of this paper, Asendorpf (2006) and Herzberg and Roth (2006) published a paper in which they suggested other initial cluster centers. They suggest that the initial cluster centres for resilient types should be set at 0.5 for extraversion, conscientiousness and emotional stability and .25 for agreeableness and openness. For the overcontrollers, the initial cluster centres should be -1 for extraversion, 0 for agreeableness and conscientiousness, -0.5 for emotional stability and -0.25 for openness. Finally, the initial cluster centres for undercontrollers should be 0 for extraversion and openness, -0.5 for agreeableness, -1.0 for conscientiousness and -.25 for emotional stability. We reran the k-means cluster analyses using these initial cluster centres. We compared our cluster solution with the cluster solution in which the new initial cluster centres were used and found a correspondence of .98 (Cohen's kappa) for the stable personality groups. When selecting only those adolescents who scored within two standard deviations of the cluster centre, Cohen's kappa increased to 1.00. Since the correspondence between the two cluster solutions was perfect, we were confident that we could use our cluster solution as well. Also, when conducting MANOVAs with the new cluster solution as between subjects factor and the Big Five dimensions as dependent variables separately for the three separate waves, we found an almost identical pattern of these three personality types on the Big Five personality dimensions as depicted in Figure 1a-c. We can conclude that differences on the separate personality dimensions in comparison to previous studies, such as a higher level on agreeableness in undercontrollers, is not due to differences in initial cluster centres.

<sup>2</sup>: We compared the stable and changing personality groups on gender, age, Big Five dimensions, depression and delinquency. The stable personality groups differed significantly from the changing personality groups on gender ( $\chi^2(1) = 7.77, p < .01$ , adjusted residual = 2.8; more girls than boys in the stable group; more boys than girls in the changing group), age ( $\chi^2(1) = 25.10, p < .001$ , adj. res. = 5.0; more early than middle adolescents in both the stable and changing group), agreeableness (within-subjects agreeableness  $\times$  personality:  $F(2, 2166) = 3.06, p < .01$ ; higher increase in changing group than in stable group; between-subjects:  $F(1, 1083) = 19.07, p < .001$ ; stable > changing), conscientiousness (between-subjects:  $F(1, 1086) = 9.70, p < .01$ ; stable > changing), openness to experience (between-subjects:  $F(1, 1076) = 6.46, p < .05$ ; stable > changing) and delinquency (between-subjects:  $F(1, 1148) = 4.2, p < .05$ ; changing > stable). Hence, the stable group differs from the changing group in several ways.

<sup>3</sup>: We reran both models with five longitudinal personality groups ( $N = 568$ ). According to Caspi and Silva (1995) and Herzberg and Roth (2006), two additional personality types may be present, namely a reserved personality group with both resilient and overcontroller attributes and a confident personality group with both resilient and undercontroller attributes (we are grateful to one of the reviewers to point this out to us). We constructed a reserved personality group by selecting those adolescents who switched between the resilient and overcontroller types ( $n = 92$ ) and a confident personality group by selecting those adolescents who switched between the resilient and undercontroller types ( $n = 138$ ).

over the three waves. Since we found that the fit of the stability model did not differ significantly from the fit of the acting out / failure model ( $\Delta\chi^2 = 29.47$ ,  $\Delta df = 12$ ,  $p > .05$ ), we chose the most parsimonious model, namely the stability model. When comparing the five personality groups on the stability of delinquency and the (mean) co-occurrence of depression and delinquency, we found the reserved personality group to be lower than the resilient but higher than the overcontrollers. Furthermore, we found the confident personality group to be lower than the resilient but higher than the undercontrollers. However, this pattern was not present on depression. Since the pattern of the changing personality groups was not clear on all stability or co-occurrence paths, we decided to restrict our study to the co-occurrence of depression and delinquency in the stable personality groups.

<sup>4</sup>: When conducting bivariate correlational analyses on the total longitudinal adolescent sample ( $N = 940$ ; this sample contained adolescents who filled out the questionnaires about personality, depression and delinquency completely on the three waves and the sample consisted of adolescents who did or did not judge their personality type consistently over the three waves), we found the co-occurrence between depression and delinquency to be even more pronounced (T1:  $r = .14$ ,  $p < .01$ ; T2:  $r = .15$ ,  $p < .01$ ; T3:  $r = .08$ ,  $p < .01$ ).

<sup>5</sup>: We must point out that the way we corrected for range restriction could be somewhat unusual, since McNemar's formula is originally developed for meta-analyses.

<sup>6</sup>: In order to elucidate what the stabilities between wave 1 and 3 mean, we analyzed a stability model without depression and delinquency on wave 2 ( $\chi^2(6) = 13.22$ ,  $p < .05$ ; CFI = .95, RMSEA = .06, AIC = 85.22). The co-occurrence on wave 1 was the same for the model including and the model excluding depression and delinquency on wave 2, whereas the correlated change on wave 3 (resilient:  $r = .16$ ,  $p > .05$ ; overcontrollers:  $r = .03$ ,  $p > .05$ ; undercontrollers:  $r = -.04$ ,  $p > .05$ ) differed from the model including wave 2. Furthermore, we found that the standardized regression weights between wave 1 and 3 were significantly higher for delinquency in the three personality groups (resilient:  $r = .62$ ,  $p < .001$ ; overcontrollers:  $r = .41$ ,  $p < .001$ ; undercontrollers:  $r = .30$ ,  $p < .001$ ) when delinquency on wave 2 was not included. This implies that delinquency on wave 2 perfectly mediates the association between delinquency on wave 1 and 3. However, in depression no mediation was found (resilient:  $r = .56$ ,  $p < .001$ ; overcontrollers:  $r = .19$ ,  $p < .05$ ; undercontrollers:  $r = .26$ ,  $p < .01$ ).

## **Chapter 5**

### **LONGITUDINAL RELATIONS BETWEEN BIG FIVE PERSONALITY CHARACTERISTICS AND PROBLEM BEHAVIOURS IN ADOLESCENCE <sup>1</sup>**

<sup>1</sup> Akse, J., Hale III, W. W., Engels, R. C. M. E., Raaijmakers, Q. A. W., Asendorpf, J. B., & Meeus, W. H. J. (2006). Longitudinal relations between Big Five personality characteristics and problem behaviours in adolescence. *Manuscript Submitted for Publication*.

### **Abstract**

This study investigates the longitudinal relations between the Big Five personality traits and aggression and anxiety during adolescence in a full recursive design. A total of 1,331 early and middle adolescents completed questionnaires on their Big Five personality traits, aggressive and anxious problem behaviours. We tested the hierarchical superiority of personality over problem behaviour by comparing the stabilities of personality with the stabilities of the problem behaviours. Additionally, we tested whether the predictions from personality to problem behaviour were stronger than the reverse using structural equation modelling. According to these assumptions, the Big Five personality dimensions appeared to be not hierarchically superior to problem behaviour in the total adolescent sample and within the age groups. However, we found that during adolescence the stability of extraversion and emotional stability as well as the stability of panic symptoms and separation anxiety symptoms increased, that agreeableness could be a surface personality characteristic, whereas generalized anxiety symptoms could be a core personality characteristic and that changes in openness were associated with changes in aggression.

## **5.1 Introduction**

‘Where problem behaviours are concerned, personality clearly matters’ (Krueger, Caspi, & Moffitt, 2000). This statement about problem behaviours and personality addresses the importance of the role of personality in problem behaviours, which both are two main research topics in adolescence. Ehrler, Evans and McGhee (1999) claim that focusing on adolescents’ problem behaviours alone offers an incomplete understanding of the relevant underlying processes. They also state that personality provides an explanation for adolescents’ involvement in problem behaviour. The current study aims to shed more light on the relation between adolescents’ personality traits and aggression and anxiety in a 4-wave longitudinal study using a full recursive design.

Many studies in this domain focus specifically on the Big Five personality dimensions. Cross-sectional studies of the Big Five dimensions and problem behaviours, such as aggression and anxiety, have demonstrated that the two are associated with one another during adolescence, although the direction of the associations is not always clear. Consistent findings have been reported on the negative relation between extraversion and anxiety (Ferguson, 2000; Ehrler et al., 1999), on the negative relation between agreeableness and aggression (Lounsbury, Steel, Loveland, & Gibson, 2004; Asendorpf & Van Aken, 2003b; Lounsbury, Sundstrom, Loveland, & Gibson, 2003; Ehrler et al., 1999; Caprara, Barbaranelli & Zimbardo, 1996) and anxiety (Ferguson, 2000; Ehrler et al., 1999), on the negative relation between conscientiousness and aggression (Lounsbury et al., 2004; Asendorpf & Van Aken, 2003b; Lounsbury et al., 2003; Scher & Osterman, 2002; Caprara et al., 1996) and finally, on the negative relation between emotional stability and anxiety (Ferguson, 2000; Ehrler et al., 1999). However, also inconsistent findings on the associations between the Big Five personality dimensions and aggression and anxiety have been reported, namely on the relation between extraversion and aggression, on the relation between conscientiousness and anxiety, on the relation between emotional stability and aggression, on the relation between openness and aggression and finally, on the relation between openness and anxiety (Zimmermann, 2006; Lounsbury et al., 2004; Asendorpf & Van Aken, 2003b; Lounsbury et al., 2003; Ferguson, 2000; Ehrler et al., 1999; Caprara et al., 1996).

The Big Five dimensions are also useful in predicting which persons are likely to develop problem behaviours in adolescence. In one of the rare studies done, Huey Jr. and Weisz (1997) found that extraversion positively predicted externalizing problems and negatively predicted internalizing problems, that agreeableness as well as conscientiousness negatively predicted externalizing

problem behaviours and, finally, that emotional stability negatively predicted internalizing problem behaviours. These findings are not completely in agreement with the abovementioned cross-sectional studies, which might be due to the use of general measures for externalizing and internalizing problem behaviours in Huey Jr. and Weisz (1997)'s study instead of using more specific measures for problem behaviours, such as aggression and anxiety.

Other studies investigated whether problem behaviours are predictive of personality characteristics, since it appears to be clear that contextual and experiential factors, such as problem behaviours, could affect the Big Five personality traits (Asendorpf & Van Aken, 2003b; Ge & Conger, 1999). In one of the very few studies testing the effects of problem behaviours on personality, it was found that emotional and behavioural problems predicted change in personality traits, as measured by the Multidimensional Personality Questionnaire, during adolescence (Ge & Conger, 1999). However, such as in the aforementioned studies no full recursive design was used to simultaneously predict personality by problem behaviour and vice versa. To our knowledge, no full recursive design has yet been used in studies about the Big Five personality dimensions and problem behaviours.

In the current study, we will investigate in what way personality and problem behaviour are related to each other concurrently and longitudinally. According to earlier studies (Asendorpf & Van Aken, 2003a), we can assume that the Big Five personality dimensions are core personality characteristics, which means that the Big Five dimensions are highly immune to environmental influences and that they are rather stable over time (Asendorpf & Van Aken, 2003a; Ge & Conger, 1999; John & Srivastava, 1999). Furthermore, we assume that problem behaviours are surface characteristics, since they are strongly affected by environmental influences, such as highly charged emotional situations, psychosocial stressors and important social relationships (Asendorpf & Van Aken, 2003a). It is for these reasons that personality should dominate problem behaviour or, in other words, that personality should be hierarchically superior to problem behaviour. More specifically, we expect to find a larger stability in the Big Five dimensions compared to the stability in aggression and anxiety and we expect to find more predictions from the Big Five dimensions to aggression and anxiety over time than the reverse.

In light of the aforementioned, we formulated three research questions. The first research question examines whether the associations between the Big Five dimensions and problem behaviours are in concordance with earlier research. On the basis of previous cited studies, we hypothesize that extraversion is negatively associated with anxiety, that agreeableness is negatively related to aggression and

anxiety, that conscientiousness is negatively associated with aggression, and that emotional stability is negatively related to anxiety. We are not able to formulate any hypotheses on the association between extraversion and aggression, between conscientiousness and anxiety, between emotional stability and aggression, between openness and aggression and between openness and anxiety, so we will study these associations exploratively.

The second research question examines whether personality is hierarchically superior to problem behaviour over time. To answer this research question affirmatively, two assumptions should be met. The first assumption is that the rank-order stabilities of the Big Five personality dimensions are larger than the rank-order stabilities of the aggressive and anxious problem behaviours. Since we assume that the Big Five personality traits are core personality characteristics and that problem behaviours are surface characteristics (Asendorpf & Van Aken, 2003a; Neyer & Asendorpf, 2001), we expect that the rank-order stabilities of the personality traits are larger than the rank-order stabilities of the problem behaviours. The second assumption is that personality should be a better predictor of problem behaviour over time than the reverse. If it is true that the Big Five personality traits are more stable than the aggressive and anxious problem behaviours, personality has a greater chance of predicting change in problem behaviour than the reverse: the effects of the more stable personality traits are constant and accumulate over time, whereas the effects of the less stable problem behaviours are likely to fluctuate and may even cancel each other out (Roberts & DelVecchio, 2000).

The third research question examines whether the hierarchical superiority of the Big Five personality dimensions and adolescent problem behaviours would be more present in older than in younger adolescents, since it is known that the rank-order stability of personality increases during adolescence (Roberts & DelVecchio, 2000). Therefore, the two assumptions mentioned above should be more apparent in the older than in the younger adolescents.

## **5.2 Method**

### **5.2.1 Participants**

Participants in this study were drawn from the CONflict And Management Of Relationships study (CONAMORE), which is an ongoing longitudinal study of Dutch adolescents that examines their relationships with parents and peers as well as their emotional and behavioural states (Meeus et al., 2002). For this study, we used the first four waves of CONAMORE, collected yearly from 2001 onwards. The participating adolescents were students from 12 participating high schools

located in the province of Utrecht, The Netherlands. From the first wave onwards, the sample was designed to contain two age cohorts, namely early and middle adolescents. The total adolescent sample consisted of 1,331 respondents and demonstrated a very small attrition (1% from wave 1 to wave 2, 2.6% from wave 2 to wave 3, 1.4% from wave 3 to wave 4).

Before we started the administration of the questionnaires, both students and their parents received written information describing the aims of the study and, if the students decided to participate, they were required to provide written informed consent. Less than 1% decided not to participate. Written informed consent from the head masters of the participating schools was obtained. The administration was performed in the homeroom study period, during which the students filled out the questionnaires anonymously. The research assistants, who attended the administration, gave verbal instructions about the questionnaires and written instructions were included. The research assistants collected the completed questionnaires and conducted the data entry to ensure that the data remained anonymous. Students who were absent on the day of testing were invited for a second administration or received the questionnaire by regular mail.

### **5.2.2 Measures**

*Aggression.* The aggression questionnaire of Björkqvist et al. (1992) is a self-report questionnaire, which contained the subscales indirect aggression (IA), direct aggression (DA) and withdrawal (WITH). Students filled out the 23-item questionnaire (12 items for IA, 5 for DA and 6 for WITH) with regard to what he or she would do to a classmate when he or she was angry with the classmate. Sample items included: When I'm mad at a classmate, I will 'irritate the other until he/she loses his/her patience' (IA), 'hit or kick the other' (DA) and 'I talk about what happened' (WITH). It should be pointed out that the subscale withdrawal measures a mature way of handling aggressive encounters and not social withdrawal. The items were scored on a 4-point scale, ranging from 'never', 'sometimes', 'often' to 'very often'. In this study, the mean Cronbach's alphas were .86 (range: .81 - .91) for IA, .84 (range: .83 - .87) for DA and .63 (range: .60 - .67) for WITH over the four waves.

*Anxiety.* The Screen for Child Anxiety Related Emotional Disorders (SCARED) is a self-report questionnaire, which is used to measure symptoms of DSM-IV linked anxiety disorders in children and adolescents (Birmaher et al., 1997; Hale, Raaijmakers, Muris, & Meeus, 2005). Generally, it has a good reliability as measured by the internal consistency and test-retest reliability and it shows good concurrent and discriminant validity (Birmaher et al., 1997; Muris & Steerneman, 2001; Muris, Merckelbach, Van Brakel, & Mayer, 1999). The SCARED consisted of

38 items and contained five subscales, namely panic symptoms (PS; 13 items), social anxiety symptoms (SOCAS; 4 items), separation anxiety symptoms (SEPAS; 8 items), generalized anxiety symptoms (GAS; 9 items) and school phobia (SCHOOL; 4 items). Sample items included 'When frightened, it is hard to breathe' (PS), 'I don't like to be with people I don't know' (SOCAS), 'I get scared when I sleep away from home' (SEPAS), 'I worry about others not liking me' (GAS) and 'I get headaches or stomach aches when I am at school' (SCHOOL). The items were scored on a 3-point scale, ranging from 'hardly ever', 'sometimes' to 'often'. In this study, the mean Cronbach's alphas were .86 (range: .84 - .89) for PS, .83 (range: .82 - .85) for SOCAS, .71 (range: .68 - .76) for SEPAS, .86 (range: .85 - .87) for GAS and .68 (range: .63 - .74) for SP over the four waves.

*Personality.* The personality dimensions Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Openness to Experience were measured using the shortened Dutch version of the Big Five questionnaire (Gerris, Houtmans, Kwaaitaal-Roosen, Schipper, Vermulst & Janssens, 1998; Goldberg, 1992). This questionnaire has a good reliability and construct validity, such as convergent and divergent validity (e.g., John & Srivastava, 1999; Smith & Snell Jr., 1996). It contained 30 items, such as: talkative (Extraversion), sympathetic (Agreeableness), systematic (Conscientiousness), nervous (Emotional Stability) and creative (Openness to Experience). The adolescents judged whether the 30 items applied to themselves on a 7-point scale, ranging from 'absolutely agree' to 'absolutely disagree'. Internal consistencies were high with mean alphas of .82 (range: .78 - .85) for Extraversion, .85 (range: .84 - .87) for Agreeableness, .85 (range: .82 - .87) for Conscientiousness, .82 (range: .81 - .83) for Emotional Stability and .77 (range: .76 - .78) for Openness to Experience over the four waves. A factor analysis (Principal Components Analysis, Oblique-rotation) was conducted in the four waves identifying five unique factors, which accounted for 58.8 per cent (range: 56.74% – 60.78%) of the total variance on average.

### **5.2.3 Sample Characteristics**

The longitudinal adolescent sample (N = 1,331) consisted of 686 girls (48.5%) and 645 boys (51.5%). Furthermore, the sample consisted of two age groups, namely early (n = 940, 70.6%;  $M_{W1age} = 12.41$ ;  $SD_{W1age} = .58$ ;  $range_{W1} = 10 - 15$  years) and middle (n = 391, 29.4%;  $M_{W1age} = 16.67$ ;  $SD_{W1age} = .84$ ;  $range_{W1} = 16-20$  adolescents).

### **5.2.4 Strategy of Analyses**

The first research question examines whether the associations between the Big Five dimensions and problem behaviours are in concordance with earlier research

using AMOS 5 (Arbuckle, 1995). Within each wave correlations were calculated between each Big Five dimension and problem behaviour.

To answer the second research question, we used structural equation modelling in AMOS 5 (Arbuckle, 1995) to test the stabilities of the Big Five dimensions and of the aggressive and anxious problem behaviours and to test whether the Big Five dimensions predicted the specific problem behaviours in a larger extent than the reverse over the four waves. In order to do so, we calculated the co-occurrence between the Big Five dimensions and the specific problem behaviours on wave 1 (Figure 1; path a). Simultaneously, we calculated the stabilities of the Big Five dimensions and of the aggressive and anxious problem behaviours between adjacent years (paths b, c, d and paths g, h, i) and across a 2 year period (paths e, f and paths j, k). Furthermore, we assessed the predictions from each Big Five dimension on wave 1, 2 and 3 to each of the aggressive and anxious problem behaviours on wave 2, 3 and 4 respectively (paths l, m, n) and we assessed the predictions from each of the aggressive and anxious problem behaviours on wave 1, 2 and 3 to each of the Big Five dimensions on wave 2, 3 and 4 respectively (paths p, q, r). Finally, we also calculated the correlated change between the Big Five dimensions and the specific problem behaviours on wave 2, 3 and 4 (paths s, t, u).

In order to answer the third research question, we repeated the abovementioned structural equation modelling in Analysis of Moment Structures (AMOS 5; Arbuckle, 1995) for the two age groups by transforming the abovementioned models into multigroup age group models. Within and between age group differences were compared on (a) the co-occurrence on wave 1, (b) the 1 and 2 year stabilities of both the Big Five dimensions and the specific problem behaviours, (c) the predictions from the Big Five dimensions to the specific problem behaviours and vice versa and (d) the correlated change between the Big Five dimensions and the problem behaviours.

To obtain a dataset with no missing cases, two imputation strategies were used. First, to enhance the accuracy of the model based imputation of missing data, missing Likert type scale items were first substituted by their relative mean (Raaijmakers, 1999) after which the remaining missing data were imputed using FIML estimation within Amos (e.g., Enders & Bandalos, 2001). The mean number of respondents with complete data on the study variables across waves was about 1150, meaning that missing data were imputed for about 180 respondents. Furthermore, all means and intercepts were estimated. In all models, observed variables were used. The fit of the abovementioned models was assessed by several fit indices:  $\chi^2$ , Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA) and Akaike's Information Criterion (AIC).

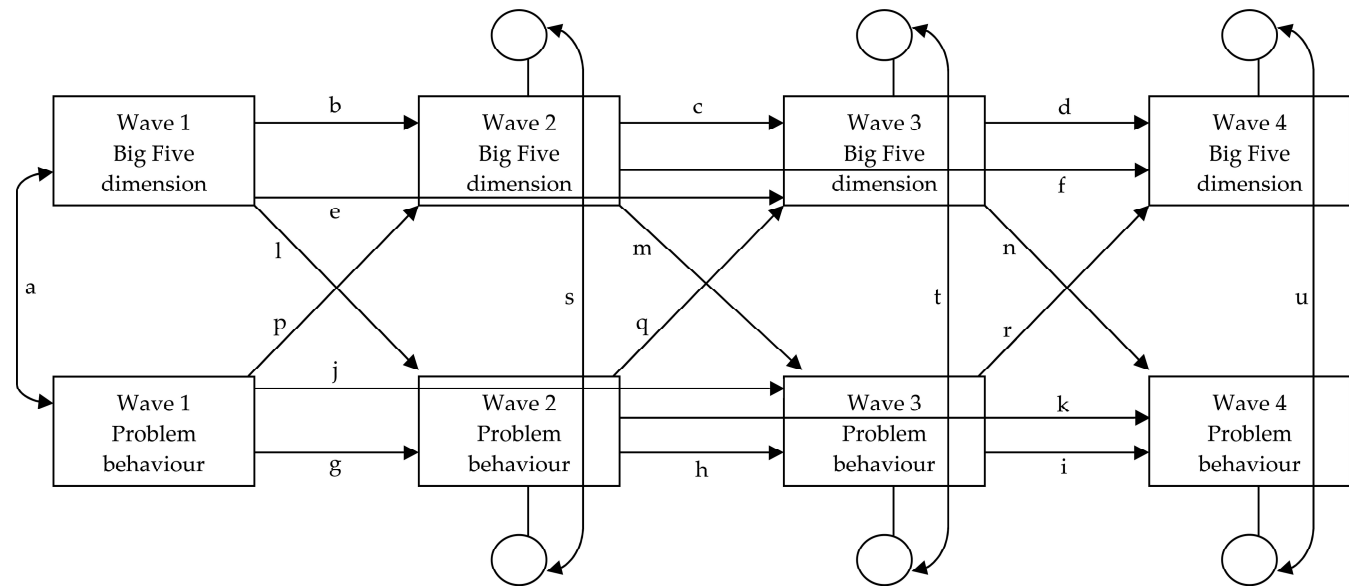


Figure 1. Hierarchy model of the Big Five dimensions and problem behaviours

### **5.3 Results**

#### ***5.3.1 Correlations between Big Five Dimensions and Aggression and Anxiety***

To answer the first research question, we calculated bivariate correlations between the Big Five dimensions and the aggression and anxiety subscales within the waves (Table 1). We speak of an association between the Big Five and aggression and anxiety subscales if three of the four within-wave correlations are significant at a .01 level. Since the mean correlations are absolute values, the direction of the association can be derived from the range of the correlations. We found that extraversion was not related to any of the aggression subscales, but that it was negatively related to all anxiety subscales. Agreeableness was found to be negatively related to IA and DA and to PS and SCHOOL; it was positively related to WITH. Furthermore, we found that conscientiousness was negatively associated with IA and DA and that it was positively related to WITH. It was not related to any of the anxiety subscales. Emotional stability was negatively related to IA and all anxiety subscales, and finally, openness was positively related to WITH. When checking the abovementioned correlations on the consistency over the four waves, we found that the direction of these associations was the same over the four waves.

Additionally, we found significant differences between the age group differences on the mean within wave correlations (Table 1). The mean within wave correlation between openness and WITH was larger in early than in middle adolescents (early:  $r = .21$ ; middle:  $r = .04$ ). Furthermore, the negative correlation between SOCAS and extraversion (early:  $r = -.41$ ; middle:  $r = -.53$ ) and openness (early:  $r = .03$ ; middle:  $r = -.16$ ) was larger in middle adolescents compared to early adolescents. Finally, we found significant age group differences on the mean within wave correlation between emotional stability and WITH (early:  $r = -.10$ ; middle:  $r = .07$ ). Since only 3 of 40 mean within wave correlations were significant, we decided to not consider these results in order to avoid possible Type I-errors.

#### ***5.3.2 Stability of Big Five Dimensions and Stability of Aggression and Anxiety***

To answer the second research question, we performed structural equation modelling using AMOS 5 (Arbuckle, 1995). We calculated the relations between the Big Five dimensions and the subscales of aggression and anxiety, which resulted in 40 [5 personality variables \* (3 aggression variables + 5 anxiety variables)] models. Because of the large number of tests and because of the large number of participants, it was important to avoid false positive findings resulting from Type I error (Neyer & Asendorpf, 2001; Roberts, Caspi, & Moffitt, 2003). To avoid Type I errors, we fixed the significance level at .01 throughout the models. The fits of the

**Table 1.** Mean correlations between the Big Five dimensions and the aggression and anxiety subscales over the four measurement waves in the total longitudinal sample (N = 1331) and in the early (n = 940) and middle adolescents (n = 391); calculated by means of AMOS

Group	B5	Mean Correlation across Waves							
		IA	DA	WITH	PS	SOCAS	SEPAS	GAS	SCHOOL
		Mean (range)	Mean (range)	Mean (range)	Mean (range)	Mean (range)	Mean (range)	Mean (range)	Mean (range)
Total	E	.03 (.00 - .06)	.02 (-.02 - .04)	.09 (-.07 - .13)	.25* (-.23 - .28)	.45* (-.39 - .50)	.17* (-.16 - .19)	.35* (-.32 - .39)	.22* (-.20 - .23)
	A	.16* (-.11 - .20)	.18* (-.11 - .23)	.25* (.23 - .28)	.15* (-.10 - .17)	.03 (-.00 - .04)	.08 (.01 - .12)	.05 (-.03 - .06)	.17* (-.13 - .20)
	C	.14* (-.09 - .18)	.17* (-.13 - .20)	.11* (.09 - .15)	.01 (.00 - .03)	.06 (.03 - .09)	.08 (.06 - .10)	.03 (-.00 - .07)	.07 (-.05 - .09)
	ES	.11* (-.09 - .12)	.05 (-.04 - .07)	.09 (-.06 - .11)	.33* (-.30 - .39)	.36* (-.32 - .38)	.29* (-.27 - .31)	.49* (-.41 - .58)	.26* (-.24 - .27)
	O	.03 (-.00 - .06)	.07 (.01 - .12)	.19* (.17 - .21)	.03 (.01 - .05)	.01 (-.00 - .03)	.02 (.00 - .02)	.06 (.05 - .07)	.03 (.02 - .05)
Early	E	.06 (-.02 - .10)	.04 (.02 - .07)	.08 (-.04 - .14)	.28* (-.24 - .31)	.41* (-.33 - .47) <sup>a</sup>	.22* (-.17 - .24)	.36* (-.32 - .41)	.25* (-.24 - .27)
	A	.13* (-.08 - .17)	.15* (-.08 - .19)	.24* (.19 - .29)	.14* (-.04 - .19)	.02 (-.00 - .04)	.09 (.05 - .13)	.06 (.01 - .11)	.15* (-.10 - .18)
	C	.14* (-.10 - .18)	.18* (-.14 - .20)	.14* (.10 - .19)	.03 (-.02 - .04)	.06 (.03 - .10)	.09 (.06 - .11)	.04 (-.00 - .10)	.06 (-.04 - .07)
	ES	.12* (-.11 - .13)	.07 (-.04 - .16)	.10 (-.08 - .13) <sup>a</sup>	.32* (-.30 - .37)	.35* (-.29 - .38)	.30* (-.26 - .33)	.47* (-.41 - .55)	.26* (-.23 - .29)
	O	.02 (.01 - .05)	.05 (-.03 - .07)	.21* (.17 - .26) <sup>a</sup>	.04 (-.02 - .08)	.03 (.02 - .05) <sup>a</sup>	.04 (-.01 - .12)	.07 (.04 - .12)	.04 (-.02 - .05)
Middle	E	.05 (-.03 - .07)	.05 (.04 - .07)	.08 (-.04 - .14)	.21* (-.18 - .24)	.53* (-.49 - .58) <sup>b</sup>	.09 (-.05 - .13)	.32* (-.31 - .33)	.20* (-.17 - .23)
	A	.19* (-.12 - .23)	.17 (-.10 - .25)	.17 (.13 - .25)	.11 (-.04 - .23)	.14 (-.10 - .19)	.04 (.00 - .11)	.12 (-.05 - .16)	.18 (-.14 - .23)
	C	.10 (-.08 - .15)	.10 (-.08 - .13)	.03 (.01 - .04)	.03 (-.00 - .08)	.07 (.04 - .08)	.09 (.04 - .14)	.05 (-.01 - .10)	.08 (-.01 - .14)
	ES	.08 (-.04 - .16)	.06 (-.05 - .12)	.07 (.03 - .15) <sup>b</sup>	.38* (-.32 - .44)	.36* (-.32 - .38)	.33* (-.18 - .41)	.53* (-.42 - .62)	.26* (-.22 - .29)
	O	.08 (.01 - .14)	.07 (-.03 - .16)	.04 (-.02 - .07) <sup>b</sup>	.03 (-.00 - .05)	.16 (-.12 - .22) <sup>b</sup>	.02 (.03 - .04)	.03 (.01 - .09)	.03 (-.00 - .08)

\*: minimally 3 of the 4 correlations are significant at  $p < .01$ ; <sup>a, b</sup>: Correlations with different superscripts are significantly different between the age groups at  $p < .01$ ; <sup>c, d</sup>: Correlations with different superscripts are significantly different between the age groups at  $p < .001$

Note: Mean values of correlations are absolute values; B5: Big Five dimensions; E: extraversion; A: agreeableness; C: conscientiousness; ES: emotional stability; O: openness; IA: indirect aggression; DA: direct aggression; WITH: withdrawal; PS: panic symptoms; SOCAS: social anxiety symptoms; SEPAS: separation anxiety symptoms; GAS: generalized anxiety symptoms; SCHOOL: school phobia.

40 models were good (range of  $\chi^2$ s(8) = 17.52 – 52.42,  $p < .05$ ; range of CFIs = .986 – .997, range of RMSEAs = .03 – .07).

The answer to second research question required testing two assumptions. According to the first assumption, the stabilities of personality should be larger than the stabilities of problem behaviour. We calculated whether the stability of each Big Five dimension differed from the stability of each aggression and anxiety subscale. As depicted in Table 2, all personality and problem behaviour stability coefficients were significant at  $p < .001$ . We compared two models: a restricted model, in which all estimated stability parameters were required to be equal between personality and problem behaviour, and a non-restricted model, in which these stability parameter estimates were allowed to differ. The significance level at which the models should be significantly different from each other was set at  $p < .01$ ; this was the case in 34 of the 40 models.

In the non-restricted models, we found that the stability of extraversion was significantly (all  $p < .001$ ) larger than the stability of IA, DA, WITH, PS, SEPAS and SCHOOL. Furthermore, the stability of agreeableness was significantly larger than the stability of WITH ( $p < .001$ ) and the stability of conscientiousness was significantly larger than the stabilities of all problem behaviour subscales ( $p < .01$  or  $p < .001$ ), except GAS. The stability of emotional stability, then, was significantly larger than the stability of WITH ( $p < .001$ ), PS ( $p < .01$ ), SEPAS ( $p < .001$ ) and SCHOOL ( $p < .01$ ). Finally, the stability of openness was larger than IA ( $p < .001$ ) and DA ( $p < .01$ ), WITH ( $p < .001$ ), PS ( $p < .001$ ), SEPAS ( $p < .001$ ) and SCHOOL ( $p < .001$ ; Table 2). In sum, in 24 of the 40 models (60%) the stability of the Big Five dimensions was larger than the stability of the problem behaviours. This means that the first assumption was met: the majority of the results was in favour of the idea that personality is hierarchically superior to problem behaviour.

However, in 40% of the models the hierarchical superiority of personality over problem behaviour was not found. In two of the 40 models, the stability of problem behaviour was larger than the stability of personality. More specifically, the stability of GAS was larger than the stability of agreeableness ( $p < .001$ ) and emotional stability ( $p < .001$ ). In the other 14 models we found that the stability of personality did not differ from the stability of problem behaviour; or, that there was a difference between the stabilities, although the direction was not clear (agreeableness – SOCAS).

### ***5.3.3 Predictions from Big Five Dimensions to Aggression and Anxiety and Vice Versa***

According to the second assumption, the prediction from personality to problem behaviour should be larger than the reverse. We calculated whether the

**Table 2.** Standardized regression weights on the stabilities of the Big Five dimensions and the aggression and anxiety subscales in the total sample (N = 1331) and the early (n = 940) and middle adolescents (n = 391); calculated by means of AMOS

Group	B5	Stability	IA	DA	WITH	PS	SOCAS	SEPAS	GAS	SCHOOL
Total	E	B5 <sup>a</sup>	.52	.52	.52	.52	.48	.52	.50	.52
		PB <sup>b</sup>	.43	.45	.32	.41	.42	.38	.49	.38
	A	B5	.43	.43	.43	.44	.44	.44	.44	.43
		PB	.43	.45	.29	.42	.47	.38	.50	.38
	C	B5	.55	.55	.55	.55	.55	.55	.55	.55
		PB	.43	.45	.31	.43	.47	.38	.51	.39
	ES	B5	.47	.47	.47	.45	.43	.45	.40	.46
		PB	.43	.46	.31	.40	.45	.36	.47	.38
	O	B5	.48	.48	.48	.48	.48	.48	.48	.48
		PB	.43	.45	.31	.43	.47	.38	.50	.39
Early	E	B5	.48	.48	.47	.47	.45	.47	.46	.47
		PB	.42	.44	.30	.38	.38	.34	.46	.36
	A	B5	.43	.43	.43	.43	.44	.44	.43	.42
		PB	.42	.44	.28	.40	.43	.35	.49	.38
	C	B5	.51	.51	.51	.52	.52	.51	.52	.52
		PB	.42	.43	.30	.40	.43	.36	.49	.38
	ES	B5	.43	.43	.43	.42	.40	.42	.37	.42
		PB	.42	.44	.30	.38	.41	.35	.44	.42
	O	B5	.42	.44	.30	.38	.41	.44	.44	.36
		PB	.47	.47	.46	.47	.47	.47	.47	.46
Middle	E	B5	.63	.63	.63	.62	.57	.63	.62	.63
		PB	.43	.44	.31	.48	.49	.46	.52	.38
	A	B5	.36	.37	.37	.37	.37	.38	.37	.37
		PB	.43	.44	.30	.48	.52	.46	.54	.39
	C	B5	.62	.62	.62	.62	.62	.62	.62	.62
		PB	.43	.44	.31	.48	.53	.46	.54	.39
	ES	B5	.55	.56	.56	.52	.52	.53	.48	.54
		PB	.43	.44	.32	.47	.53	.43	.51	.37
	O	B5	.50	.50	.51	.51	.51	.51	.51	.51
		PB	.44	.44	.31	.48	.52	.46	.53	.39

<sup>a</sup>: each row represents the mean stability coefficients of personality (e.g., extraversion) in the models with problem behaviour (e.g., indirect aggression to school phobia); <sup>b</sup>: each row represents the mean stability coefficients of problem behaviour (e.g., indirect aggression to school phobia) in the models with personality (e.g., extraversion); *Note.* All stability estimates were significant at  $p < .001$ ; B5: Big Five dimensions; E: extraversion; A: agreeableness; C: conscientiousness; ES: emotional stability; O: openness; Stab. B5: stabilities of Big Five dimension; Stab. PB: stabilities of problem behaviour; IA: indirect aggression; DA: direct aggression; WITH: withdrawal; PS: panic symptoms; SOCAS: social anxiety symptoms; SEPAS: separation anxiety symptoms; GAS: generalized anxiety symptoms; SCHOOL: school phobia.

cross paths from the Big Five dimensions to the problem behaviour subscales differed significantly from the reverse by comparing two models: a restricted model, in which all estimated cross path parameters were required to be equal between personality and problem behaviour, and a non-restricted model, in which these cross path estimates were allowed to differ. We found that the non-restricted model differed significantly (at the .01 level) from the restricted model in 34 of the 40 models. In addition to the criterion that the overall difference of these two models should be significant at the .01 level, two of the three cross paths should be significant at the .01 level.

In the non-restricted models, we tested whether the prediction from personality to problem behaviour was larger than the reverse: this was found in 2 of the 40 models (Table 3). More specifically, the prediction from extraversion to PS ( $\beta = -.08$ ) and to SOCAS ( $\beta = -.14$ ) was larger than the reverse ( $\beta = -.01$ ;  $\beta = -.11$  respectively). The opposite effect was found in 3 of the 40 models: the prediction from IA ( $\beta = -.07$ ) and from SCHOOL ( $\beta = -.06$ ) to agreeableness and the prediction from GAS ( $\beta = -.18$ ) to emotional stability was larger than the reverse ( $\beta = -.05$ ;  $\beta = -.03$ ;  $\beta = -.09$  respectively). We should note that the values of the cross paths in Table 3 are averaged values over the waves, which could be the reason that the differences between the cross paths appear to be small. In the majority of the models (75%) no significant difference between the prediction from personality to problem behaviour and the reverse was found. For example, the predictions from conscientiousness and from openness to all problem behaviour subscales were in no case different from the reverse. We also found some differences in 5 of 40 models, although the direction was not clear. This means that the second assumption was not met in the total sample: the majority of these latter results (35 of 40 models) was not in favour of the idea that personality is hierarchically superior to problem behaviour.<sup>1</sup>

Remarkably, the hierarchical superiority of personality over problem behaviour was not present between the personality dimensions and GAS. The stability of GAS was equal to the stability of extraversion (GAS:  $\beta = .49$ ; E:  $\beta = .50$ ), conscientiousness (GAS:  $\beta = .51$ ; C:  $\beta = .55$ ) and openness (GAS:  $\beta = .50$ ; E:  $\beta = .48$ ) and it was even larger than the stability of agreeableness (GAS:  $\beta = .50$ ; A:  $\beta = .44$ ) and emotional stability (GAS:  $\beta = .47$ ; ES:  $\beta = .40$ ). Also, the prediction from GAS to emotional stability ( $\beta = -.18$ ) was significantly stronger than the prediction from emotional stability to GAS ( $\beta = -.09$ ) and the cross paths from GAS to E were significant ( $\beta = -.06$ ), whereas the cross paths from E to GAS were not ( $\beta = -.07$ ). The only relationship in which the hierarchical superiority of personality over problem behaviour was present, was the relation between extraversion and PS. The stability of extraversion ( $\beta = .52$ ) was significantly larger than the stability of PS ( $\beta = .41$ ;  $p <$

**Table 3.** Standardized regression weights on the cross-paths between Big Five dimensions and the aggression and anxiety subscales in the total sample (N = 1331) and the early (n = 940) and middle adolescents (n = 391); calculated by means of AMOS

Group	B5	Cross paths	IA	DA	WITH	PS	SOCAS	SEPAS	GAS	SCHOOL
Total	E <sup>a</sup>	E -> PB	-.01	.02	-.03	-.08	-.14*	-.03	-.07	-.07*
		PB -> E	.04	.03	-.01	-.01	-.11*	-.02	-.06*	-.03
	A <sup>b</sup>	A -> PB	-.05	-.06	.11*	-.05	-.03	-.06	.01	-.03
		PB -> A	-.07*	-.07	.06	-.05	.02	-.05	.02	-.06*
	C	C -> PB	-.07*	-.07*	.03	-.02	-.01	.00	-.03	-.04
		PB -> C	-.04	-.03	.02	.02	.03	.03	.02	-.03
	ES	ES -> PB	-.03	.02	-.01	-.07	-.07*	-.07	-.09*	-.07
		PB -> ES	-.02	-.01	-.02	-.07	-.11*	-.07*	-.18*	-.06
	O	O -> PB	-.02	-.06	.06	-.03	-.04	-.04	.02	.01
		PB -> O	-.01	-.04	.04	.02	.01	-.02	.02	-.03
Early	E	E -> PB	.02	-.01	-.04	-.10*	-.14*	-.06	-.08*	-.07
		PB -> E	.05	.04	-.02	.01	-.11*	-.03	-.07	-.04
	A	A -> PB	-.04	-.06	.11*	-.06	-.02	-.08*	-.02	-.03
		PB -> A	-.07	-.07	.09	-.07	.03	-.06	-.05	-.07
	C	C -> PB	-.07*	-.08	.04	-.03	-.03	-.02	-.03	-.05
		PB -> C	-.04	-.04	.03	.04	.04	.05	-.03	-.03
	ES	ES -> PB	-.04	.01	-.02	-.08	-.09	-.06	-.10*	-.08
		PB -> ES	-.03	-.02	-.03	-.07	-.11*	-.07	-.17*	-.07
	O	O -> PB	.01	-.04	.08	-.03	.02	-.05	.03	.03
		PB -> O	-.02	-.03	.05	.03	.02	-.01	.02	-.04
Middle	E	E -> PB	-.04	.02	-.05	.04	-.13*	.03	-.04	-.07
		PB -> E	.03	.01	.02	-.02	-.13*	-.03	-.06	-.03
	A	A -> PB	-.04	-.02	.05	.03	-.07	.05	-.06	-.02
		PB -> A	-.05	-.06	.04	.06	.02	.07	.04	-.04
	C	C -> PB	-.05	-.03	.01	.03	-.03	.04	.05	.07
		PB -> C	.03	.02	.04	.02	.04	.04	-.04	-.03
	ES	ES -> PB	-.04	.04	.08	-.07	-.05	-.11	-.07	-.08
		PB -> ES	-.03	.05	.05	-.10	-.11	-.11	-.19*	-.06
	O	O -> PB	-.04	-.05	-.10	.03	-.02	.03	.03	.04
		PB -> O	.05	-.06	.04	.05	-.08	-.03	.03	.04

\*: minimally 2 of the 3 cross paths are significant at  $p < .01$ ; <sup>a</sup>: each row represents the mean cross path coefficients of personality (e.g., extraversion) in the models with problem behaviour (e.g., indirect aggression to school phobia); <sup>b</sup>: each row represents the mean cross path coefficients of problem behaviour (e.g., indirect aggression to school phobia) in the models with personality (e.g., extraversion). Note. E: extraversion; A: agreeableness; C: conscientiousness; ES: emotional stability; O: openness; PB: problem behaviour; IA: indirect aggression; DA: direct aggression; WITH: withdrawal; PS: panic symptoms; SOCAS: social anxiety symptoms; SEPAS: separation anxiety symptoms; GAS: generalized anxiety symptoms; SCHOOL: school phobia.

.001) and the predictions from extraversion to PS ( $\beta = -.08$ ) were stronger than the reverse ( $\beta = -.01$ ;  $p < .001$ ).

#### ***5.3.4 Correlated Change Associations between Big Five Dimensions and Aggression and Anxiety***

We also calculated the correlated change between the Big Five dimensions and the aggression and anxiety subscales on wave 2, 3 and 4 (Table 4). We speak of a significant correlated change between the personality dimensions and the aggression and anxiety subscales if at least two of the three correlated change associations were significant at the .01 level. In the total sample, no correlated change was found between extraversion and the aggression subscales, while a negative correlated change was found between extraversion and all anxiety subscales (range:  $\beta = -.10$  -  $\beta = -.28$ ). A negative correlated change was found between agreeableness and IA ( $\beta = -.10$ ), DA ( $\beta = -.11$ ), PS ( $\beta = -.09$ ) and SCHOOL ( $\beta = -.10$ ), whereas a positive correlated change was found between agreeableness and WITH ( $\beta = .15$ ). Furthermore, a negative correlated change was found between conscientiousness and DA ( $\beta = -.09$ ). A negative correlated change was also found between emotional stability and IA ( $\beta = -.07$ ) and all anxiety subscales (range:  $\beta = -.18$  -  $\beta = -.37$ ). Finally, a positive correlated change was found between openness and WITH ( $\beta = .13$ ). Additionally, we examined whether these significant correlated change associations were consistent in direction compared to the association on wave 1: this was the case in all the abovementioned associations (i.e., in 18 of 40 models). In only six models, the T1 correlation and the correlated change associations were not consistent; more specifically, in these cases the T1 correlations were significant, whereas the correlated change associations were not.

#### ***5.3.5 Stability of Big Five Dimensions and Stability of Aggression and Anxiety in both Age Groups***

To answer the third research question, we calculated 40 multigroup age group models. For these multi-group models we compared two models: a restricted model in which all parameters were required to be equal across group, and a non-restricted group, in which these parameter estimates were allowed to differ across the groups. Model comparisons tests for the 40 multi-group models demonstrated that all the non-restricted models fit the data better than the matching restricted models ( $\Delta\chi^2 = 249.54 - 2996.40$ ,  $\Delta df = 34$ ,  $p < .001$ ). The fits of the models were good (range of  $\chi^2s(16) = 20.95 - 88.86$ ; range of  $p$ :  $p < .001 - p > .05$ ; range of CFIs = .980 - .998; range of RMSEAs = .02 - .06). We calculated whether the stability of each Big Five dimension differed from the stability of each problem behaviour subscale

**Table 4.** T1 and correlated change associations between the Big Five dimensions and the aggression and anxiety subscales for the total sample (N = 1331) and the age groups (early: n = 940; middle: n = 391); calculated by means of AMOS

Group	B5	IA		DA		WITH		PS		SOCAS		SEPAS		GAS		SCHOOL	
		T1	CC	T1	CC	T1	CC	T1	CC	T1	CC	T1	CC	T1	CC	T1	CC
Total	E	-.04	-.04	-.02	-.02	-.09*	-.06	-.25**	-.10*	-.39**	-.28*	-.17**	-.14*	-.33**	-.24*	-.20**	-.15*
	A	-.11**	-.10*	-.11**	-.11*	.25**	.15*	-.10**	-.09*	.00	-.01	-.01	-.03	-.03	-.04	-.16**	-.10*
	C	-.09**	-.06	-.13**	-.09*	.15**	.07	.02	.02	.09**	.04	.10**	.07	.07	.02	-.05	-.02
	ES	-.11**	-.07*	-.07	-.05	-.11**	.06	-.30**	-.26*	-.32**	-.24*	-.27**	-.21*	-.41**	-.37*	-.25**	-.18*
	O	.06	-.01	.01	-.03	.19**	.13*	.04	.03	-.00	.02	.06	.02	.07	.03	.02	-.02
Early	E	-.09 <sup>a</sup>	-.04	-.07	.03	-.04	-.08	-.28**	-.20*	-.33 <sup>**a</sup>	-.27 <sup>*a</sup>	-.24**	-.15 <sup>*a</sup>	-.33**	-.26*	-.27**	-.17 <sup>*a</sup>
	A	-.08	-.08*	-.08	-.08*	.26**	.14*	-.04 <sup>a</sup>	-.10*	.04	.03	.05a	-.04	.01 <sup>a</sup>	-.04	-.15**	-.08*
	C	-.10*	-.06	-.14**	-.09*	.09*	.07	.03	.01	.10*	.04	.12**	.07	.10*	.03	-.04	.02
	ES	-.13**	.08	-.12**	.05	-.08	.08	-.31**	-.25 <sup>*a</sup>	-.29**	-.26*	-.33 <sup>**a</sup>	-.21*	-.41**	-.36*	-.26**	-.19*
	O	.05	.02	.04	.02	.21**	.14*	.08	.03	.05 <sup>a</sup>	.05	.12 <sup>**a</sup>	.04	.12 <sup>**a</sup>	.04	.05	.02
Middle	E	.07 <sup>b</sup>	-.06	.07	.07	-.14*	.05	-.22**	-.14*	-.49 <sup>**b</sup>	-.31 <sup>*b</sup>	-.09	-.13 <sup>b</sup>	-.31**	-.19*	-.19**	-.11 <sup>b</sup>
	A	-.22**	-.13	-.20**	-.13	.17**	.14	-.23 <sup>**b</sup>	-.07	-.11	-.09	-.11b	-.07	-.15 <sup>*b</sup>	-.09	-.23**	-.11
	C	-.08	-.04	-.09	-.08	.02	.06	-.02	-.03	.08	.02	.07	.06	-.01	-.03	-.08	-.06
	ES	-.04	-.05	.03	-.09	-.15*	-.04	-.32**	-.28 <sup>*b</sup>	-.38**	-.18*	-.18 <sup>**b</sup>	-.24*	-.42**	-.39*	-.22**	-.17*
	O	.06	-.10	-.03	-.07	.06	.07	-.05	-.03	-.16 <sup>*b</sup>	-.08	-.04 <sup>b</sup>	-.01	-.09 <sup>b</sup>	-.03	-.08	-.01

\*: T1:  $p < .01$ , CC: minimally 2 of the 3 correlated change associations are significant at  $p < .01$ ; \*\*:  $p < .001$

<sup>a, b</sup>: Correlations with different superscripts are minimally significantly different between the age groups at  $p < .01$

*Note.* T1: correlations on the first measurement wave; CC: mean correlated change, averaged over wave 2, 3 and 4; E: extraversion; A: agreeableness; C: conscientiousness; ES: emotional stability; O: openness; PB: problem behaviour; IA: indirect aggression; DA: direct aggression; WITH: withdrawal; PS: panic symptoms; SOCAS: social anxiety symptoms; SEPAS: separation anxiety symptoms; GAS: generalized anxiety symptoms; SCHOOL: school phobia.

within both age groups. In both age groups, all personality and problem behaviour stability coefficients were significant at  $p < .001$ .

The stabilities of the personality dimensions and the problem behaviours were compared within both age groups (Table 2). For each age group we compared the two models as described above. The significance level at which the models should be significantly different from each other was .01. Differences between the age groups on the stabilities or on the cross paths are only considered different, if all values of the three between-wave or between-variable associations are different consistently in the same direction; i.e., in order to be different from each other one age group should be larger or smaller than the other group on the three between-wave or between-variable associations.

*Early adolescents.* For the early adolescents, we found that the stability of extraversion (range:  $\beta = .45 - \beta = .48$ ;  $p < .001$ ) and conscientiousness (range:  $\beta = .51 - \beta = .52$ ;  $p < .001$ ) was significantly larger than the stability of all problem behaviours (range:  $\beta = .34 - \beta = .44$ ; range:  $\beta = .30 - \beta = .43$  respectively), except GAS. Furthermore, the stability of agreeableness (range:  $\beta = .42 - \beta = .44$ ) and emotional stability (range:  $\beta = .37 - \beta = .43$ ) was significantly larger than the stability of WITH ( $\beta = .28$ ;  $\beta = .30$  respectively), PS ( $\beta = .40$ ;  $\beta = .38$  respectively) and SEPAS ( $\beta = .35$ ;  $\beta = .35$  respectively; all:  $p < .001$ ); the stability of emotional stability ( $\beta = .42$ ) was also larger than the stability of SCHOOL ( $\beta = .36$ ;  $p < .001$ ). Finally, the stability of openness was significantly larger than the stability of IA, WITH, PS and SCHOOL ( $p < .001$ ). Overall, we found that the stability of all Big Five dimensions was larger than the stability of WITH and PS and that the stability of extraversion and conscientiousness was higher than the stability of all problem behaviours, except GAS. In sum, in 62.5% of the models the stability of the Big Five dimensions was larger than the stability of the problem behaviours. This means that for the early adolescents the first assumption was met: the majority of the results was in favour of the idea that personality is hierarchically superior to problem behaviour.

*Middle adolescents.* For the middle adolescents, we found that the stability of extraversion (range:  $\beta = .57 - \beta = .63$ ; Table 2) was significantly larger than the stability of all problem behaviours (range:  $\beta = .31 - \beta = .52$ ;  $p < .001$ ). The stability of agreeableness (range:  $\beta = .36 - \beta = .38$ ) was equal to or significantly smaller than the stability of all problem behaviours (range:  $\beta = .30 - \beta = .52$ ;  $p < .001$ ). Furthermore, the stability of conscientiousness ( $\beta = .62$ ) was significantly larger than the stability of all problem behaviours (range:  $\beta = .31 - \beta = .54$ ;  $p < .001$ ), except SEPAS ( $\beta = .46$ ). The stability of emotional stability (range:  $\beta = .52 - \beta = .56$ ) was larger than the stability of all problem behaviours (range:  $\beta = .32 - \beta = .47$ ;  $p < .001$ ), except SOCAS ( $\beta = .53$ ) and GAS ( $\beta = .51$ ). Finally, the stability of openness (range:  $\beta = .50 - \beta = .51$ ;  $p < .001$ ) was significantly larger than the stability of WITH ( $\beta = .31$ ) and SCHOOL

( $\beta = .39$ ;  $p < .001$ ). In sum, in 57.5% of the models the stability of the Big Five dimensions was larger than the stability of the problem behaviours. This means that for the middle adolescents the first assumption was met: the majority of the results was in favour of the idea that personality is hierarchically superior to problem behaviour.

Next to comparing the stabilities of personality and problem behaviour within the age groups, we compared the stabilities between the age groups. We found that the stability of extraversion (range:  $\beta = .45$  -  $\beta = .48$  in early adolescents; range:  $\beta = .57$  -  $\beta = .63$  in middle adolescents) and emotional stability (range:  $\beta = .37$  -  $\beta = .43$  in early adolescents; range:  $\beta = .48$  -  $\beta = .56$  in middle adolescents) was consistently higher in middle adolescents compared to early adolescents. Also, we found that the stability of PS (range:  $\beta = .38$  -  $\beta = .47$  in early adolescents; range:  $\beta = .49$  -  $\beta = .53$  in middle adolescents) and SEPAS (range:  $\beta = .34$  -  $\beta = .47$  in early adolescents; range:  $\beta = .43$  -  $\beta = .46$  in middle adolescents) was consistently higher in middle adolescents than in early adolescents. Finally, we found that the stability of GAS (range:  $\beta = .44$  -  $\beta = .49$  in early adolescents; range:  $\beta = .51$  -  $\beta = .54$  in middle adolescents) was larger than the stability of agreeableness (range:  $\beta = .42$  -  $\beta = .44$  in early adolescents; range:  $\beta = .36$  -  $\beta = .38$  in middle adolescents) in both age groups. All differences between the age groups are significant at  $p < .001$ .

### 5.3.6 Predictions from Big Five Dimensions to Aggression and Anxiety and Vice Versa in both Age Groups

*Early adolescents.* Additionally, we investigated whether the cross paths from personality to problem behaviour differed significantly from the reverse within each age group. In the early adolescent group, we found that in 2 of the 40 models the prediction from extraversion to PS ( $\beta = -.10$ ) and to SOCAS ( $\beta = -.14$ ) was larger than the reverse ( $\beta = .01$ ;  $\beta = -.11$  respectively; Table 3). The opposite effect was also found in 2 of the 40 models: the predictions from IA ( $\beta = -.07$ ) and from SCHOOL ( $\beta = -.06$ ) to agreeableness were larger than the reverse ( $\beta = -.05$ ;  $\beta = -.03$  respectively). In other words, in the vast majority of the early adolescent models (32 of 40) no significant differences were found between the prediction from personality to problem behaviour and the reverse. We also found some differences in 4 of 40 models, although the direction of the difference was not clear. This means that the second assumption was not met in the early adolescents: the majority of the results was not in favour of the idea that personality is hierarchically superior to problem behaviour in early adolescents.

*Middle adolescents.* Furthermore, in the middle adolescents we found that in 39 of the 40 models the prediction from personality to problem behaviour was equal to the reverse (Table 3). In only one model, openness ( $\beta = -.08$ ) to SOCAS ( $\beta = -.02$ )

the prediction from personality to problem behaviour was larger than vice versa. This means that the second assumption was not met in the middle adolescents: the majority of these latter results was not in favour of the idea that personality is hierarchically superior to problem behaviour.

In addition, we calculated age group differences on the cross paths from personality to problem behaviour and vice versa. We found that in 92.5% of the models, no age groups were found on the cross paths from personality to problem behaviour; in three models the direction of the difference was not clear. On the cross paths from problem behaviour to personality, we found no age group differences in 97.5% of the models; in one of the models the direction of the difference was not clear. In conclusion, we did not find any clear age group differences on the cross paths between personality and problem behaviours.

### **5.3.7 Correlated Change Associations between Big Five Dimensions and Aggression and Anxiety in both Age Groups**

*Early adolescents.* We calculated the correlated change between the Big Five dimensions and the aggression and anxiety subscales within both age groups (Table 4). Two of the three correlated change associations should be significant at the .01 level in both age groups. In the early adolescents, no correlated change association was found between extraversion and the aggression subscales, while a negative correlated change association was found between extraversion and all anxiety subscales (range:  $\beta = -.15$  -  $\beta = -.27$ ). A negative correlated change was found between agreeableness and IA ( $\beta = -.08$ ), DA ( $\beta = -.08$ ), PS ( $\beta = -.10$ ) and SCHOOL ( $\beta = -.08$ ), whereas a positive correlated change was found between agreeableness and WITH ( $\beta = .14$ ). Furthermore, a negative correlated change was found between conscientiousness and DA ( $\beta = -.09$ ). No correlated change association was found between emotional stability and aggression, whereas a negative correlated change was found between emotional stability and all anxiety subscales (range:  $\beta = -.19$  -  $\beta = -.36$ ). Finally, a positive correlated change was found between openness and WITH ( $\beta = .14$ ). In conclusion, we found 17 times a correlated change association in the early adolescent group.

*Middle adolescents.* In the middle adolescents, no correlated change associations were found between extraversion and aggression subscales, SEPAS and SCHOOL, while a negative correlated change association was found between extraversion and PS ( $\beta = -.14$ ), SOCAS ( $\beta = -.31$ ) and GAS ( $\beta = -.19$ ). A negative correlated change was found between emotional stability and all anxiety subscales (range:  $\beta = -.17$  -  $\beta = -.39$ ). No correlated change associations were found between agreeableness, conscientiousness, emotional stability and openness and aggression and between agreeableness, conscientiousness and openness and anxiety. In

conclusion, we found 8 times a correlated change association in the middle adolescent group.

Additionally, we examined in each age group whether the significant correlated change associations were consistent in direction compared to the T1 association: this was the case in all the abovementioned associations (early: in 17 of 40 models; middle: in 8 of the 40 models). For the early and middle adolescents, the T1 correlation and the correlated change associations were not consistent in only three and two of these models respectively; in these cases the T1 correlations were significant, whereas the correlated change associations were not.

In addition, both age groups differed on the correlated change associations between personality and problem behaviour on wave 2, 3 and 4. The correlated change between extraversion and SOCAS and between emotional stability and PS was significantly stronger in middle adolescents than in early adolescents. However, the correlated change between extraversion and SEPAS and SCHOOL was significantly stronger in early adolescents than in middle adolescents.

## **5.4 Discussion**

The purpose of the current study was to examine whether personality was hierarchically superior to problem behaviour during adolescence. In order to do so, we investigated three research questions. Our first research question examined the associations between the Big Five dimensions and problem behaviours. The following findings were in concordance with previous studies: extraversion was found to be not related to aggression (Asendorpf & Van Aken, 2003b) and to be negatively associated with anxiety (Ehrler et al., 1999; Ferguson, 2000). We found that agreeableness was negatively related to indirect and direct aggression (Asendorpf & Van Aken, 2003b; Caprara et al., 1996; Ehrler et al., 1999; Lounsbury et al., 2004; Lounsbury et al., 2003) and to certain anxiety subscales (Ehrler et al., 1999; Ferguson, 2000). Conscientiousness, then, was negatively associated with indirect and direct aggression (Asendorpf & Van Aken, 2003b; Caprara et al., 1996; Lounsbury et al., 2004; Lounsbury et al., 2003; Scher & Osterman, 2002) and it was not related to anxiety (Ferguson, 2000). We found that emotional stability was negatively related to (indirect) aggression (Asendorpf & Van Aken, 2003b) and to anxiety (Ehrler et al., 1999; Ferguson, 2000). These findings were in agreement with our hypotheses. However, we also found agreeableness, conscientiousness and openness to be positively associated with withdrawal from aggression. This relation could be explained by the fact that these personality traits represent mature behaviour (Caspi, Roberts, & Shiner, 2005), as withdrawal from aggression

is also mature behaviour. However, this remains a speculative explanation and should be addressed in future studies.

#### ***5.4.1 Personality not Hierarchically Superior over Problem Behaviours in Adolescence***

The second research question contained two assumptions. According to the first assumption, we expected that the rank-order stabilities of the Big Five personality dimensions would be larger than the rank-order stabilities of the aggressive and anxious problem behaviours, since we presumed the personality dimensions to be core personality characteristics and the problem behaviours to be surface characteristics (Asendorpf & Van Aken, 2003a; Neyer & Asendorpf, 2001). As expected, we found that the stability of personality was larger than the stability of problem behaviour in most of the longitudinal path models (60%). The second assumption held that personality should be a better predictor of problem behaviour than the reverse. However, we found that in the majority of the models (75%), the prediction from personality to problem behaviour was equal to the reverse. Only in 5% of the models the prediction from personality to problem behaviour was larger than the reverse. This means that the second assumption was not met. When taking both assumptions into account, we can conclude that personality is not hierarchically superior to problem behaviour, counter to our expectations.

Instead of a hierarchical superiority of personality over problem behaviour, we found systematic patterns of correlated change between personality and problem behaviour. These patterns of correlated change were very much the same as the wave 1 associations, in the total sample as well as in the early and middle adolescents: when the correlated change associations were significant, the wave 1 correlations were significant; within these associations, the direction of the relation was the same over time. For example, we found that the negative association between extraversion and panic symptoms was stable over time, as indicated by the negative association on wave 1 and the negative correlated change associations. The direction of these associations is stable over time during adolescence. Hence, when the correlated change associations are consistent with the wave 1 associations, the direction of the relation is stable over time.

The findings of the current study appear to be in congruence with the spectrum hypothesis as explained by Krueger and Tackett (2003). The spectrum hypothesis, originally developed in clinical research, claims that similar personality traits and problem behaviours, such as neuroticism and anxiety, exist on a spectrum or a continuum ranging from personality traits to problem behaviours (Krueger & Tackett, 2003); our findings indicated 18 possible continua.

More specifically, a continuum could be present ranging from extraversion to panic symptoms, from extraversion to social anxiety symptoms, from extraversion to separation anxiety symptoms, from extraversion to generalized anxiety symptoms and from extraversion to school phobia. Since the relation between extraversion and all anxiety symptoms was negative, this means that in the extension of a high level of extraversion lies a low level of several anxiety symptoms. Other continua could be present ranging from agreeableness to indirect aggression, from agreeableness to direct aggression, from agreeableness to withdrawal, from agreeableness to panic symptoms and from agreeableness to school phobia. The relation between agreeableness and indirect aggression, direct aggression, panic symptoms and school phobia was negative, which means that in the extension of a high level of agreeableness lies a low level of these problem behaviours. However, the relation between agreeableness and withdrawal was positive; this means that in the extension of a high level of agreeableness lies a high level of withdrawal. Furthermore, a continuum could be present ranging from conscientiousness to direct aggression. Since this is a negative relation, it implies that in the extension of a high level of conscientiousness lies a low level of direct aggression. Also, a continuum ranging from emotional stability to indirect aggression, from emotional stability to panic symptoms, from emotional stability to social anxiety symptoms, from emotional stability to separation anxiety symptoms, from emotional stability to generalized anxiety symptoms and from emotional stability to school phobia could be present. The relation between emotional stability and indirect aggression and all anxiety symptoms was negative, implying that in the extension of a high level of emotional stability lies a low level of these problem behaviours. Finally, a continuum could be present between openness and withdrawal. The relation between openness and withdrawal is positive, meaning that in the extension of a high level of openness lies a high level of withdrawal. Additionally, since extraversion and emotional stability were longitudinally related to all anxiety symptoms, a continuum may be present between extraversion and anxiety in general and between agreeableness and anxiety in general. The same might hold for agreeableness and aggression: since agreeableness was longitudinally related to all aggression subscales a continuum could be present between agreeableness and aggression in general. Obviously, future studies are needed to replicate these continua.

#### ***5.4.2 Personality not Hierarchically Superior over Problem Behaviours in Early and Middle Adolescents***

We did not find the hierarchical superiority of personality over problem behaviour in the early and middle adolescents either. Although the first

assumption about the stability of personality being larger than the stability of the problem behaviours was met in a small majority in both age groups (early: 62.5%; middle: 57.5%), the second assumption about the prediction from personality to problem behaviour being larger than the reverse (early: 5% of the models; middle: 0% of the models) was rejected. Again, these findings should be tested in future studies in order to examine if our findings can be replicated.

#### ***5.4.3 Stabilities of Big Five Dimensions and Problem Behaviours in Early and Middle Adolescents***

We found that the stabilities of extraversion and emotional stability were higher in middle than in early adolescents. In a meta-analysis of Roberts and DelVecchio (2001) was reported that the trait consistency of Big Five personality dimensions increased with age, including from childhood to adolescence and from adolescence to young adulthood. This process of an increase in trait consistency also occurs during adolescence, at least so it seems for extraversion and emotional stability.

Furthermore, we found that the stabilities of panic symptoms and separation anxiety symptoms were higher in middle adolescents than in early adolescents. This could imply that the stability of panic symptoms and separation anxiety symptoms increases during adolescence. Panic symptoms are primarily caused by an increased sensitivity to physical sensations (Kaplan, Sadock, & Grebb, 1994), which parallels the overall increase in awareness to the body and to bodily changes during adolescence (Steinberg, 2002; Rice, 1999). Possibly, the increase of the stability in panic symptoms is due to an increase in the overall awareness to the changing adolescent body. We also found an increase in the stability of separation anxiety symptoms during adolescence. A tentative explanation for this finding could be that the separation from parents becomes more of an issue in middle adolescence than in early adolescence. In middle adolescence, choices about a new education or a job have to be made, marking a new phase in life, which might cause the adolescents to realize that they will soon be mature enough to move away from home and their parents. Obviously, more research is needed to replicate these findings and to address our speculative explanations.

Finally, we found that the stability of agreeableness was lower in middle adolescents compared to early adolescents. Although this seems in contradiction to the findings of the meta-analysis by Roberts and DelVecchio (2000) indicating that the rank-order consistency of agreeableness is relatively high in adulthood, this finding might not hold in adolescence. Since adolescents become more involved with their friends and tend to react against their parents (Steinberg, 2002; Rice, 1999), causing them to be more agreeable in one situation than in the next, the

rank-order consistency of agreeableness might decrease during adolescence. When they grow older and become young adults, the relationship with their parents improves, possibly resulting in more consistency in agreeableness. Since the rank-order stability of agreeableness appears to decrease during adolescence, it is possible that agreeableness is more of a surface personality characteristic instead of a core personality characteristic.

Overall, we found four clear age group differences on the stabilities of personality and problem behaviour. The stabilities of these personality dimensions and problem behaviours were larger in middle than in early adolescents. These findings support the idea that adolescence is a formative period in life, since the rank-order stabilities of personality as well as the rank-order stabilities of problem behaviours appear to increase during adolescence.

#### **5.4.4 Additional Findings**

Markedly, we found that the stability of GAS was higher than the stability of agreeableness and emotional stability and that it was equally stable as extraversion, conscientiousness and openness. Moreover, the cross paths from GAS to emotional stability were stronger than the reverse and the cross paths from GAS to extraversion were significant, whereas the reverse was non-significant. According to the assumptions about hierarchical superiority (Asendorpf & Van Aken, 2003a; Neyer & Asendorpf, 2001) these findings seem to imply that GAS could be hierarchically superior to the Big Five personality dimensions: the rank-order stabilities of GAS are equal to or larger than the rank-order stabilities of the Big Five personality dimensions and GAS appears to be a better predictor of certain Big Five dimensions (i.e., extraversion, emotional stability) over time than the reverse. This might imply that GAS, with worry as one of its key components (Hale, Engels, & Meeus, 2006), could be a core personality characteristic. In previous studies GAS was distinguished into early-onset and late-onset GAS, with GAS starting in childhood and adolescence as the early-onset GAS and with GAS starting after the second decade as the late-onset GAS (Hoehn-Saric, Hazlett, & McLeod, 1993). Especially the early-onset form has sometimes been considered a disturbance in character (Masi, Millepiedi, Mucci, Poli, Bertini, & Milantoni, 2004), implying that GAS occurring early in life (e.g., in adolescence), could be considered a personality characteristic. Whether GAS could be a more core personality characteristic than the Big Five personality dimensions should be addressed in future studies.

Additionally, we found a positive correlated change between openness and withdrawal. The personality dimension openness is the most debated and least understood dimension of the Big Five (Caspi, Roberts, & Shiner, 2005). Although it

seems not clear whether openness is related to problem behaviours in other studies, we found that adolescents changing in openness are likely to change in withdrawal as well. Since it is known that openness increases during adolescence (Roberts, Walton, & Viechtbauer, 2006a), withdrawal from aggression is likely to increase as well, indicating a more mature reaction to being angry at peers in open adolescents. Possibly, open adolescents who are angry at a friend are more creative (Shiner, 2005) in solving problems with that friend compared to less open adolescents.

#### ***5.4.5 Strengths and Limitations of the Present Study; Implications for Future Research***

Important strengths of this study are that the longitudinal relations between the Big Five personality dimensions and aggressive and anxiety problem behaviours are investigated in a large sample of normal adolescents. Furthermore, few studies have investigated personality using all Big Five dimensions during adolescence and no study has yet investigated the longitudinal relations between the Big Five dimensions and problem behaviour in a full recursive design.

However, also some limitations of the present study should be addressed. The first limitation is that our findings on personality and problem behaviours were solely based on adolescent self-reports, which could result in biased answers and in shared method variance. Obviously, collecting data from multiple informants would improve our understanding of the associations between personality and problem behaviour. However, since personality and internalizing behaviours might be more difficult to observe by others (Achenbach, McConaughy, & Howell, 1987), we were specifically interested in the feelings and opinions of adolescents themselves. Furthermore, by using path analyses, the shared method variance was reduced. In this case, individual differences in socially desirable responding or extremity of responding for example inflate concurrent correlations between personality and problem behaviours. Because cross-paths control statistically for the indirect paths that contain the full bias, the error is at least partly eliminated (Asendorpf & Van Aken, 2003; Neyer & Asendorpf, 2001).

A second limitation is that our findings could be biased by Type I-errors, since we tested a large amount of models consisting of many relations. However, throughout the whole study we tried to diminish this bias by using the stricter significance level of  $p < .01$  instead of the more common significance level of  $p < .05$ . This solution has been used in other studies as well (Neyer & Asendorpf, 2001; Roberts et al., 2003). Furthermore, we only considered associations to be significant (e.g., when comparing the predictions from personality to problem behaviour) if

the majority of the associations (i.e., at least two of the three cross paths in this example) were significant at the .01 level.

A third limitation deals with the differences in sample size between the early and middle adolescent age groups. Since the size of the early adolescent group is more than two times larger than the sample size of the middle adolescent group, the values in the larger group possess more power for finding significant relationships which may stay hidden in the smaller group (Kline, 1998).

A fourth limitation of this study is that although it is suggested that the personality traits could be a primary cause of the co-occurrence between aggression and anxiety (Krueger, McGue, & Iacono, 2001), we did not take the co-occurrence between the problem behaviours into account. Future research should address this more carefully (Krueger, 1999).

Finally, only subclinical levels of problem behaviours were assessed. Although the data reported here can be used as a baseline for clinical populations, they do not meet clinical criteria and the results of this study should not be equated with those from studies of adolescents with psychiatric disorders (Gjerde, Block, & Block, 1988; Kim & Smith, 1998).

## **5.5 Conclusion**

This longitudinal study of the Big Five dimensions and problem behaviours in adolescence in a full recursive design is the first of its kind. In this study, we tested whether the Big Five dimensions were hierarchically superior to problem behaviour, such as aggression and anxiety, by comparing the stabilities of personality with the stabilities of the problem behaviours and by testing whether the predictions from personality to problem behaviour were larger than the reverse using structural equation modelling. According to these assumptions, the Big Five personality dimensions were not hierarchically superior to problem behaviour in the total adolescent sample and within early and middle adolescents. However, we found that during adolescence the stability of extraversion and emotional stability as well as the stability of panic symptoms and separation anxiety symptoms increased, that agreeableness could be a surface personality characteristic, whereas GAS could be a core personality characteristic and that the change in openness was associated with the change in aggression.

## **Footnotes**

<sup>1</sup>: When we exclusively considered the cross paths that were significant on either the cross paths from personality to problem behaviour or from problem behaviour to personality (in 11 models), we found that in 9% of the models the prediction from personality to problem behaviour was larger than the reverse. The opposite effect was found in 27% of the models. In 18% of the models, differences were found, although it was not clear which of the predictions showed the largest strength, and in 45% no differences between the predictions were found at all.

When we exclusively considered the cross paths that were significant on both the cross paths from personality to problem behaviour and from problem behaviour to personality (in three models), we found that in 33.3% the prediction from personality to problem behaviour was larger than the reverse. The opposite effect was found in 33.3%. In 33.3% no differences between the predictions were found at all.

## **Chapter 6**

### **CONCLUSIONS AND GENERAL DISCUSSION**



The current dissertation focused on the development of personality and the development of problem behaviours during adolescence. The main purpose of this dissertation was to elaborate on previous studies by investigating longitudinal associations between adolescents' personality, using both a person-centred as well as a variable-centred approach, and several internalizing and externalizing problem behaviours. The four empirical studies in the previous chapters all addressed a part of the overall research goal.

In this final chapter, we provide a summary of the main findings (§6.1) and a general discussion of the four studies (§6.2). Additionally, limitations of these studies (§6.3) as well as some implications for future research (§6.4) are discussed.

## **6.1 Summary of the Main Findings**

### ***6.1.1 Personality, Perceived Parental Rejection and Problem Behaviour in Adolescence (Chapter 2)***

The main goal of the first study was to examine whether personality moderated the associations between perceived parental rejection, depression and aggression. In order to meet this goal, we addressed several issues. First, we investigated the association between perceived parental rejection and depression as well as aggression. Next, we examined the interaction between personality types (i.e., resilient, overcontrollers and undercontrollers) and gender on the associations between perceived parental rejection, depression and aggression. Before addressing this final issue, we tested whether the shortened version of Goldberg's Big Five personality questionnaire (Goldberg, 1992) was appropriate for constructing the three personality types. We will now address these issues in more detail.

*What are the associations between perceived parental rejection, depression and aggression during adolescence?*

We demonstrated that perceived parental rejection was associated with high levels of depression and aggression during adolescence. These findings are congruent with previous studies that have also indicated that a problematic relationship with parents could be one of the antecedents of developing problem behaviours (Buehler & Gerard, 2002; Chang et al., 2003; Chen et al., 2000; Forehand & Nousiainen, 1993; Ge et al., 1996; Harold & Conger, 1997; Khaleque & Rohner, 2002; Kim et al., 2003; Koestner et al., 1991; Muris et al., 2001; Nolan et al., 2003; Rapee, 1997; Rothbaum & Weisz, 1994). Parental rejection can lead adolescents to negatively evaluate themselves and their future prospects; evaluations which, in turn, might make them vulnerable to depression (Kim et al., 2003; Nolan et al.,

2003). Additionally, it has been shown that parental rejection tends to increase a child's learning of socially unacceptable behaviour, such as externalizing problem behaviour (Ge et al., 1996; Rothbaum & Weisz, 1994).

We also found clear concurrent associations between depression and aggression in adolescents. This is congruent with a line of research reporting a substantial co-occurrence of adolescents' problem behaviours (e.g., Angold, Costello, & Erkanli, 1999; Krueger, Caspi, & Moffitt, 2000; Overbeek et al., 2001), such as depression and aggression.

*Is the shortened version of Goldberg's Big Five questionnaire appropriate for constructing personality types?*

We demonstrated that the three personality types of Block and Block (1980) can be constructed by means of the shortened version of Goldberg's Big Five questionnaire (Goldberg, 1992). The three personality types (i.e., resilient, overcontrollers and undercontrollers) were very similar to the personality types found in Dubas et al. (2002)'s study, which employed the 100-item version of the Big Five questionnaire. The similarities with findings of other studies were not only present in the Big Five profile of the personality types, but also in the mean level differences of depression and aggression (Asendorpf & Van Aken, 1999; Dubas et al., 2002; Hart et al., 1997; Robins et al., 1996; Van Lieshout et al., 1998).

Since most longitudinal studies contain several questionnaires concerning different concepts, it is important to search for short questionnaires with which the same results can be obtained as with the longer versions. In general, the advantages of using a shortened version are that item redundancy is eliminated and that fatigue, frustration and boredom with repeatedly answering highly similar questions are reduced (e.g., Gosling, Rentfrow, & Swann, 2003). Since we replicated Block and Block's personality types, we suggest that the shortened version (30 items) of Goldberg's Big Five questionnaire can be adequately administered to construct the three personality types instead of the 100-item version.

*Is personality type membership a moderator of the associations between perceived parental rejection, depression and aggression?*

The associations between perceived parental rejection, depression and aggression were moderated by the adolescents' personality type. We found that perceived parental rejection was associated with depression and aggression in most personality type by gender groups; several clear differences between the groups were present.

The largest number of personality type by gender differences were observed concerning the co-occurrence of depression and aggression, indicating that the differences between the personality type by gender groups were most pronounced regarding the co-occurrence of these problem behaviours. Since it has been found that the co-occurrence of internalizing and externalizing problem behaviours occurs most frequently in undercontrollers (Dubas et al., 2002; Van Aken & Dubas, 2004), the fact that the co-occurrence of depression and aggression was most pronounced in the adolescent undercontrollers is in agreement with previous studies. The co-occurrence in undercontrollers could come about by means of failure experiences: undercontrollers are very impulsive and they experience academic as well as behavioural problems, which could be a possible cause for serious conflicts with other people; the negative feelings that are related to these conflicts might cause a depressive mood (Dubas et al., 2002). However, it should be kept in mind that the co-occurrence of depression and aggression in undercontroller boys was as strong as the co-occurrence in overcontroller boys (although the co-occurrence in this group was not significantly different from resilient boys); possibly, this is due to the combination of a vulnerability to depression in overcontrollers with a vulnerability to aggression in boys. This was not present in overcontroller and undercontroller girls. Generally, the co-occurrence of depression and aggression appeared to be more important in eliciting type by gender differences than the associations between perceived parental rejection and problem behaviour: the co-occurrence between depression and aggression was strongest in undercontroller boys and girls.

*Strengths.* A major strength of this study is that combined personality type by gender groups were investigated. Although it is known that the genders differ within the types (Asendorpf & Van Aken, 1999) and that the genders as well as the personality types differed on internalizing and externalizing problem behaviours (e.g., Coie & Dodge, 1998; Dubas et al., 2002; Nolen-Hoeksema, 2001; Robins et al., 1996;), this study is among the first to study this specific interaction. Since we found clear personality type differences (but not the same in both genders) and since we found clear gender differences (in some but not all types), future study into this personality type by gender interaction is warranted. Furthermore, the findings of this study imply that the use of the type by gender groups is especially important in studies concerning the co-occurrence of internalizing and externalizing problem behaviours.

### **6.1.2 Stability and Change in Personality Type Membership and Anxiety in Adolescence (Chapter 3)**

The main purpose of this second study was to examine the associations between personality type membership and anxiety over time. Two issues were addressed in order to meet this purpose. First, stability and change in adolescents' personality type membership were investigated, by means of three stable and six changing personality groups. Second, the associations between changes in personality type membership and changes in anxiety level were studied. The results of these examinations are summarized below.

*What is the stability or changeability of personality type membership during adolescence?*

The personality type membership remained the same for a small majority of adolescents (56.9%), whereas the type membership changed for a significant minority of adolescents (43.1%). Several previous studies also demonstrated a moderate stability in personality type membership (Asendorpf & Van Aken, 2001; Hart et al., 2003; Van Aken & Dubas, 2004). Since adolescence is a period in which several changes occur in many developmental domains (Rice, 1999; Steinberg & Silk, 2002), personality type membership seems to be one of the domains that is prone to change. This implies that not only individual personality dimensions can change (Roberts & DelVecchio, 2000; Roberts, Walton, & Viechtbauer, 2006a, 2006b) but that the constellation of personality dimensions can change as well.

*Is change in personality type membership related to change in anxiety level?*

When examining the three stable personality groups, we demonstrated that if the type membership remained stable, the level of anxiety experienced by adolescents remained stable. Although the three stable personality groups exhibited a significantly different mean level of anxiety (i.e., stable overcontrollers were more anxious than stable resilient and stable undercontrollers; stable undercontrollers were more anxious than stable resilient), their change in anxiety was the same (i.e., no change occurred). Next, when examining the six changing personality groups, we found that if the type membership changed to a personality type prone to internalizing problems, the anxiety level increased (e.g., the resilient-overcontroller group increased in their level of anxiety). The opposite also seemed true: when type membership changed to a type that is less prone to problem behaviour (i.e., resilient), the anxiety level decreased (e.g., the overcontroller-resilient group decreased in their level of anxiety). Furthermore, our findings suggest that when personality changed in the opposite direction, the level of anxiety changed in the opposite direction (e.g., the change in anxiety between the

resilient-overcontroller group (increase) and the overcontroller-resilient group (decrease) differed significantly).

*Additional findings.* We found that adolescents who were overcontrollers (but not resilient) on either wave demonstrated the highest level of anxiety, whereas those who were resilient (but not overcontroller) on either wave demonstrated the lowest anxiety level. This finding suggests that resiliency may be a protective factor in anxiety development. As has been previously found, adolescents who are classified as resilient but not as overcontrollers generally have a better ability to recover from negative events (Olsson, Bond, Burns, Vella-Brodrick, & Sawyer, 2003), which could also help to explain the lower anxiety level of this group.

*Strengths.* Some of the strengths of this study should be pointed out. This is one of the first studies that investigates the co-occurrent associations between change in personality type membership and problem behaviour (i.e., anxiety) in adolescence. This is an important issue since changes in (internalizing) problem behaviour appear to co-occur with changes in personality types, indicating that personality change could lie at the heart of anxiety change; in other words, anxiety development could come about due to changes in the personality profile. Hence, when anxiety changes, several underlying personality characteristics might have changed as well. For example, when the level of anxiety increases, it is likely that personality dimensions such as extraversion (decrease), agreeableness (increase) and emotional stability (decrease) change as well. These findings imply that when 'spontaneous' change in personality types occurs, change in personality could be caused intentionally, e.g., by means of therapy. When these personality dimensions are dealt with properly, the anxiety level could decrease to a normal level. Although it would seem more logical to address the anxiety problems directly, which could be done effectively by means of cognitive-behaviour therapy, the advantage of trying to establish some changes in personality could prevent the origins of other problems within the anxiety or even within the internalizing spectrum. However, two remarks should be made. First, the effects of therapy for personality disorders are not very promising in this regard, but changes in personality may be established more easily in relatively normal adolescents; second, since changes in personality and anxiety were studied at the same time, it is also possible that changes in anxiety have an impact on change in personality instead of the reverse.

### **6.1.3 Co-occurrence of Depression and Delinquency in Personality Types (Chapter 4)**

The main goal of the third study was to examine whether personality moderated the longitudinal associations between depression and delinquency. In order to meet this goal, we addressed three issues. First, we constructed three stable personality groups and validated these groups by means of their levels of problem behaviour. Next, we investigated which of three co-occurrence models, namely stability, acting out or failure, was able to explain the co-occurrence of depression and delinquency best during adolescence. Finally, we assessed whether the longitudinal associations between depression and delinquency differed between the stable personality groups.

#### *Validation of three stable personality groups*

We demonstrated that the longitudinal personality group differences found in this study were similar to those found in previous cross-sectional studies (e.g., Asendorpf & Van Aken, 1999; Dubas et al., 2002; Robins et al., 1996): the stable overcontrollers showed the highest mean level of depression over time and the stable undercontrollers showed the highest mean level of delinquency over time. The stable resilienters exhibited the lowest mean level of both problem behaviours, representing the most preferable psychosocial adjustment compared to the other two personality groups. Comparable results were also found in a longitudinal study by Van Aken and Dubas (2004). By using a highly specific sample, such as this one (only adolescents who were classified consistently over time), we created a very strong validation of the personality types in general: when adolescents are classified in the same personality type on each wave, they also maintain the same level of internalizing and externalizing problem behaviours over time.

Furthermore, we found that the development of the problem behaviours did not differ between the three stable personality groups. This implies that although the level of depression and delinquency differed between the stable personality groups, as pointed out above, the development of the problem behaviours was the same (i.e., stable) for each personality group.

#### *What is the nature of the longitudinal associations between depression and delinquency in adolescence?*

We demonstrated that depression and delinquency co-occurred in adolescence. Additionally, we found that the longitudinal co-occurrence of depression and delinquency was best described in a stability model, as was also found by Overbeek et al. (2001). This means that the co-occurrence of depression and delinquency could be due to non-specific risk factors, such as family history of

criminal offending, poor parent-child relationships or negative life events (Fergusson, Lynskey, & Horwood, 1996), that lead to separate but associated problem behaviours. Possibly, certain aspects of personality could constitute other risk factors: the degree of ego-control could be a possible common risk factor that either leads to internalizing (high level of ego-control) or to externalizing (low level of ego-control) problem behaviour.

*Is personality type membership a moderator in the co-occurrence of depression and delinquency?*

Depression and delinquency clearly co-occurred in the three stable personality groups. The co-occurrence was larger in the stable resilients than in the stable overcontrollers and undercontrollers, implying that the co-occurrence of (the low levels of) depression and delinquency is larger in resilients than the co-occurrence of (the higher levels of) depression and delinquency in overcontrollers and undercontrollers. The personality group differences on this co-occurrence could be due to the fact that the amount of non-specific risk factors is different (i.e., lower) in resilients compared to the amount of non-specific risk factors in the other personality types (Hart et al., 2003).

*Additional findings.* In addition to the clear personality group differences in the co-occurrence of depression and delinquency, we found clear personality group differences in the longitudinal stability of both depression and delinquency. In combining rank-order with mean-level stability, the low mean levels of depression and delinquency were stable over time in resilients. Since ego-resiliency is related to stability in the overall environment (Asendorpf & Van Aken, 1991) and since resilients have a higher level of ego-resiliency by definition than the other types, the overall environment of resilients is expected to be more stable than the overall environment of overcontrollers and undercontrollers. Therefore, the stability of depression and delinquency could be more pronounced in resilients.

The stable overcontrollers and stable undercontrollers demonstrated specific but opposite patterns of longitudinal stability of internalizing and externalizing problem behaviour. In combining rank-order with mean-level stability, the overcontrollers demonstrated a particular internalizing pattern of problem behaviour; the undercontrollers demonstrated a particular externalizing pattern of problem behaviour. Hence, these two personality groups have the exact opposite longitudinal pattern of problem behaviour, which could be explained as follows: overcontrollers and undercontrollers are similar in their (low) level of ego-resiliency, but they differ markedly in their level of ego-control (high and low respectively). Hart et al. (2005) found that although overcontrollers and

undercontrollers are remarkably similar in terms of physiological and cognitive processes, which could be due to their low levels of ego-resiliency (Asendorpf & Van Aken, 1999; Robins et al., 1996), they differ radically at the behaviour level (Hart et al., 2005), which could be due to their markedly different levels of ego-control, namely high for overcontrollers and low for undercontrollers (Asendorpf & Van Aken, 1999; Robins et al., 1996). In this respect, ego-control, and not ego-resiliency, might play an important role in explaining the opposite patterns of problem behaviours over time.

Additionally, the rank-order stability of the problem behaviour to which a specific personality group was most prone increased with age during adolescence. More specifically, the stable overcontrollers are prone to depression (Dubas et al., 2002; Robins et al., 1996): the middle adolescent overcontrollers demonstrated a higher rank-order stability in depression than early adolescent overcontrollers. Furthermore, the stable undercontrollers are more prone to delinquency (Dubas et al., 2002; Robins et al., 1996): the middle adolescent undercontrollers demonstrated a higher rank-order stability in delinquency than early adolescent undercontrollers. These findings are consistent with studies on trait consistency, which claim that traits become increasingly consistent with age (Roberts & DelVecchio, 2000).

*Strengths.* The current study provided new insights into the nature of the co-occurrence of internalizing and externalizing problem behaviours and the study of personality types. This study is among the first to (1) demonstrate that adolescents' personality type is an important moderating variable in the longitudinal co-occurrence of problem behaviours, and to (2) combine rank-order consistencies (structural equation modelling) with mean level consistencies (repeated measures analyses) on internalizing and externalizing problem behaviours. Examining the associations between depression and delinquency is relevant because it has implications for the current debate about the co-occurrence of internalizing and externalizing psychopathology: depression and delinquency do not affect each other over time in a sample of adolescents whose personality was classified consistently, but non-specific risk factors probably caused the development of both problem behaviours. Hence, depression and delinquency can occur at the exact same time in adolescents, but these problem behaviours do not necessarily constitute a risk factor for each other. One of the possible non-specific risk factors that could cause both depression and delinquency is the (high or low) level of ego-control.

#### **6.1.4 Longitudinal Relations between Big Five Personality Characteristics and Problem Behaviour in Adolescence (Chapter 5)**

The main goal of the fourth study was to examine the longitudinal associations between the Big Five personality dimensions on the one hand and the problem behaviours aggression and anxiety on the other. In order to meet the goal of this study, we addressed two issues. First, we investigated whether adolescents' personality was hierarchically superior to problem behaviour over time. Second, we examined whether the hierarchical superiority of personality over problem behaviour was more present in older than in younger adolescents.

In contrast to the previous studies, we now focus on the variable-centred approach, since every new measurement wave added extra opportunities for the adolescents' personality type membership to change (in a 3 wave study 27 changes in personality type membership are possible, whereas in a 4 wave study 81 changes are possible). Additionally, the large number of personality groups would most probably contain a small number of adolescents, eliciting small power. Therefore, we decided to focus on personality dimensions instead of personality type membership in this 4-wave longitudinal study.

*What are the longitudinal associations between the Big Five personality dimensions and problem behaviours during adolescence?*

The reported associations between the Big Five dimensions and problem behaviours were in agreement with those reported in previous studies: extraversion, agreeableness, and emotional stability were found to be negatively related to anxious feelings (Ehrler et al., 1999; Ferguson, 2000). Thus, a high level of extraversion, agreeableness or emotional stability is associated with a low level of anxious feelings. Furthermore, agreeableness was positively related to aggression (Asendorpf & Van Aken, 2003b; Caprara et al., 1996; Ehrler et al., 1999; Lounsbury et al., 2004; Lounsbury et al., 2003), whereas conscientiousness and emotional stability were negatively related to aggression (Asendorpf & Van Aken, 2003b; Caprara et al., 1996; Lounsbury et al., 2004; Lounsbury et al., 2003; Scher & Osterman, 2002), implying that a high level of agreeableness is associated with a high level of aggression and that a high level of conscientiousness or emotional stability is associated with a low level of aggression. Additionally, agreeableness, conscientiousness and openness were found to be positively associated with withdrawal from aggression. The personality dimensions agreeableness, conscientiousness and openness (Caspi, Roberts, & Shiner, 2005) as well as withdrawal from aggression all represent mature behaviour.

*Is personality hierarchically superior to problem behaviour during adolescence?*

In order to answer this question we had two assumptions. The first stated that the rank-order stabilities of the Big Five personality dimensions should be stronger than the rank-order stabilities of the aggressive and anxious problem behaviours. The findings of this study were in agreement with this assumption. The second assumption stated that personality should be a better predictor of problem behaviour than the reverse. However, the findings of this study were not in line with the second assumption; we found that personality was not hierarchically superior to problem behaviour.

Our outcomes are in congruence with the spectrum hypothesis as explained by Krueger and Tackett (2003). The spectrum hypothesis claims that similar personality dimensions and problem behaviours exist on a spectrum or a continuum ranging from personality dimensions to problem behaviours (Krueger & Tackett, 2003; Shiner, 2003). Our findings indicated 18 possible continua between specific personality dimensions and problem behaviours. For example, a possible continuum was present ranging from extraversion to panic symptoms; since the relation between extraversion and panic symptoms is negative, this means that in the extension of a high level of extraversion lies a low level of panic symptoms. Also, some general continua could be present, since some personality dimensions were associated with all the aggressive or anxious problem behaviours we studied. These broad continua could be present for extraversion and anxiety, for agreeableness and aggression, and for emotional stability and anxiety.

*Is the hierarchical superiority of personality to problem behaviour more present in older than in younger adolescents?*

Although the first assumption about the rank-order stability of personality being larger than the rank-order stability of the problem behaviours was met in a small majority in both age groups, the second assumption about the prediction from personality to problem behaviour being larger than the reverse was rejected. In conclusion, we neither demonstrated a hierarchical superiority of personality to problem behaviour in early and middle adolescents nor was this superiority more present in older than in younger adolescents.

*Additional findings.* Instead of a hierarchical superiority, we found systematic patterns between the wave 1 correlations and correlated change associations of personality and problem behaviour. Since the direction of the correlated change associations was in most cases the same as the wave 1 correlations, the direction of these associations was stable over time. This implies that during adolescence the

co-occurrence of the Big Five personality dimensions and problem behaviours is stable over time.

Furthermore, the stabilities of extraversion and emotional stability were higher in middle than in early adolescents, as well as the stabilities of panic symptoms and separation anxiety symptoms. Since these stabilities were larger in middle than in early adolescents, these findings support the idea that adolescence is a formative period in life.

Additionally, the stability of agreeableness was lower in middle than in early adolescents. This could imply that the rank-order stability of agreeableness decreases during adolescence. Therefore, agreeableness could be more of a surface characteristic instead of a core personality characteristic. Remarkably, according to the hierarchical superiority assumptions (Asendorpf & Van Aken, 2003a; Neyer & Asendorpf, 2001) Generalized Anxiety Disorder (GAD) seemed hierarchically superior to the personality dimensions. This could imply that GAD is more of a core characteristic instead of a surface characteristic.

Finally, although the personality dimension openness is the most debated and least understood dimension of the Big Five (Caspi, Roberts, & Shiner, 2005), at least with regard to its associations with problem behaviour, we found that adolescents changing in openness are likely to change in withdrawal as well. Since it is known that openness increases during adolescence (Roberts, Walton, & Viechtbauer, 2006), withdrawal from aggression is likely to increase as well, indicating a more mature reaction to being angry at peers in open adolescents. Possibly, open adolescents who are angry at a friend are more creative (Shiner, 2005) in solving problems with that friend compared to less open adolescents.

*Strengths.* In sum, chapter 5 contains a longitudinal study of Big Five dimensions and problem behaviours in a full recursive design which is the first of its kind. Important strengths of this study are that the longitudinal associations between the Big Five personality dimensions and aggressive and anxiety problem behaviours are investigated in a large sample of the general adolescent population. Furthermore, few studies have investigated personality using all Big Five dimensions during adolescence (Roberts & DelVecchio, 2000) and no study has yet investigated the longitudinal relations between the Big Five dimensions and problem behaviours in a full recursive design.

Finally, we will end this paragraph by providing an overview of the main findings. The main findings of this dissertation can be found in Table 6.1.

**Table 6.1.** Summary of the Main Findings of this Dissertation

Chapter 2	<ul style="list-style-type: none"> <li>▪ Perceived parental rejection was associated with high levels of depression and aggression during adolescence; these associations were moderated by personality type by gender groups.</li> <li>▪ The co-occurrence between depression and aggression was most pronounced in undercontroller boys and girls.</li> </ul>
Chapter 3	<ul style="list-style-type: none"> <li>▪ The personality type membership remained the same for a small majority of adolescents, whereas the type membership changed for a significant minority of adolescents.</li> <li>▪ When the type membership remained stable, the level of anxiety experienced by adolescents remained stable. When the type membership changed to a type prone to internalizing problems, the anxiety level increased; and, when the type membership changed to a type less prone to internalizing problems, the anxiety level decreased.</li> </ul>
Chapter 4	<ul style="list-style-type: none"> <li>▪ The longitudinal co-occurrence of depression and delinquency was best described in a stability model, implying that it could be due to non-specific risk factors. One possible risk factor in this regard is the level of ego-control. Adolescent resilients demonstrated the strongest co-occurrence of depression and delinquency.</li> <li>▪ The stable overcontrollers and undercontrollers demonstrated specific but opposite patterns of longitudinal stability of internalizing and externalizing problem behaviour, possibly due to their markedly different levels of ego-control.</li> </ul>
Chapter 5	<ul style="list-style-type: none"> <li>▪ The associations between the Big Five dimensions and problem behaviours in adolescence can be best explained by means of the spectrum hypothesis.</li> <li>▪ Agreeableness could be more of a surface characteristic, whereas Generalized Anxiety Disorder could be more of a core characteristic.</li> </ul>

## 6.2 General Discussion

In this dissertation, the development of adolescents' personality and the development of adolescents' problem behaviours were two key subjects. We will integrate the findings on these subjects below, starting with the development of personality and problem behaviour and closing with the associations between both subjects.

### 6.2.1 The Development of Personality in Adolescence

*Development of personality types.* First, we investigated whether personality by means of personality types developed during adolescence. Although we studied the personality types of the adolescents only cross-sectionally in chapter 2, we examined the stability and change of the personality types in a two-wave (Chapter 3) and a three-wave longitudinal study (Chapter 4). In chapter 3, we demonstrated that the adolescents' personality type membership was only moderately stable; only a small majority of the adolescents (56.9%) had the same personality type classification on both waves. This is in agreement with previous studies

(Asendorpf & Van Aken, 1999; Hart et al., 2003). In chapter 4, we found that the stability of personality type membership was even lower (about 30% of the sample was classified with the same personality type), which is also congruent with previous research (Van Aken & Dubas, 2004). Obviously, the percentage of the stability of personality type membership is lower in the 3-wave study, since every additional measurement wave creates an extra opportunity for adolescents to change their personality type membership. These findings imply that personality type membership can change during adolescence. Although it was already known that personality dimensions could change in their rank-order and mean-level continuity over time (e.g., Roberts & DelVecchio, 2000; Roberts, Walton, & Viechtbauer, 2006), we now demonstrated that the constellation of adolescents' personality dimensions (as measured by means of personality type membership) is also prone to change. This is in agreement with previous studies on the change of personality type membership (Asendorpf & Van Aken, 1999; Hart et al., 2003; Van Aken & Dubas, 2004), although it was not yet demonstrated during adolescence.

*Development of personality dimensions.* Second, we investigated the development of personality during adolescence by means of personality dimensions. The development of personality dimensions was examined in two ways: by means of their rank-order stability and by means of their mean-level stability. In chapter 3, we examined the rank-order stability in a 2-wave longitudinal study and tested whether the stability differed between early and middle adolescents. We found that the 1-year stability of extraversion, conscientiousness, emotional stability and openness increased during adolescence, whereas the stability of agreeableness did not change. Furthermore, we compared the 3-year stability of the Big Five dimensions between early and middle adolescents (Chapter 5) and we found that the stability of extraversion and emotional stability increased during adolescence, whereas the stability of agreeableness decreased. Since both studies indicated that the rank-order stability during adolescence was not the same for all Big Five dimensions, these findings are in line with the idea of differential stability of the Big Five dimensions (Roberts & DelVecchio, 2000; Vaidya, Gray, Haig, & Watson, 2002). In the studies of Roberts and DelVecchio (2000) and Vaidya and colleagues (2002), extraversion appeared to be the most stable dimension of the Big Five. In our study, extraversion was not the most stable dimension. For example, in chapter 3 conscientiousness was the most stable dimension in both early and middle adolescents. In early adolescents, the rank-order stability of extraversion was lower than the stability of conscientiousness and openness, whereas in middle adolescents the stability of extraversion was only lower than conscientiousness. Since Roberts and DelVecchio

(2000) and Vaidya et al. (2002) found extraversion to be the most stable dimension in adulthood, our findings might indicate that the stability of extraversion develops from a moderately stable dimension during adolescence to a highly stable personality dimension in adults. These findings are also supported by research on children's temperament: although the temperamental dimensions 'activity level' and 'approach' were related to extraversion in adulthood, these dimensions did not demonstrate the highest stability during childhood; moreover, activity level was found to have one of the lowest stabilities (Roberts & DelVecchio, 2000). Taken together, this might indicate that the stability of extraversion develops (i.e., increases) from childhood and adolescence to adulthood.

Additionally, our findings show that the Big Five dimensions do not only have different stabilities during adolescence, they also appear to have a differential development. For example, the stability of extraversion appears to increase, whereas the stability of agreeableness seems to decrease. This would take the idea about differential stability (Roberts & DelVecchio, 2000; Vaidya et al., 2002) one step further, namely to a differential rank-order *development* of the Big Five dimensions, particularly during specific life periods such as adolescence. The present study is the first to suggest a differential development of the Big Five.

In addition to the rank-order stability of personality dimensions, we investigated the mean-level stability in a 2-wave longitudinal study (Chapter 3). The level of agreeableness and openness appeared to increase during adolescence, whereas the level of extraversion and emotional stability decreased. In a meta-analysis by Roberts, Walton and Viechtbauer (2006), it was found that the dimensions social dominance (facet of extraversion), emotional stability and openness increased during adolescence, which is only partly in agreement with our findings. In addition, we found that the mean level change in each Big Five dimension did not differ between early and middle adolescents. Thus, although the mean levels of the dimensions differed between early and middle adolescents, the mean-level change did not differ, implying that the development of the Big Five dimensions was the same for both age groups. However, this findings could be due to the fact that only 2- and 3-wave studies were used; when more measurement waves or larger time intervals between the waves were used or when a comparison was made with another age group, such as young adults, age group differences on the development of the Big Five dimensions could be more apparent.

Notably, these findings again indicate that rank-order stability provides different information about personality stability than mean-level stability (Roberts & DelVecchio, 2000). For example, the rank-order stability of extraversion and emotional stability increased during adolescence (Chapters 3 and 5), whereas the

mean-level stability of these dimensions decreased (Chapter 3). When combining these findings, this implies that although the mean-level of these dimensions decreases during adolescence, the degree to which adolescents' relative position does not change over time increases.

*Overall, we can conclude that adolescents' personality is in development. We examined personality development by means of a person-centred and a variable-centred approach. When applying the person-centred approach, we demonstrated that a large amount of adolescents changed their personality type membership. When applying the variable-centred approach, several Big Five personality dimensions were found to change both in rank-order and mean-level continuity.*

### **6.2.2 The Development of Problem Behaviour in Adolescence**

The second key subject that was investigated in this dissertation is the development of problem behaviours during adolescence. First, we will describe the findings on internalizing problem behaviours, then we will report our findings of the externalizing problem behaviours.

*Internalizing problem behaviours.* The internalizing problem behaviours studied here were depression and anxiety. We investigated depression cross-sectionally (Chapter 2) as well as longitudinally (Chapter 4). In the cross-sectional study the depression level was higher in girls than in boys. In the longitudinal study, the depression level appeared also higher in girls than in boys (although not significantly). These findings are in agreement with Nolen-Hoeksema (2001), who reports that the level of depression is higher in girls than in boys; however, Kovacs (2001) claims that the gender differences are not always apparent. We did not find any significant differences between the age groups (Chapter 4), which means that the level of depression did not differ between early and middle adolescents over three waves.

Additionally, the development of anxiety was investigated (Chapter 3). We found that the anxiety level was higher in girls than in boys, which is line with previous studies (Hale et al., 2005; Muris, de Jong, & Engelen, 2004; Norton et al., 2000). We did not find any age group differences, implying that the anxiety level is the same in early and middle adolescence. Although some studies did report significant age group differences (Verhulst & Verheij, 2000; Wenar & Kerig, 2000), others did not find significant age group differences in adolescence (Allsopp & Williams, 1991). Possibly, finding age group differences on anxiety depends on the specific anxiety symptoms under study. For example, when studying separation anxiety a decrease is expected, whereas investigating social anxiety an increase is

more likely to be found during adolescence (Craske, 1997). Since a general level of anxiety was studied in this dissertation, the specific changes in several anxiety symptoms could level each other out, which might explain why we did not find any significant differences between early and middle adolescents.

*Externalizing problem behaviours.* In addition to studying the development of internalizing problem behaviours, we investigated the development of externalizing problem behaviours. We investigated two externalizing problem behaviours, namely aggression, in a cross-sectional (Chapter 2) and a 4-wave longitudinal study (Chapter 5), and delinquency, in a 3-wave longitudinal study (Chapter 4). Although aggression was studied longitudinally in chapter 5, we did not report any mean level development since we focused exclusively on the rank-order stability in that study. Although Bongers et al. (2003) and Coie and Dodge (1998) found an increase in delinquency during adolescence, we did not find that the delinquency level was higher in middle than in early adolescents. Next, boys were found to have a higher level of aggression and delinquency than girls, which is in agreement with previous research (Coie & Dodge, 1998; Compas, Hinden, & Gerhardt, 1995). We also investigated whether early and middle adolescents differed in their level of delinquency, but this was not the case.

Additionally, we investigated whether interactions between the development of the four problem behaviours and gender or age occurred, but none of these interactions were significant. This implies that the development of these problem behaviours was the same for both genders or age groups, which contrasts the findings of Bongers et al. (2003). Furthermore, we did not study gender by age by personality type interactions, since these groups would have too little power due to their small sizes (Kline, 1998).

In addition to studying the abovementioned problem behaviours solitarily, we examined whether internalizing and externalizing problem behaviours co-occurred during adolescence. We studied the co-occurrence of depression and aggression cross-sectionally (Chapter 2) and the co-occurrence of depression and delinquency longitudinally (Chapter 4). First of all, we clearly demonstrated that the co-occurrence of internalizing and externalizing problem behaviours was present, even in a general population of adolescents, which is in agreement with the results of a study reported by Overbeek et al. (2001). Second, an important finding of the co-occurrence of depression and aggression was that it was significantly larger in boys than in girls; remarkably, this gender difference was found in all personality types (Chapter 2). Possibly, the depressive feelings that underlie aggressive behaviour in boys are acted out (e.g., Ben-Amos et al., 1992; Gold, Mattlin, & Osgood, 1989). Third, we found that the co-occurrence of depression and

delinquency was best described by a stability model (in a highly specific sample of adolescents with a stable personality type over three waves; Chapter 4), indicating that the co-occurrence of depression and delinquency originates due to non-specific risk factors that lead to separate but associated problem behaviours (Krueger, 1999; Krueger, Caspi, Moffitt, & Silva, 1998; Vollebergh, Iedema, Bijl, De Graaf, Smit, & Ormel, 2001). Hence, depression and delinquency do not constitute risk factors for each other, as would be expected on the basis of an acting out or a failure model, but non-specific risk factors may cause both internalizing as well as externalizing problem behaviours. These findings could have implications for research and practice in psychopathology: according to the DSM-IV-TR (American Psychiatric Association, 2000), aggression is a possible consequence of depression, but in this dissertation no proof was found for this association over time. Several studies reported similar conclusions in both non-clinical and clinical samples, assuming the association between internalizing and externalizing problem behaviours to originate due to non-specific risk factors (e.g., Fergusson, Lynskey, & Horwood, 1996; Krueger & Markon, 2006; Overbeek et al., 2001).

*Generally, we found that girls showed higher levels of internalizing problem behaviours, whereas boys demonstrated higher levels of externalizing problem behaviours. Early and middle adolescents did not differ on the mean level of these problem behaviours. Furthermore, the development of these problem behaviours was the same for boys and girls or for early and middle adolescents. Finally, the co-occurrence of internalizing and externalizing problem behaviours was clearly present in adolescence; both problem behaviours appeared to not constitute risk factors for each other.*

### **6.2.3 The Development of Personality and Problem Behaviour in Adolescence**

*Development of personality types and problem behaviour.* We investigated whether stability and change in personality types were associated with problem behaviours. In chapters 2, 3 and 4 we examined whether the personality types differed in their mean levels of several problem behaviours; in chapters 2 and 4 we investigated whether the personality types differed on the co-occurrence of several problem behaviours.

When comparing the (stable) personality groups on the mean levels of internalizing and externalizing problem behaviours, we found that overcontrollers scored highest on anxiety and depression (Chapters 2, 3 and 4) and that undercontrollers scored highest on aggression and delinquency (Chapter 2 and 4); the resilients scored lowest on these problem behaviours. These findings are in agreement with the findings of previous studies (e.g., Asendorpf & Van Aken, 1999; Dubas et al., 2002; Robins et al., 1996). Also, considerable differences emerged

between adolescents with a stable personality and adolescents with a changing personality regarding their mean-levels of problem behaviour (Chapters 3 and 4). When comparing the combined stable personality groups (i.e., stable resilient, stable overcontrollers *and* stable undercontrollers) with the combined changing personality groups (Chapter 4), it appeared that the changing adolescents were somewhat less well-adjusted than the stable personality groups: e.g., the level of delinquency was higher in the changing groups compared to the stable groups. Furthermore, we found that when adolescents maintained their personality type membership over time, their mean level of problem behaviour remained the same as well (Chapters 3 and 4). However, when adolescents changed in personality types membership, the level of problem behaviour also changed; for example, when adolescents changed from a personality type that was not prone to internalizing behaviour (resilient) to a personality that was prone to internalizing problem behaviour (overcontroller), the level of internalizing problem behaviour increased (Chapter 3).

When comparing the personality types on the longitudinal rank-order stabilities of problem behaviours considerable personality type differences were found (Chapter 4). The longitudinal stability of depression as well as of the longitudinal stability of delinquency was highest in resilient. Combining the high rank-order stability with the low mean levels on depression and delinquency in resilient, this implies that the low mean levels are stable over time. Resilient are known to resist delinquent behaviour and not to be prone to develop a depressive mood. This may be due to the fact that they have the best resources to recover from negative events (Olsson, 2003) and that they have the ability to adapt to and to succeed in difficult contexts (Hart et al., 1997). However, overcontrollers and undercontrollers demonstrated other patterns of problem behaviour that seemed opposites of each other. More specifically, the overcontrollers were found to have an internalizing pattern of problem behaviour: they demonstrated a high mean level and a moderate rank-order stability on depression, whereas the mean level and rank-order stability on delinquency were low. Furthermore, the undercontrollers had an externalizing pattern of problem behaviour: they demonstrated a high mean level and a moderate rank-order stability on delinquency, whereas the mean level and rank-order stability on depression were low. This pattern of opposites could be explained as follows. Hart et al. (2005) found that although overcontrollers and undercontrollers are remarkably similar in terms of physiological and cognitive processes, which could be due to the similarity in the level of ego-resiliency (Asendorpf & Van Aken, 1999; Robins et al., 1996), they radically differ at the behaviour level (Hart et al., 2005), which could be due to their markedly different levels of ego-control, namely high for

overcontrollers and low for undercontrollers (Asendorpf & Van Aken, 1999; Robins et al., 1996). In this respect, ego-control may play an important role in explaining the opposite patterns of the problem behaviours over time, especially for the personality groups that do not respond flexibly to their environment, such as the overcontrollers and undercontrollers. Possibly, the level of ego-control is one of the common risk factors that could either lead to internalizing or to externalizing problem behaviours. Although the mean level differences of personality types on problem behaviours are well-established in previous studies (Asendorpf & Van Aken, 1999; Dubas et al., 2002; Hart et al., 1997; Robins et al., 1996), this is the first study in which the personality types are compared on the rank-order stability of internalizing and externalizing problem behaviours.

When comparing the personality types on the co-occurrence of depression and aggression, we found that the co-occurrence was larger in undercontrollers than in resilient; this is in agreement with the results of Van Aken et al. (2002)'s study. It is known that undercontrollers are very impulsive and have academic and behavioural problems, which could be a possible cause for conflicts with others. The negative feelings that are related to these conflicts may cause the undercontrollers to feel depressed (Dubas et al., 2002). This personality type difference was present in both genders, although the difference between undercontrollers and resilient was much smaller for boys than for girls. However, when comparing the personality groups on the longitudinal co-occurrence of depression and delinquency (Chapter 4), the co-occurrence was stronger in resilient than in overcontrollers and undercontrollers. Combining the high rank-order stability with the low mean levels of depression as well as delinquency in resilient, the low levels of depression and delinquency co-occur in resilient. It should be pointed out that the two chapters that report on the personality group differences regarding the co-occurrence of depression and aggression or delinquency are not the same. Several differences in the design of the two studies could account for the differences in the findings; e.g., (a) in chapter 2, a cross-sectional study is conducted, which consists of a large group of adolescents whose personality type is measured on one wave only; in chapter 4, a 3-wave longitudinal study is performed, which consists of a select group of adolescents, whose personality type was stable over three waves, and (b) in chapter 2, the co-occurrence of depression and aggression was examined, whereas in chapter 4 the co-occurrence of depression and delinquency was investigated. However, both studies indicate that the co-occurrence of internalizing and externalizing problem behaviours is clearly present in adolescence and that clear personality group differences emerged on this co-occurrence.

*Closing the door on the personality type debate.* We demonstrated that clear differences between the personality types were present on internalizing and externalizing problem behaviours; both cross-sectionally as well as longitudinally, both in mean-level as well as in rank-order stability. Furthermore, clear differences between stable and changing personality types were found. According to the findings of this dissertation, and a series of previous studies (e.g., Asendorpf & Van Aken, 1999; Dubas et al., 2002; Hart et al., 1997; Robins et al., 1996), the importance of the personality types is proven once again. Consequently, the debates about whether or not the personality types based on the work of Block and Block (1980, 2006) are reliable and can be replicated, whether or not the personality types are really present in the adolescent population or whether or not it would be better to focus on personality dimensions exclusively (see Asendorpf, 2006; McCrae et al., 2006a, 2006b for a recent debate), should not cause research on personality types to cease. Obviously, researchers should continue extending research on personality types as such (see §6.4 for some suggestions), but the descriptive efficiency, the conceptual clarity and the usefulness as moderators (Robins & Tracey, 2003) are unquestionably established. Therefore, we are confident that in extending research on personality, it is obviously worthwhile to study personality types.

*Development of personality dimensions and problem behaviour.* In chapter 5, the cross-sectional associations between the Big Five dimensions and anxiety and aggression were investigated. These findings were in concordance with the results of previous studies (Asendorpf & Van Aken, 2003b; Caprara et al., 1996; Caspi, Roberts, & Shiner, 2005; Ehrler et al., 1999; Ferguson, 2000; Lounsbury et al., 2004; Lounsbury et al., 2003; Scher & Osterman, 2002). In addition, the relations between personality and problem behaviour were studied in depth by examining whether personality was hierarchically superior to problem behaviour during adolescence. Our findings appear to be incongruent with the hierarchical superiority hypothesis (Asendorpf & Van Aken, 2003a; Neyer & Asendorpf, 2001), which assumes personality to be more stable than problem behaviour and it assumes personality to be more predictive of problem behaviour than the reverse. Instead, our findings are more in line with the spectrum hypothesis (Krueger & Tackett, 2003; Shiner, 2003), which assumes that problem behaviour is an extreme manifestation of personality. We suggested several spectra or continua between personality dimensions and problem behaviours (see §6.1.4 for a detailed description). In extension of these findings, future studies should investigate whether specific personality disorders form an extreme end of specific personality dimensions and whether specific psychopathological disorders form extreme ends of specific

problem behaviours, by means of which broad continua come about. For example, a high level of the antisocial personality disorder (APD) could be related to a low level of the personality dimension agreeableness (Derefinko & Lynam, 2006; Jakobwitz & Egan, 2006), which is related to a high level of the problem behaviour direct aggression (Chapter 5), which in turn is related to a high level of the psychopathological disorder oppositional defiant disorder (ODD; Kempes, Matthys, De Vries, & Van Engeland, 2005), indicating a broad continuum between APD and ODD.

At the end of this general discussion, we would like to point out some remarkable results. First of all, we found clear personality type by gender differences on the association between parental rejection and problem behaviour (Chapter 2), which were only present in the personality type or gender that was most prone to that specific problem behaviour: e.g., the association between perceived parental rejection and depression was larger in female than in male overcontrollers: this gender difference occurred exclusively in the personality type that was most prone to depression (i.e., overcontrollers); and, the association between perceived parental rejection and aggression was smaller in overcontroller than in resilient boys: this personality type difference occurred in the gender that was most prone to aggression (i.e., boys). Second, we found that when adolescents changed from a personality type that was prone to internalizing behaviour (overcontroller) to a personality that was not prone to internalizing problem behaviour (resilients), the level of internalizing problem behaviour decreased and vice versa (Chapter 3). Third, we found a clear internalizing problem behaviour pattern in the personality type that was the most vulnerable to internalizing problem behaviours (overcontrollers) and a clear externalizing pattern in the personality type that was the most vulnerable to externalizing problem behaviours (undercontrollers). Fourth, and finally, the rank-order stability increased in the problem behaviour to which a specific personality type was most prone: the middle adolescent overcontrollers demonstrated a higher rank-order stability on depression than the early adolescent overcontrollers, whereas the middle adolescent undercontrollers demonstrated a larger rank-order stability on delinquency than the early adolescent undercontrollers (Chapter 4).

These findings seem congruent with the corresponsiveness principle (Roberts, Caspi, & Moffitt, 2002). The corresponsiveness principle states that the most likely effect of life experience on personality development is to deepen the characteristics that lead people to those experiences in the first place (Roberts, Caspi, & Moffitt, 2002). This principle links two mutually supportive life-course dynamics, namely 'social selection', by means of which people select environments that are linked to

their personality dimensions, and ‘social influence’, by means of which environmental experiences affect personality functioning (Caspi, Roberts, & Shiner, 2005). Although this principle links personality with social relationships, it may also apply to the association between personality types and problem behaviour. For instance, undercontrollers (i.e., relatively low on agreeableness and conscientiousness) might search friends with similar personality characteristics (social selection). The social interactions with their friends could influence the social interaction style which leads to a hostile attributional style, hostility and aggressiveness in social encounters (social influence), leading to further deepening of the personality characteristics. Similarly, overcontrollers (i.e., low on extraversion and emotional stability) are known to be introverted and socially withdrawn (Van Aken, Van Lieshout, Scholte, & Haselager, 2002) and are thus unlikely to visit public places (social selection). Consequently, not meeting other people implies not improving their social skills (social influence), possibly leading to more introversion and social withdrawal, consequently deepening their overcontroller characteristics. The principle of correspondiveness is important as it highlights the fact that individuals will have their own unique developmental trajectory based in part on their own personality. The type of change that people demonstrate will often grow out of their individuality and will therefore be somewhat predictable. People tend to build a personal niche that fits with their values, goals and personality dimensions (Roberts et al., 2003). The abovementioned findings seem congruent with the correspondiveness principle.

*Overall, the differences between resilient, overcontrollers and undercontrollers on internalizing and externalizing problem behaviours were in agreement with previous studies. The longitudinal stability of depression and delinquency was highest in resilient; overcontrollers and undercontrollers demonstrated specific but opposite patterns on the longitudinal stability of these problem behaviours, possibly due to their markedly different levels of ego-control. The longitudinal co-occurrence of internalizing and externalizing problem behaviours elicited clear differences between the personality types. Finally, the spectrum hypothesis explained the associations between the Big Five dimensions and the problem behaviours most adequately.*

### **6.3 General Limitations**

Some limitations need to be pointed out. Although each chapter already addressed some limitations, we will focus on some general limitations here. First of all, our findings on personality and problem behaviours were solely based on adolescent self-reports, which could result in biased answers and in shared method

variance. Obviously, collecting data from multiple informants would improve our understanding of the associations between personality and problem behaviour. However, since personality and internalizing behaviours might be more difficult to observe by others (Achenbach, McConaughy, & Howell, 1987), we were specifically interested in the feelings and opinions of adolescents themselves (O'Connor & Dvorak, 2001). This is the main reason why we also asked adolescents themselves about their externalizing problem behaviour and their perception of parental rejection. Consequently, we do not know whether the parents themselves felt they rejected their child. But, as noted by Dekovic et al. (2005), parents have been found to elicit a strong positive bias of their own upbringing behaviours and demonstrate less agreement with outside observers than adolescents have (Cook & Goldstein, 1993). Furthermore, the subjective experience of being 'brought up' has more influence on adolescent development (Steinberg et al., 1992) and is more strongly related to adolescent adjustment and mental health than parents' reports of their upbringing behaviours (Gesac & Schwalbe, 1986; Noller, 1995). Furthermore, it is the perception of others' attitude or behaviour which is more consequential for our own attitudes and behaviour than the actual attitudes or behaviour of others (Gesac & Schwalbe, 1986). Therefore, we would suggest that our use of the adolescent reports of parental rejection is justified. Finally, the shared method variance, that might be present due to solely relying on self-reports, was reduced by using path analyses (Chapters 4 and 5). Because cross-paths control statistically for the indirect paths that contain the full bias, the error due to shared method variance is at least partly eliminated (Asendorpf & Van Aken, 2003; Neyer & Asendorpf, 2001).

A second limitation of the studies reported in this dissertation is that only sub-clinical levels of problem behaviours were obtained. This implies that the mean levels of the problem behaviours are by definition lower than the mean levels of psychiatric disorders. However, these data have the advantage that they are applicable to the vast majority of the population and that they can be used as a baseline for clinical populations. However, it should be clear that the results of this dissertation should not be equated with those from studies of adolescents with clinical psychopathological disorders (Gjerde, Block, & Block, 1988; Kim & Smith, 1998).

Another limitation is concerned with causality. In chapter 2, we studied the relationships between perceived parental rejection, depression and aggression and these relations are not unidirectional. Although we expected perceived parental rejection to have an impact on problem behaviour (e.g., Muris et al., 2001; Rapee, 1997), other studies suggested that problem behaviour affected parental rejection in adolescents (Coyne, 1976a). Thus, our study could also imply that adolescents'

problem behaviours have an impact on parental rejection. Furthermore, in chapter 2, 3 and 4 we examined the personality types simultaneously with problem behaviours. Since we measured personality type membership or change in type membership and problem behaviour or change in problem behaviour at the same time, we could neither conclude that (a change in) type membership caused (a change in) problem behaviour nor that (a change in) problem behaviour caused (a change in) type membership. We would also like to mention that the personality type changes we found, could be due to measurement error. However, previous studies using other methods than ours found the same amount of personality type change (Asendorpf & Van Aken, 1999; Hart et al., 2003; Van Aken & Dubas, 2004). Therefore, we are confident that the personality type changes we found are actually present in adolescents.

A fourth limitation is concerned with the possible moderator effects of gender and age. Although we acknowledge that it is important to explicitly study gender and age effects in the associations between personality and problem behaviour, we decided to solely examine type by gender interaction (Chapter 2) or type by age interaction (Chapters 4 and 5). We decided to choose this strategy since personality type by gender by age groups would be too small to provide adequate power (Kline, 1998).

A fifth limitation of this dissertation is concerned with possible repetition effects. Since the adolescents filled out the same questionnaires at each measurement wave, it is possible that a repetition effect occurred. After the first measurement in which adolescents answer questions about problem behaviour, they might become more aware of their own problem behaviours. This change in awareness could lead to a change in response on the next measurement wave. Although it is a limitation that endangers most longitudinal studies, it is not plausible that the results of our studies were affected by this limitation, since no general effects, e.g., on the problem behaviours, were found. Perhaps the 1-year interval between two measurement waves is too long to elicit any repetition effects.

A last limitation we need to address, concerns the construction of the personality types. We did not construct the personality types completely according to the current 'state of the art'. According to the state of the art, two-step clustering procedure is recommended: first, a Ward's hierarchical procedure should be performed, followed by a non-hierarchical k-means clustering analysis (Asendorpf, 2001; Herzberg & Roth, 2006; Van Leeuwen et al., 2004). The Ward's hierarchical procedure is conducted in order to provide seed values for the k-means cluster analysis. In this dissertation, we conducted a single-step k-means clustering approach and used predetermined initial cluster centres derived from other studies (Dubas et al., 2002; Van Aken & Dubas, 2000). Although other initial cluster centres

were suggested in Asendorpf (2006)'s study, we found neither differences in the assignment of adolescents to types nor differences in the Big Five profile of the three personality types when we compared the results obtained by testing these different initial cluster centres (Chapter 4).

#### **6.4 Implications for Future Research**

With reference to the four studies of this dissertation we can formulate some ideas and implications for future research. In chapters 3 and 4 we based our longitudinal types on the change of cross-sectional types, or in other words, we investigated the sameness of the personality types over time (Hart et al., 2003). It would be interesting to investigate developmental types based on their longitudinal personality characteristics, as was done by Morizot and Le Blanc (2005): they identified a developmental personality typology using data from a prospective longitudinal study of a representative sample of men assessed on four occasions. Although they reported promising findings about four developmental types and their associations with antisocial behaviour, they did not study a developmental typology on the basis of the Big Five dimensions in a sample with both genders and they did not examine the associations between the developmental typology and internalizing problem behaviours, which leaves many opportunities for future studies. For example, advanced statistical packages, such as *Mplus* (Muthén & Muthén, 2005), are now capable of calculating longitudinal types on the basis of multiple dimensions combined with multiple measurement waves. By employing this strategy, longitudinal personality types can be constructed on the basis of the Big Five dimensions over several measurement waves. Obviously, the associations between these longitudinal personality types and several problem behaviours could be examined.

In addition to studying the development of personality types in other ways than we did in this dissertation, it is important to establish the possible causes of stability or change in personality types. In this dissertation, we investigated whether stability and change in personality type occurred in the same period as stability or change in problem behaviour. However, we did not examine possible factors that might cause changes in personality types. Hart et al. (2003) were the first to examine this issue more closely in children: they investigated whether the change from resilient to undercontroller and vice versa could be explained by several risk factors. To our knowledge, other changes in personality types have not been studied, let alone the investigation of why these other type changes could occur. In extension of this lies the investigation of possible consequences of personality type change (e.g., adolescents who change their personality type

membership could have an outcome that is less well-adjusted than adolescents with a stable personality type membership). Also, next to investigating possible causes of personality type changes, other periods in life should be studied, since the change of personality in one life period could have a different impact than the same changes in another life period (e.g., when resilient children change to undercontroller their behaviour change might be interpreted as an increase in playful behaviour which is rather positive, whereas this change in adolescence might be seen as an increase in impulsive or hyperactive behaviour which may be more negative). Obviously, the issues about possible causes and consequences can only be solved when stability or change in personality types are investigated previous to possible consequences or after possible precursors.

Some precursors have already been found to have an impact on personality dimensions. For example, a working life appeared to lead to more agency (Roberts, 1997), divorced women showed increases in extraversion and openness (Costa et al., 2000) and individuals who recently began dating showed greater declines in neuroticism and shyness (Neyer & Asendorpf, 2001). So, experiences in life seemed to influence the development of personality dimensions (Vaidya, Gray, Haig, & Watson, 2002): extraversion and neuroticism were influenced by positive and negative life experiences and participants who had experienced fewer positive events were more stable on extraversion (Vaidya et al., 2002). Perhaps other life experiences that are more like life *events*, such as the divorce of parents (Block, Block, & Gjerde, 1986), changing schools, getting a first job, having an intimate partner for the first time or experiencing the death of a parent could cause personality to change. In line with these findings, it would be interesting to compare the causes of change in personality dimensions with causes of personality type change. Possibly, more (or more influential) life experiences or events are needed to induce personality type change than change in a dimension, since more dimensions are needed to change before a type change occurs.

Furthermore, it is also important to investigate the origins of the type differences. Perhaps some biological differences can be distinguished that explain the differences between the personality types, e.g., by their different levels of stress hormones, such as cortisol (Hart et al., 2003) or adrenaline, or other stress related factors, such as heart rate or blood pressure. Additionally, the Big Five dimensions have been related to a model that provides a behaviourally and physiologically based explanation for personality, namely the BIS/BAS model (BIS or Behavioural Inhibition System; BAS or Behavioural Approach System). The following associations between the Big Five dimensions and the BIS/BAS model have been reported: extraversion was negatively related to BIS and positively to BAS, agreeableness and conscientiousness were positively related to BIS and negatively

to BAS, emotional stability was negatively related to BIS and positively to BAS and openness was hardly predicted by BIS or BAS (Smits & Boeck, 2006). When inspecting the profile of the BIS/BAS dimensions on the Big Five dimensions, it seems that the BIS/BAS dimensions overlap with the personality dimensions of ego-resiliency and ego-control (Block & Block, 1980, 2006): BIS overlaps with ego-control and BAS with ego-resiliency. Consequently, the dimensions ego-resiliency and ego-control might be related to the BIS/BAS system. Moreover, this line of reasoning can be taken even one step further. Since the Big Five personality dimensions are related to the BIS/BAS system, the three personality types based on Block and Block's typology might be constructed on the basis of the BIS/BAS system. By undertaking these endeavours, small steps can be made to unravel the general aetiology of the personality type differences.

Similarly, since the personality types can be constructed on the basis of the Big Five personality dimensions, it would be interesting to examine whether the two dimensions ego-resiliency and ego-control (Block & Block, 1980, 2006) could be derived from the Big Five, where the first factor is expected to be strongly related to extraversion and openness (ego-resiliency) and the second factor is expected to be strongly related to agreeableness and conscientiousness (ego-control). Both factors should be related to emotional stability: positively to ego-resiliency but negatively to ego-control (Zuckerman, Kuhlmann, Joireman, Teta, & Kraft, 1993). Furthermore, the two dimensions constructed on the basis of the Big Five might be congruent with the alpha and beta meta-traits reported by Digman (1997). The alpha and beta meta-traits also exhibit clear differences on the associations with the Big Five: the alpha meta-trait is related to agreeableness, conscientiousness and neuroticism, whereas the beta meta-trait is related to extraversion and openness (Krueger, 2005). Perhaps these alpha / beta meta-traits are related to each other in a curvilinear way in the same way as ego-resiliency and ego-control, which might suggest a similarity between the meta-traits and the Block and Block's dimensions. If this proves to be possible, not only the California Q-set (Block & Block, 1980) can be used to investigate ego-resiliency and ego-control, but also Big Five questionnaires can fulfil this need. By doing so, more studies could then complement their findings on the Big Five and personality types with ego-resiliency and ego-control.

Furthermore, future studies should investigate the personality types in specific clinical populations in extending their validation. Although the division of resilient, overcontrollers and undercontrollers has been found to be roughly 35-35-30% respectively in general adolescent populations (De Fruyt et al., 2002; Dubas et al., 2002; Van Aken et al., 2002; Van Aken & Dubas, 2004; Van Leeuwen et al., 2004; Van Lieshout et al., 1998), one should expect this division to be radically

different in other populations, such as in clinical groups. For example, when taking the prototypes of normal adolescents as a starting point, one would expect for instance the proportion of overcontrollers to be larger in depressed or anxious individuals or in individuals with obsessive compulsive disorder and the proportion of undercontrollers to be larger in individuals with conduct disorder (CD) or oppositional defiant disorder (ODD). Hence, we suggest that more studies should focus on the link between personality type and problem behaviour in clinical populations.

Although we found clear personality type differences on the co-occurrence of depression and delinquency (i.e., heterotypic co-occurrence) in this dissertation, future studies should focus on whether personality type differences can be found on homotypic co-occurrence. Homotypic co-occurrence is the co-occurrence of two very similar problem behaviours (Angold, Costello, & Erkanli, 1999), such as the co-occurrence of depression and anxiety or between aggression and delinquency. The co-occurrence of depression and anxiety is probably higher in overcontrollers than in undercontrollers, whereas the co-occurrence of aggression and delinquency is probably higher in undercontrollers than in overcontrollers.

Since we found evidence for the spectrum hypothesis in chapter 5, these findings imply that the differences between personality and problem behaviours are not as clear as often suggested. In the DSM-IV-TR (American Psychiatric Association, 2000) for example, personality and problem behaviour, or personality disorders (Axis II) and psychopathology (Axis I), are clearly divided into two separate axes. However, according to the spectrum hypothesis (Krueger & Tackett, 2003; Shiner, 2003) both concepts are positioned on either end of a continuum, indicating strong associations between personality and problem behaviours. This implies that both concepts are not as different as often assumed: problem behaviour lies in the extension of personality in contrast to being a completely different concept on a completely different axis. Consequently, when using the DSM-IV-TR it should be kept in mind that a high co-occurrence is present between personality and problem behaviour and that the axes are not as distinct as implied by the DSM-IV-TR.

Although the focus of this dissertation was primarily on the associations between personality and problem behaviour, we briefly addressed the associations between personality and social relationships by means of perceived parental rejection (Chapter 2). Although it is well established that overcontrollers and undercontrollers have the most troublesome relationships with parents and peers (e.g., Scholte, Van Lieshout, De Wit, & Van Aken, 2005; Van Aken & Dubas, 2004; Van Aken, Van Lieshout, Scholte, & Haselager, 2002), it is not yet clear whether they also differ in the amount of conflicts in these relationships and whether they

differ in the way they solve these conflicts. In line with previous studies on conflicts and conflict resolution styles (e.g., Branje, Van Doorn, & Van der Valk, 2005; Van Doorn, Branje, & Meeus, in press), it might be expected that resilient have the lowest amount of conflicts, compared to overcontrollers and undercontrollers. When resilient do have conflicts with parents or peers, they will probably use problem solving as a conflict resolution style. However, overcontrollers might be more likely to solve their conflicts by means of complying or by withdrawing from the situation, whereas undercontrollers will probably solve their conflicts by means of engaging or attacking the other.

### **The Development of Personality and Problem Behaviour in Adolescence**

In ending this dissertation, it should be pointed out that both personality and problem behaviour develop during adolescence and both concepts are clearly linked to each other. Although we were able to answer several questions about the stability and change in personality type membership and Big Five dimensions in relation to several internalizing and externalizing problem behaviours, numerous questions remain. Therefore, we would like to encourage future research to disentangle new issues on the development of personality and problem behaviour in adolescence.



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## **SUMMARY**



## **The Development of Personality and Problem Behaviour in Adolescence**

The development of adolescents' personality is one of the two key subjects of this dissertation. Whether personality can grow or develop, lies at the heart of the conceptualization of personality. Central to most personality definitions lies the assumption that personality remains constant over time. Although it has long been thought that personality was stable, at least past the age of 30, recent studies have found meaningful changes in personality during all phases of life. In this dissertation, the personality development of adolescents is studied. Adolescence is a period of life in which many changes occur, such as attending a new school or having new friendships or romantic relationships. Probably, these changes lead to personality change. Therefore, we assume that adolescents' personality develops.

The development of adolescents' problem behaviours is the second major subject of this dissertation. We consider it important to study this subject, since problem behaviours can limit the daily functioning of adolescents leading to psychopathological disorders later in life, and since the prevalence of problem behaviours is higher in adolescence than at other ages.

Both these major subjects are clearly related to each other; as Krueger, Caspi and Moffitt (2000) point out 'where problem behaviours are concerned, personality clearly matters'. This statement highlights the importance of the study of the interrelatedness of personality and problem behaviours. Therefore, studies on the development of problem behaviour should also focus on personality development.

Hence, this dissertation focuses on the associations between the development of personality and the development of problem behaviours in adolescence. It elaborates on previous studies by focusing on data from adolescents and in employing longitudinal data and advanced methodological techniques.

The results presented in this dissertation are based on data collected as part of the CONflict And Management Of Relationships study (CONAMORE). Its main purpose is to investigate the relationships of adolescents with their parents and peers as well as the adolescents' emotional and behavioural states. CONAMORE is a longitudinal research project with a total of five measurement waves conducted annually. This design provides information about stability and change in the development of individuals over time. Since the data are gathered in (junior-)high schools, only adolescents from the general population participated. From the first wave onward, the sample was designed to contain two age cohorts, namely early and middle adolescents. The total longitudinal sample consists of 1,331 adolescents and demonstrates a very small attrition. In this dissertation, only the data of the first four waves are presented.

This dissertation comprises four studies, each of which addresses a part of the overall research interest. The main goal of the first study was to examine whether personality moderated the associations between perceived parental rejection, depression and aggression. In order to meet this goal, we addressed several issues. First, we investigated the association between perceived parental rejection and depression as well as aggression. Next, we examined the interaction between personality types (i.e., resilients, overcontrollers and undercontrollers) and gender on the associations between perceived parental rejection, depression and aggression. In short, we found perceived parental rejection, depression and aggression to be related to each other during adolescence. These associations were moderated by the personality types: the co-occurrence of depression and aggression was highest in undercontroller boys and girls.

The main focus of the second study was to examine the associations between personality type membership and anxiety over time. Two issues were addressed in order to meet this study's purpose. First, stability and change in adolescents' personality type membership were investigated by means of three stable and six changing personality groups. Second, the associations between changes in personality type membership and changes in anxiety level were studied. In summary, the stability of adolescents' personality type membership was found to be low to moderate during adolescence. Furthermore, when personality type membership was stable, the level of anxiety did not change; but, when personality type membership changed, the anxiety level changed as well.

The third study focused on the moderation of personality on the longitudinal associations between depression and delinquency. First, we constructed three stable personality groups and validated these groups by means of their levels of problem behaviour. Next, we investigated which of three co-occurrence models, namely the stability, acting out or failure model, was able to explain the co-occurrence of depression and delinquency best during adolescence. Finally, we assessed whether the longitudinal associations between depression and delinquency differed between the stable personality groups. We found that the co-occurrence of depression and delinquency was best described by means of a stability model, implying that the co-occurrence of depression and delinquency could be due to non-specific risk factors that lead to separate but associated problem behaviours. Possibly, certain aspects of personality could constitute risk factors: the degree of ego-control could be a possible common risk factor that either leads to internalizing or to externalizing problem behaviour. The co-occurrence of depression and delinquency was highest in stable resilients.

The main purpose of the fourth study was to examine the longitudinal associations between the Big Five personality dimensions on the one hand and the

problem behaviours aggression and anxiety on the other. In meeting this study's goal, we addressed two issues. First, we investigated whether adolescents' personality was hierarchically superior to problem behaviour over time, assuming that personality is more stable than problem behaviour and that personality is more predictive of problem behaviour than the reverse. Second, we examined whether the hierarchical superiority of personality over problem behaviour was more present in older than in younger adolescents. Since only one of the two assumptions of the hierarchical superiority was met, personality was not hierarchically superior to problem behaviour. The hierarchical superiority was neither present in the general adolescent sample nor in early and middle adolescents.

We will now discuss how these findings are related to one another in respect to the development of adolescents' personality and problem behaviours.

*Development of personality types and problem behaviour.* We investigated whether stability and change in personality types were associated with problem behaviours. In chapter 2, 3 and 4 we examined whether the personality types differed in their mean levels of several problem behaviours; in chapter 2 and 4 we investigated whether the personality types differed on the co-occurrence of several problem behaviours.

When comparing the (stable) personality groups on the mean levels of internalizing and externalizing problem behaviours, we found that overcontrollers scored highest on anxiety and depression (Chapter 2, 3 and 4) and that undercontrollers scored highest on aggression and delinquency (Chapter 2 and 4); the resilients scored most adequately on these problem behaviours. Also, considerable differences emerged between adolescents with a stable personality and adolescents with a changing personality regarding their mean-levels of problem behaviour (Chapter 3 and 4). When comparing the combined stable personality groups with the combined changing personality groups (Chapter 4), it appeared that the changing adolescents were somewhat less well-adjusted than the stable personality groups. Furthermore, we found that when adolescents maintained their personality type membership over time, their mean level of problem behaviour remained the same as well (Chapter 3 and 4). However, when adolescents changed in personality types membership, the level of problem behaviour also changed; for example, when adolescents changed from a personality type that was not prone to internalizing behaviour (resilient) to a personality that was prone to internalizing problem behaviour (overcontroller), the level of internalizing problem behaviour increased (Chapter 3).

When comparing the personality types on the longitudinal rank-order stabilities of problem behaviours considerable personality type differences were found (Chapter 4). The longitudinal stability of depression as well as of the longitudinal stability of delinquency was highest in resilient. Combining the high rank-order stability with the low mean levels on depression and delinquency in resilient, this implies that the low mean levels are stable over time. Resilient are known to resist delinquent behaviour and not to be prone to develop a depressive mood. This may be due to the fact that they have the best resources to recover from negative events and that they have the ability to adapt to and to succeed in difficult contexts. However, overcontrollers and undercontrollers demonstrated other patterns of problem behaviour that seemed opposites of each other. More specifically, the overcontrollers were found to have an internalizing pattern of problem behaviour: they demonstrated a high mean level and a moderate rank-order stability on depression, whereas the mean level and rank-order stability on delinquency were low. Furthermore, the undercontrollers had an externalizing pattern of problem behaviour: they demonstrated a high mean level and a moderate rank-order stability on delinquency, whereas the mean level and rank-order stability on depression were low. This pattern of opposites could be explained as follows. Although overcontrollers and undercontrollers are remarkably similar in terms of physiological and cognitive processes, which could be due to the similarity in the level of ego-resiliency, they radically differ at the behaviour level, which could be due to their markedly different levels of ego-control, namely high for overcontrollers and low for undercontrollers. In this respect, ego-control may play an important role in explaining the opposite patterns of the problem behaviours over time, especially for the personality groups that do not respond flexibly to their environment, such as the overcontrollers and undercontrollers. Possibly, the level of ego-control is one of the common risk factors that could either lead to internalizing or to externalizing problem behaviours. Although the mean level differences of personality types on problem behaviours are well-established in previous studies, this is the first study in which the personality types are compared on the rank-order stability of internalizing and externalizing problem behaviours.

When comparing the personality types on the co-occurrence of depression and aggression, we found that the co-occurrence was larger in undercontrollers than in resilient. It is known that undercontrollers are very impulsive and have academic and behavioural problems, which could be a possible cause for conflicts with others. The negative feelings that are related to these conflicts may cause the undercontrollers to feel depressed. This personality type difference was present in both genders, although the difference between undercontrollers and resilient was

much smaller for boys than for girls. However, when comparing the personality groups on the longitudinal co-occurrence of depression and delinquency (Chapter 4), the co-occurrence was stronger in resilient than in overcontrollers and undercontrollers. Combining the high rank-order stability with the low mean levels of depression as well as delinquency in resilient, the low levels of depression and delinquency co-occur in resilient. It should be pointed out that the two chapters that report on the personality group differences regarding the co-occurrence of depression and aggression or delinquency are not the same; several differences in the design of the two studies could account for the differences in the findings. However, both studies indicate that the co-occurrence of internalizing and externalizing problem behaviours is clearly present in adolescence and that clear personality group differences emerged on this co-occurrence.

*Development of personality dimensions and problem behaviour.* In chapter 5, the cross-sectional associations between the Big Five dimensions and anxiety and aggression were investigated; the findings were in concordance with the results of previous studies. In addition, the relations between personality and problem behaviour were studied in depth by examining whether personality was hierarchically superior to problem behaviour during adolescence. Our findings appear to be incongruent with the hierarchical superiority hypothesis. Instead, our findings are more in line with the spectrum hypothesis, which assumes that problem behaviours is an extreme manifestation of personality. We suggested several spectra or continua between personality dimensions and problem behaviours.

Overall, we can conclude that adolescents' personality is in development. We examined personality development by means of a person-centred and a variable-centred approach. When applying the person-centred approach, we demonstrated that a large amount of adolescents changed their personality type membership. When applying the variable-centred approach, several Big Five personality dimensions were found to change both in their rank-order and mean-level continuity. Furthermore, when focusing on problem behaviour we found that girls showed higher levels of internalizing problem behaviours, whereas boys demonstrated higher levels of externalizing problem behaviours. Early and middle adolescents did not differ on their mean level of these problem behaviours. The development of these problem behaviours was the same for boys and girls or for early and middle adolescents. Finally, the co-occurrence of internalizing and externalizing problem behaviours was clearly present in adolescence; both problem behaviours appeared to not constitute risk factors for each other.

Additionally, the differences between the three personality types on internalizing and externalizing problem behaviours were in agreement with previous studies. The longitudinal stability of depression and delinquency was highest in resilient; overcontrollers and undercontrollers demonstrated specific but opposite patterns on the longitudinal stability of these problem behaviours, possibly due to their markedly different levels of ego-control. The longitudinal co-occurrence of internalizing and externalizing problem behaviours elicited clear differences between the personality types. Finally, the spectrum hypothesis best explained the associations between the Big Five dimensions and the problem behaviours.

## **SAMENVATTING**

(Summary in Dutch)



## **Ontwikkeling van Persoonlijkheid en Probleemgedrag tijdens de Adolescentie**

*Ieder individu is uniek. Echter, niemand is uniek genoeg om een persoonlijkheidstype te vormen (Block, 1971).*

Een van de twee hoofdthema's van dit proefschrift is de ontwikkeling van persoonlijkheid bij adolescenten. Een van de kernvragen binnen de theorievorming over persoonlijkheid is de vraag of persoonlijkheid kan groeien of ontwikkelen. In de meeste definities over persoonlijkheid ligt juist besloten dat persoonlijkheid niet verandert in de loop van de tijd. Lang was stabiliteit van persoonlijkheid (tenminste na de leeftijd van 30 jaar) een uitgangspunt voor onderzoek. Recent onderzoek toonde echter aan dat er belangrijke veranderingen kunnen optreden in de persoonlijkheid tijdens alle levensfasen. In dit proefschrift wordt de persoonlijkheidsontwikkeling van adolescenten onderzocht. De adolescentie is een levensfase waarin vele veranderingen optreden, zoals verandering van school, nieuwe vriendschappen en liefdesrelaties. Deze veranderingen leiden waarschijnlijk tot verandering in persoonlijkheid. Daarom nemen wij aan dat de persoonlijkheid van adolescenten kan veranderen.

De ontwikkeling van probleemgedrag tijdens de adolescentie is het tweede hoofdthema van dit proefschrift. Het is belangrijk om dit onderwerp te bestuderen, omdat probleemgedrag het dagelijks functioneren van adolescenten kan beperken, zelfs met psychopathologische stoornissen in het latere leven tot gevolg, en omdat de prevalentie van probleemgedrag tijdens de adolescentie hoger is dan in andere leeftijdsgroepen.

Beide hoofdthema's zijn duidelijk aan elkaar verbonden, zoals Krueger, Caspi en Moffit (2000) beweren: *"where problem behaviours are concerned, personality clearly matters"* [vert.: "waar het probleemgedrag betreft, speelt persoonlijkheid een belangrijke rol"]. Deze stelling benadrukt het belang van het bestuderen van de relatie tussen persoonlijkheid en probleemgedrag. Daarom moet onderzoek naar de ontwikkeling van probleemgedrag ook de ontwikkeling van persoonlijkheid in ogenschouw nemen.

Om deze redenen concentreert dit proefschrift zich op de associaties tussen de ontwikkeling van persoonlijkheid en de ontwikkeling van probleemgedrag tijdens de adolescentie. Het is een voortzetting van voorgaand onderzoek, waarbij gegevens van adolescenten uit een longitudinale dataset worden gebruikt en waarbij geavanceerde methodologische technieken worden toegepast.

De resultaten, die in dit proefschrift worden gepresenteerd, zijn gebaseerd op data die verzameld worden in het kader van het CONflict And Management Of RElationships project (CONAMORE). Het doel van dit onderzoeksproject is het

bestuderen van zowel relaties van adolescenten met hun ouders en peers als de emotionele en gedragsmatige status van de adolescenten. CONAMORE is een longitudinaal onderzoeksproject met in totaal vijf jaarlijkse meetmomenten. Dit onderzoeksdesign levert informatie op over de stabiliteit en verandering in de ontwikkeling van individuen in de loop van de tijd. Aangezien de data op middelbare scholen worden verkregen, worden alleen adolescenten uit de algemene populatie geworven voor deelname. Vanaf het eerste meetmoment werden twee leeftijdsgroepen onderzocht, namelijk vroeg- en middenadolescenten. De totale steekproef bestaat uit 1331 adolescenten met een zeer kleine uitval. In dit proefschrift wordt gebruik gemaakt van data van de eerste vier meetmomenten.

Het huidige proefschrift bestaat uit vier onderzoeken, waarbij ieder onderzoek een deel van de overkoepelende onderzoeksvraag bestudeert. Het doel van het eerste onderzoek was te bestuderen of persoonlijkheid de associaties tussen waargenomen ouderlijke afwijzing, depressie en agressie modereert. Om dit doel te bereiken, moesten we enkele stappen ondernemen. Eerst onderzochten we de associatie tussen waargenomen ouderlijke afwijzing enerzijds en depressie en agressie anderzijds. Vervolgens onderzochten we de interactie tussen de persoonlijkheidstype, te weten veerkrachtigen, overcontrollers en ondercontrollers, en geslacht op de associaties tussen waargenomen ouderlijke afwijzing, depressie en agressie. Voordat we het laatste punt konden beantwoorden, onderzochten we eerst of de verkorte versie van Goldberg's Big Five persoonlijkheidsvragenlijst geschikt was voor het construeren van de hierboven genoemde persoonlijkheidstypen.

Het tweede onderzoek bestudeerde hoofdzakelijk de associatie tussen persoonlijkheidstype en angst in de loop van de tijd. Twee vragen werden hiervoor beantwoord. Eerst werden stabiliteit en verandering van de persoonlijkheidstypen bij adolescenten onderzocht, waarbij drie stabiele en zes veranderlijke groepen werden gevormd. Vervolgens werden de associaties tussen verandering in persoonlijkheidstype en verandering in angstniveau bestudeerd.

Het doel van de derde studie was te onderzoeken of persoonlijkheid de longitudinale associaties tussen depressie en delinquentie modereert. Drie vragen werden hiervoor beantwoord. Eerst werden drie stabiele persoonlijkheidsgroepen gevormd en gevalideerd naar aanleiding van de mate van probleemgedrag. Vervolgens onderzochten we welke van drie comorbiditeitsmodellen, te weten een stabiliteit, een *acting out* en een *failure* model, op de meest nauwkeurige manier om de comorbiditeit van depressie en delinquentie tijdens de adolescentie te verklaren. Tenslotte onderzochten we of de longitudinale associaties tussen depressie en delinquentie verschilden tussen de stabiele persoonlijkheidsgroepen.

De vierde en laatste studie bestudeerde de longitudinale associaties tussen de Big Five persoonlijkheidsdimensies enerzijds en de probleemgedragingen agressie en angst anderzijds. Twee vragen moesten hiervoor beantwoord worden. Ten eerste onderzochten we of de persoonlijkheid van adolescenten in de loop van de tijd hiërarchisch superieur was aan probleemgedrag. Ten tweede onderzochten we of deze hiërarchische superioriteit van persoonlijkheid duidelijker aanwezig was bij oudere dan bij jongere adolescenten. Aangezien slechts aan een van beide voorwaarden voldaan werd, bleek persoonlijkheid niet hiërarchisch superieur te zijn aan probleemgedrag. De hiërarchische superioriteit was niet aanwezig in de algemene steekproef van adolescenten en niet in de vroeg- en middenadolescenten.

In het kader van de ontwikkeling van persoonlijkheid en probleemgedrag tijdens de adolescentie zullen we nu weergeven hoe deze bevindingen aan elkaar gerelateerd zijn.

#### *Ontwikkeling van persoonlijkheidstypen en probleemgedrag*

We onderzochten of de stabiliteit en verandering van persoonlijkheidstypen geassocieerd waren met probleemgedrag. In hoofdstuk 2, 3 en 4 onderzochten we of de persoonlijkheidstypen verschilden in hun gemiddelde niveau van meerdere probleemgedragingen; in hoofdstuk 2 en 4 onderzochten we of de persoonlijkheidstypen verschilden in de comorbiditeit van diverse probleemgedragingen.

Bij het vergelijken van de (stabiele) persoonlijkheidsgroepen op het gemiddelde niveau van internaliserend en externaliserend probleemgedrag vonden we dat overcontrollers het hoogst scoorden op angst en depressie (Hoofdstuk 2, 3 en 4) en dat ondercontrollers het hoogst scoorden op agressie en delinquentie (Hoofdstuk 2 en 4); de veerkrachtigen scoorden het laagst op deze probleemgedragingen. Deze bevindingen komen overeen met voorgaand onderzoek. Daarnaast waren er aanzienlijke verschillen tussen adolescenten met een stabiele persoonlijkheid en adolescenten met een veranderende persoonlijkheid op het gemiddelde niveau van probleemgedrag (Hoofdstuk 3 en 4). Bij het vergelijken van de gecombineerde stabiele persoonlijkheidsgroepen (dit zijn de stabiele veerkrachtigen, stabiele overcontrollers en stabiele ondercontrollers) met de gecombineerde veranderende persoonlijkheidsgroepen (Hoofdstuk 4), bleek dat de gecombineerde veranderende groep minder goed aangepast was dan de gecombineerde stabiele persoonlijkheidsgroep: het niveau van delinquentie was bijvoorbeeld hoger in de veranderende groep dan in de stabiele groep. Bovendien vonden we dat adolescenten, die in de loop van de tijd niet van persoonlijkheidstype veranderden, hetzelfde niveau van probleemgedrag behielden (Hoofdstuk 3 en 4). Echter, wanneer adolescenten wel van persoonlijkheidstype veranderden, veranderde het niveau van probleemgedrag

ook; wanneer bijvoorbeeld de persoonlijkheid van een adolescent veranderde van een persoonlijkheidstype dat niet kwetsbaar is voor het ontwikkelen van probleemgedrag (veerkrachtig) in een persoonlijkheidstype dat wel kwetsbaar is voor het ontwikkelen van internaliserend probleemgedrag (overcontroller), dan neemt het niveau van internaliserend probleemgedrag toe.

Bij het vergelijken van de persoonlijkheidstypen op de longitudinale rangordestabiliteit van probleemgedrag werden eveneens duidelijke verschillen gevonden (Hoofdstuk 4). De longitudinale stabiliteit van depressie en van delinquentie was het hoogste in veerkrachtigen. Wanneer de hoge rangordestabiliteit gecombineerd werd met de lage gemiddelde waarden van veerkrachtigen op depressie en delinquentie, dan betekent dat dat deze lage gemiddelde waarden in de loop van de tijd stabiel zijn. Veerkrachtigen staan er om bekend dat ze de verleiding tot het uitvoeren van delinquent gedrag doorgaans adequaat kunnen weerstaan en dat ze niet kwetsbaar zijn om een depressieve stemming te ontwikkelen. Dit zou kunnen komen door het feit dat ze in vergelijking met de andere persoonlijkheidstypen de beste eigenschappen hebben om van negatieve gebeurtenissen te herstellen en dat ze de juiste vaardigheden bezitten om zich aan moeilijke situaties aan te passen en om op een succesvolle manier uit moeilijke situaties te komen. Over- en ondercontrollers daarentegen vertonen hele andere patronen van probleemgedrag, die zelfs tegenovergesteld aan elkaar lijken te zijn: de overcontrollers lieten een internaliserend patroon van probleemgedrag zien. Dat wil zeggen dat ze op depressie een hoog gemiddeld niveau en een middelmatige rangordestabiliteit hadden, terwijl het gemiddelde niveau en de rangordestabiliteit van delinquentie laag was. De ondercontrollers lieten een externaliserend patroon van probleemgedrag zien: ze hadden op delinquentie een hoog gemiddeld niveau en een middelmatige rangordestabiliteit, terwijl het gemiddelde niveau en de rangordestabiliteit van depressie laag was. Dit patroon van tegenstellingen kan als volgt verklaard worden. Hoewel over- en ondercontrollers veel op elkaar lijken wat betreft fysiologische en cognitieve processen, wat veroorzaakt zou kunnen worden door hun overeenkomsten in ego-veerkracht, ze radicaal van elkaar verschillen op het gedragsniveau, wat zou kunnen komen door hun duidelijk verschillende niveaus van ego-controle, te weten hoog voor overcontrollers en laag voor ondercontrollers. Vandaar dat ego-controle een belangrijke rol kan spelen in het verklaren van het patroon van tegenstellingen van probleemgedrag over langere tijd, vooral voor de persoonlijkheidsgroepen die niet flexibel op hun omgeving reageren, zoals over- en ondercontrollers. Het is mogelijk dat het niveau van ego-controle een van de onderliggende risicofactoren is die enerzijds tot internaliserend en anderzijds tot externaliserend probleemgedrag kan leiden. Hoewel de verschillen tussen de

persoonlijkheidstypen wat betreft het gemiddelde niveau van probleemgedrag reeds bekend waren uit voorgaand onderzoek, is dit een van de eerste onderzoeken waarin de persoonlijkheidstypen met elkaar vergeleken worden op het gebied van de rangordestabiliteit van internaliserend en externaliserend probleemgedrag.

Wanneer we de persoonlijkheidstypen onderling vergelijken op de comorbiditeit van depressie en agressie (Hoofdstuk 2), vonden we dat deze comorbiditeit groter was voor veerkrachtigen dan voor ondercontrollers. Dit komt overeen met voorgaand onderzoek. Het is bekend dat ondercontrollers erg impulsief zijn en dat ze academische en gedragsproblemen hebben, die mogelijk conflicten in relaties met anderen veroorzaken. De negatieve gevoelens die gerelateerd zijn aan deze conflicten kunnen er de oorzaak van zijn dat ondercontrollers zich gedeprimeerd voelen. Het verschil tussen veerkrachtigen en ondercontrollers vonden we voor beide seksen gevonden, hoewel het verschil bij jongens veel kleiner was dan bij meisjes. Wanneer we echter de persoonlijkheidsgroepen onderling vergelijken op de longitudinale comorbiditeit van depressie en delinquentie (Hoofdstuk 4), dan is de comorbiditeit sterker aanwezig bij veerkrachtigen dan bij over- en ondercontrollers. Wanneer de hoge rangordestabiliteit gecombineerd wordt met de lage gemiddelde waarden van veerkrachtigen op depressie en delinquentie, dan betekent dat dat deze lage gemiddelde waarden gelijktijdig voorkomen in dit persoonlijkheidstype. Er moet echter benadrukt worden dat de twee hoofdstukken over de verschillen tussen de persoonlijkheidsgroepen in de comorbiditeit van depressie en agressie (Hoofdstuk 2) of depressie en delinquentie (Hoofdstuk 4) niet hetzelfde zijn. Er zijn namelijk meerdere verschillen tussen beide studies, met name in het design, die de verschillende bevindingen zouden kunnen verklaren; bijvoorbeeld (a) in hoofdstuk 2 wordt een cross-sectioneel onderzoek beschreven dat uit een grote groep adolescenten bestaat wiens persoonlijkheidstype uitsluitend op een enkel meetmoment gemeten is; in hoofdstuk 4 wordt een longitudinaal onderzoek met drie meetmomenten beschreven, dat uit een selecte groep adolescenten bestaat, wiens persoonlijkheidstype stabiel is over drie meetmomenten, en (b) in hoofdstuk 2 wordt de comorbiditeit van depressie en agressie onderzocht, terwijl in hoofdstuk 4 de comorbiditeit van depressie en delinquentie bestudeerd wordt. Ondanks deze verschillen tonen beide onderzoeken duidelijk aan dat de comorbiditeit van internaliserend en externaliserend probleemgedrag daadwerkelijk aanwezig is tijdens de adolescentie en dat er duidelijke verschillen tussen de onderzochte persoonlijkheidsgroepen bestaan in deze comorbiditeit.

*Ontwikkeling van persoonlijkheidsdimensies en probleemgedrag*

In hoofdstuk 5 werden de cross-sectionele associaties bestudeerd tussen de Big Five dimensies enerzijds en angst en agressie anderzijds. De bevindingen komen overeen met resultaten uit voorgaand onderzoek. Daarnaast werden de associaties tussen persoonlijkheid en probleemgedrag in detail bestudeerd door na te gaan of persoonlijkheid gedurende de adolescentie hiërarchisch superieur was aan probleemgedrag. Onze bevindingen leken niet in overeenstemming te zijn met de hiërarchische superioriteitshypothese, waarin wordt aangenomen dat persoonlijkheid stabiel is dan probleemgedrag en dat persoonlijkheid beter probleemgedrag kan voorspellen dan andersom. Onze bevindingen leken beter te passen binnen de spectrum hypothese, door middel waarvan we kunnen aannemen dat probleemgedrag een extreme manifestatie van persoonlijkheid is. In het kader van deze hypothese hebben we meerdere spectra of continua tussen de persoonlijkheidsdimensies en probleemgedragingen beschreven (zie §6.1.4 voor een gedetailleerde beschrijving). Toekomstig onderzoek zou in het verlengde van deze bevindingen moeten onderzoeken of specifieke persoonlijkheidsstoornissen een extreme vorm van specifieke persoonlijkheidsdimensies zijn en of specifieke psychopathologische stoornissen een extreme vorm van specifieke probleemgedragingen zijn, waardoor brede continua ontstaan. Bijvoorbeeld: een hoog niveau van de antisociale persoonlijkheidsstoornis (APS) zou gerelateerd kunnen zijn aan een laag niveau van de persoonlijkheidsdimensie vriendelijkheid, die gerelateerd is aan een hoog niveau van het probleemgedrag directe agressie (Hoofdstuk 5), dat weer gerelateerd is aan een hoog niveau van de psychopathologische stoornis *oppositional defiant disorder* (ODD). Dit zou op een breed continuüm tussen APS en ODD kunnen duiden.

Algemeen gezien kunnen we concluderen dat persoonlijkheid in de adolescentie in ontwikkeling is. We hebben de persoonlijkheidsontwikkeling onderzocht door middel van een persoonsgerichte en een variabelegerichte benadering. Bij het toepassen van de persoonsgerichte benadering hebben we aangetoond dat het persoonlijkheidstype voor een groot deel van de adolescenten veranderde. Bij het toepassen van de variabele-gerichte benadering vonden we dat meerdere Big Five dimensies veranderden in hun rangorde stabiliteit en in hun gemiddelde waarde. Daarnaast vonden we dat meisjes een hoger niveau van internaliserend probleemgedrag lieten zien, terwijl jongens een hoger niveau van externaliserend probleemgedrag vertoonden. Vroeg- en middenadolescenten verschilden niet wat betreft het gemiddelde niveau van probleemgedrag. De ontwikkeling van probleemgedrag was hetzelfde voor jongens en meisjes en voor vroeg- en middenadolescenten. Tenslotte bleek dat de comorbiditeit van internaliserend en externaliserend probleemgedrag duidelijk aanwezig was

gedurende de adolescentie; internaliserend en externaliserend probleemgedrag vormde echter geen risicofactor voor elkaar. Verder kwamen de verschillen tussen de drie persoonlijkheidstypen op internaliserend en externaliserend probleemgedrag overeen met resultaten uit voorgaand onderzoek. De longitudinale stabiliteit van depressie en delinquentie was het hoogst bij veerkrachtigen; over- en ondercontrollers lieten een specifiek maar tegenovergesteld patroon zien op de longitudinale stabiliteit van deze probleemgedragingen, wat mogelijk veroorzaakt wordt door de verschillende niveaus van ego-controle in deze typen. De longitudinale comorbiditeit van internaliserend en externaliserend probleemgedrag veroorzaakte duidelijke verschillen tussen de persoonlijkheidstypes. Tot slot verklaarde de spectrum hypothese op de meest adequate wijze hoe de Big Five dimensies gerelateerd zijn aan diverse internaliserende en externaliserende probleemgedragingen.

Ter afsluiting van dit proefschrift moet benadrukt worden dat zowel persoonlijkheid als probleemgedrag tijdens de adolescentie ontwikkelen en dat beide concepten onomstotelijk aan elkaar geassocieerd zijn. Hoewel we reeds in staat bleken om diverse vragen over de stabiliteit en verandering van de persoonlijkheidstypen en de Big Five dimensies in relatie tot internaliserend en externaliserend probleemgedrag te beantwoorden, blijven er nog vele vragen onbeantwoord. Vandaar dat we onderzoekers op dit terrein willen aanmoedigen om nieuwe onderwerpen op het gebied van de ontwikkeling van persoonlijkheid en probleemgedrag tijdens de adolescentie te ontrafelen.



## **DANKWOORD**

(Acknowledgements in Dutch)



Het schrijven van een proefschrift is een exercitie die je onmogelijk alleen kunt uitvoeren. De mensen die in de afgelopen jaren veel voor me hebben betekend, wil ik hier graag expliciet vermelden en bedanken.

Allereerst gaat mijn hartelijke dank uit naar mijn promotoren Wim en Rutger en mijn co-promotoren Bill en Quinten. Wim, ik heb bewondering voor de grondige en kritische manier waarop je steeds m'n stukken hebt gelezen; ik heb veel van je aanwijzingen geleerd. Aanvankelijk moest ik wat wennen aan je kritische houding en onverbloemde duidelijkheid, maar die ben ik steeds meer gaan waarderen. Onze samenwerking verliep naar mijn idee dan ook erg prettig. Je toegankelijkheid en beschikbaarheid vind ik trouwens ongeëvenaard! Rutger, jij was de begeleider op afstand. Ondanks de lagere frequentie in contact, heb ik veel gehad aan de frisse blikken die je op m'n onderzoek wierp; je constructieve feedback bleek steeds erg motiverend. Bill, ik heb veel van je geleerd over jouw onderzoeksgebieden angst en depressie! Ik wil ook jou bedanken voor je kritische houding ten aanzien van mijn onderzoek. Je speelde regelmatig de advocaat van de duivel en legde meermaals de vinger op de zere plek; soms wat frustrerend, maar achteraf erg leerzaam. Ik heb je feedback en aanwijzingen steeds erg gewaardeerd. Quinten, je was steeds beschikbaar voor allerlei uiteenlopende statistische problemen en het is wonderbaarlijk hoe je die lastigheden op een heldere manier aan me duidelijk hebt kunnen maken. Ik vind je nuchtere kijk op de onderzoekswereld heerlijk relativerend. Met jullie als begeleiderskwartet heb ik het zeer getroffen!

Prof. Dr. Jens Asendorpf, herzlichen Dank dafür, dass Sie mir die Gelegenheit geboten haben, drei Monate lang am Institut für Psychologie der Humboldt-Universität zu Berlin (Arbeitsgruppe Persönlichkeitspsychologie) zu arbeiten. Es hat mich gefreut, dass Sie so oft und regelmäßig für Termine zur Verfügung standen, was ich zuvor nicht erwartet hatte. Für mich war es eine sehr fördernde Zusammenarbeit, von der ich viel gelernt habe. Auch bei meinen Kolleginnen und Kollegen Judith, Cornelia, Konrad, Michaela, Lars, Jana, Fanny und Herrn Neyer möchte ich mich herzlichst bedanken für die Art und Weise, wie sie mich in die Gruppe aufgenommen haben. Ich bewahre sehr schöne Erinnerungen an meinen Aufenthalt in Berlin.<sup>1</sup>

Verder wil ik graag *alle* medewerkers van Pedagogiek, in het bijzonder de collega's van Adolescentie (voormalige Jeugdstudies), bedanken voor de prettige werksfeer en voor de gezelligheid tijdens de lunch (*wanneer gaan we eigenlijk nog eens naar de overkant...?*), vakgroepuitjes en andere activiteiten. Met name de collega's van het onderzoeksproject Conamore wil ik bedanken voor hun plezierige samenwerking en behulpzaamheid. Mijn grote dank gaat uit naar Endy en Petra voor de nauwkeurige coördinatie van dataverzamelingen en databasebeheer. Ook de adolescenten, die bereid waren om vijf jaar achtereenvolgens 'ellenlange' vragenlijsten in te vullen, ben ik zeer erkentelijk. Tenslotte mag ik een belangrijke groep collega's niet vergeten: de promovendi van onderzoeksschool

<sup>1</sup>: Met dank aan dhr. drs. G. J. J. Spierts voor de snelle en nauwkeurige vertaling van deze tekst.

Langeveld Instituut (èn voormalig ISED-Utrecht). Ik vond het erg prettig om regelmatig onze ervaringen uit te wisselen, om van elkaar te leren en om samen diverse activiteiten te organiseren. Bedankt voor alle prettige contacten!

Natuurlijk wil ik ook *al* mijn (niet-)muzikale Limburgse vrienden van harte bedanken voor hun gezelligheid, steun, interesse en de afleiding naast m'n werk! Enkelen wil ik in het bijzonder noemen: Martijn (voor alle computertechnische ondersteuning wanneer dan ook), Roy (voor het veelvuldige 'theeën' en 'treinpoolen'), Vivian (voor haar grote interesse in anderen, ook in mij; het is weer tijd om bij te kletsen!), Richard (voor urenlange discussies, bijv. over de geschiedkundige correctheid van Disney's Pocahontas), Marinka (voor haar Eindhovense gastvrijheid en gezelligheid) en Stephanie en Monique (voor hun ruimhartige onderdak aan het begin van mijn Utrechtse avontuur). Laten we binnenkort weer wat afspreken!

Annemiek en Charlene, ik ben zeer vereerd dat jullie mijn paranimfen willen zijn! Annemiek, we hebben zo ongeveer onze hele AiO-periode samen doorgemaakt en dus zo'n vier jaar lang lief en leed (*meer lief dan leed*) gedeeld. Ik ben blij dat het meteen vanaf het begin zo goed klikte tussen ons. Ondanks alle activiteiten rondom je eigen onderzoek heb je me altijd een luisterend oor geboden. Wat ik je ook vertelde, over kleine of grotere 'trubbels', je wist me altijd weer op te peppen en te motiveren. Hoewel we officieel natuurlijk collega's zijn, zie ik je meer als vriendin! Charlene, mijn kleine zusje, we hebben tijdens onze kindertijd, adolescentie en jong volwassenheid met veel plezier allerlei dingen samen gedaan: beiden naar dezelfde basisschool, beiden naar Rolduc, samen naar ballet, samen naar de harmonie (*om bijv. samen te 'klarinettenmuckelen'*) en beiden naar de UM om psychologie te studeren. Ik vind het dan ook erg fijn dat we deze promotie ook een beetje samen kunnen doen!

Mijn ouders Materna en Henk wil ik bedanken voor de onvoorwaardelijke steun, belangstelling, adviezen, wijsheid en ervaring die jullie me al jarenlang bieden. Bedankt voor alles wat jullie steeds voor me doen! Ook Hannie, Jan en Janine wil ik bedanken voor de hartelijke steun en de oprechte interesse die jullie in me tonen.

Als laatste wil ik Rob bedanken: voor je flexibiliteit en veerkracht (*als ik iemand als 'resilient' zou moeten aanwijzen, ben jij het wel!*), voor je steun en belangstelling, voor je hartelijkheid en warmte (*en soms humor...*), voor je hulp en advies, voor je rust en geduld. Bedankt ... voor alles eigenlijk. Je bent mijn enorme lieverd!

## **CURRICULUM VITAE**



Joyce Akse was born on March 19th, 1979 in Heerlen and grew up in the Limburgse village called Simpelveld. She went to Catholic Grammar School Rolduc in Kerkrade and graduated in 1997. She continued her educational career at the university of Maastricht in order to study psychology and she graduated in the year 2001 (biological psychology, neuropsychology). After working as a medical typist at Cadans / UWV in Heerlen for a few months, she started her PhD-project at the university of Utrecht. During this period she worked on her dissertation about the development of personality and problem behaviour in adolescence, was a representative of the PhD-students for the ISED-Utrecht research school for two years, worked as a junior researcher in the RADAR-project for several months and stayed at the Institute of Psychology (personality psychology) of the Humboldt-Universität zu Berlin (Berlin, Germany) for three months.

**CURRICULUM VITAE**  
(in Dutch)

Joyce Akse werd op 19 maart 1979 te Heerlen geboren en groeide op in het Limburgse dorp Simpelveld. Ze ging naar Katholiek Gymnasium Rolduc te Kerkrade en behaalde in 1997 haar diploma. Vervolgens studeerde ze psychologie aan de Universiteit Maastricht met als afstudeerrichting biologische psychologie (neuropsychologie), waar ze in 2001 afstudeerde. Na enkele maanden als medisch typiste gewerkt te hebben bij Cadans / UWV te Heerlen begon ze aan haar AiO-project aan de Universiteit Utrecht. Tijdens deze periode werkte ze aan haar proefschrift over de ontwikkeling van persoonlijkheid en probleemgedrag tijdens de adolescentie, was ze gedurende twee jaar AiO-vertegenwoordiger voor de lokale onderzoeksschool ISED-Utrecht, werkte ze enkele maanden als junior onderzoeker binnen het RADAR-project en bezocht ze het Instituut voor Psychologie (persoonlijkheidspsychologie) aan de Humboldt-Universität zu Berlin (Berlijn, Duitsland) voor drie maanden in het kader van haar onderzoek.