Families and Adolescent Problem Behavior

Willeke Manders

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door
Wilhelmina Anna Manders
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Promotores:

Prof. dr. J.M.A.M. Janssens

Prof. dr. E.E.J. De Bruyn

Copromotor:

Dr. R.H.J. Scholte

Manuscriptcommissie:

Prof. dr. J.R.M. Gerris (voorzitter)

Prof. dr. M. Deković (Universiteit Utrecht)

Dr. S.J.T. Branje (Universiteit Utrecht)

Voor mijn ouders,

die me aan den lijve hebben laten ondervinden wat het betekent om deel uit te maken van een gezin met een warm gezinsklimaat.

Contents

Chapter 1

Introduction

Development takes place in social contexts. These social contexts are believed to have an impact on individual behavior and developmental course (Bronfenbrenner, 1979; Sameroff, 1983). Of the many contexts in which individuals develop, the family has been considered to be among the most important and influential. The family provides a context wherein individuals are necessarily interdependent, exerting a reciprocal and continuous influence on one another (Cox & Paley, 1997). Researchers have increasingly directed their attention to adolescence as an important phase in the life course, and to the family as a context for understanding adolescent development (Barber, 2006; Gecas & Seff, 1990; Steinberg & Morris, 2001).

Families consist of different levels of complexity which have to be distinguished, because each level has unique properties that may have a different impact on the development of family members (Hinde, 1997). The individual level of complexity refers to characteristics unique to individuals (e.g., father, mother, adolescent), such as their problem behavior. Although the individual is a useful and necessary level of analysis, recognition of relationships between family members at the dyadic relationship level (e.g., father-mother, mother-adolescent, father-adolescent) is necessary. Relationships are a series of interactions between two individuals who know each other. Their interactions are not independent but influence each other on the basis of past interactions and of expectations of future interactions. Finally, at the group level of complexity, the family as a unit of analysis that is independent of the individuals and dyadic relationships within the family, deserves recognition. Families have unique properties (e.g., distinct climates, styles of responding to events, and boundaries) that cannot be predicted from the collection of individuals and relationships which constitute the dynamics of the group.

Different Levels of Complexity in Family Members' Ratings

These different levels of complexity within families (i.e., the individual, dyad, and the group) may be confounded when individual ratings of family members are used to assess characteristics of the family as a group (i.e., the group level of complexity). Recent research evidence suggests that family members' ratings of characteristics of the family as a group may be significantly affected by effects at lower levels of complexity within families (Cook & Kenny, 2006). For example, a family member's rating on characteristics of the family as a group may reflect that family member's unique experience (i.e., characteristics unique to the individual) rather than properties of the family as a group one aims to assess. Ratings of family members are used to assess characteristics of the family as a group in well-known instruments such as the Family Environment Scale (Moos & Moos, 1981), the Family Assessment Measure (Skinner, Steinhauer, & Santa-Barbara, 1983), and the Family Adaptability and Cohesion Evaluation Scales (Olson, Portner, & Lavee, 1985).

In confirmatory factor analyses across these family instruments, affect was found to be one of the basic dimensions of family functioning (Jacob & Windle, 1999). In this thesis, we focus on the confounding of different levels in family members' ratings of warmth in the family as a group. Warmth can be conceived of as belonging to the affective domain. Warmth refers to family members' tendencies to express their love and respect for each other and to support each other in what they are doing (Scholte, Van Lieshout, & Van Aken, 2001). In a theoretical model described by Van Lieshout, Cillesen, and Haselager (1999) warmth is described as the positively balanced provision pole of an affective dimension of relational support, called emotional support. This affective dimension emotional support assesses warmth as opposed to hostility. Other studies provide support for warmth (also called positivity) and hostility (also called negativity) as two separate affective dimensions (Cook & Kenny, 2004; O' Connor, Hetherington, & Reiss, 1998). In this thesis, warmth is treated as a separate unidimensional affective dimension.

Different levels of complexity within families may also be confounded when ratings of family members are used to assess individual characteristics of other members. Family members' ratings of each other's personality, for example, were found to reflect characteristics of family members (i.e., the individual level), characteristics of dyadic relationships (i.e., the dyadic level), and characteristics of the family at the group level of

complexity (Branje, Van Aken, Van Lieshout, & Mathijssen, 2003). Family members' judgments of more visible and specific behaviors may also be affected by different levels of complexity. Research shows that family members' ratings of each other's problem behavior may not only be affected by characteristics of family members, but also by, for example, characteristics of the family as a group such as ethnicity/race, family stress, and SES (see e.g., De Los Reyes & Kazdin, 2005). In this thesis, we focus on the confounding of different levels in family members' ratings of each other's problem behavior.

Family members' ratings of warmth in the family as a group and each other's problem behavior are frequently used for scientific and clinical purposes. If effects at different levels of complexity are confounded in these ratings, this may have a significant impact on the assessment, clarification, and treatment of individuals and their families. In terms of guiding interventions, it could lead to interventions at the inappropriate level of complexity within families. For example, an intervention may be erroneously directed at the behavioral problems of a family member that are a consequence rather than a cause of problems at the level of the family as a group. With respect to testing theoretical predictions, if the characteristics of individuals, dyads, and the family in family members' ratings cannot be disentangled, than a finding that one of these characteristics predicts some outcome may be spurious. For example, a number of studies have reported negative associations between family members' ratings of characteristics of the family as a group (e.g., family support, cohesion) and adolescent problem behavior (Braungart-Rieker, Rende, Plomin, & De Fries, 1995; Cuffe, McKeown, Addy, & Garrison, 2005; Gorman-Smith, Tolan, Henry, & Florsheim, 2000; Halpern, 2004; Steinhausen, Gavez, & Metze, 2005). In these studies it was concluded that adolescents that come from families with a less supportive and cohesive family climate show more behavioral problems. Given that family members' ratings of the family as a group may be significantly affected by effects due to characteristics of family members, an alternative interpretation is that adolescents who perceive less support and cohesion from others show more behavioral problems.

Disentangling Different Levels of Complexity in Family Members' Ratings

In the first three empirical studies described in this dissertation, the problem of measures confounding effects at different levels of complexity within families (i.e., the

individual, dyad, and the group) is handled by using a round-robin design in which each family member rates all other family members. Such a design enables the application of the Social Relations Model (SRM: Kenny & La Voie, 1984), by means of which the contribution of various sources in the total variance of family members' ratings can be assessed. According to the family version of the SRM (Cook, 1994; Kashy & Kenny, 1990), family member A's thoughts, feelings, or behavior in relation to family member B will be a function of four factors; (1) family member A's actor effect (also called perceiver effect), (2) family member B's partner effect (also called target effect), (3) the unique relationship of family member A to family member B (i.e., a relationship effect), and (4) a family effect. Actor effects reflect characteristics of a family member that influence all of his or her relationships. It can be considered as an index of individual differences or traits. Partner effects reflect consistency in the behavior a family member elicits from or affords others. Like the actor effect it represents stability across multiple relationships, in this case, multiple relationships in which the family member is the partner. Relationship effects indicate the unique adjustment one family member makes to another. It may reflect the way two family members fit together rather than general characteristics of either one of the family members. Relationship effects are directional. That is, the mother-adolescent relationship effect is not equivalent to the adolescent-mother relationship effect. A family effect is a group effect. The family effect refers to characteristics of the family as a group that affect a family member's perceptions. It can be viewed as a clear measure of the unique properties of the family as a group unconfounded by other sources of variance.

Aims of the Studies - I

So far, we have seen that different levels of complexity within families may be confounded in individual ratings of family members. We have described SRM analysis, which can be used to disentangle these different levels of complexity in family members' ratings. In the first three empirical studies described in this dissertation, the SRM is used to disentangle effects due to different levels of complexity in individual family members' ratings of warmth in the family as a group and each other's behavioral problems. The aims and hypotheses of the studies will be looked at more closely now, and it will be made clear how these hypotheses can be tested with SRM analysis.

Research Questions and Main Hypotheses- Study 1

The aim of the first empirical study was to test whether each of four family members' (fathers, mothers, two adolescents) ratings of warmth in the family as a group measures family functioning at the intended group level of complexity within the family. In other words, we tested the level validity of family members' ratings of warmth in the family as a group. SRM analysis was used to assess actor, partner, relationship, and family factors in family members' ratings of the warmth received from each other. Because in SRM analysis factors at all levels are estimated controlling for factors at the other levels of the family, the SRM factors served as a "gold standard" for testing the level validity of family members' ratings of warmth in the family as a group. Our criteria for level validity were (1) family members' ratings of warmth in the family as a group had to be significantly associated with the family factor, and (2) family members' ratings of warmth in the family as a group should not be significantly associated with any other SRM factors in addition to the family factor.

Previous research demonstrated that ratings of family members contain a "true-score" component, but are also biased by systematic rater effects (Cole & Jordan, 1989; Cook & Goldstein, 1993; Jacob & Windle, 1999). Therefore, we hypothesized that the individual ratings of warmth in the family as a group would be predicted not only by the family factor, but also by actor factors (sometimes called rater factors). Thus, we expected that the individual ratings would lack level validity. In a second set of analyses, we tested the validity of a latent variable measure of warmth in the family as a group as indicated by the four individual ratings. A latent variable approach provides statistical control for rater effects and errors of measurement (Cook & Goldstein, 1993). Consequently, we hypothesized that the latent variable measure of warmth in the family as a group would be predicted only by the family factor, providing evidence for the level validity of the latent family warmth measure.

Research Questions and Main Hypotheses- Study 2

The aim of the second empirical study was to assess the association between warmth in the family as a group and adolescent problem behavior. The application of SRM analysis enabled us to assess the warmth in the family as a group (i.e., the family factor) controlling

for other sources of variance such as characteristics of family members and relationships. According to the social climate perspective of Moos (1975), families may provide quite different social climates for parents and children. Consequently, our first hypothesis was that a family factor could significantly account for family members' ratings of the warmth received from each other. This would imply that families differ with respect to the warmth in the family as a group.

Only when evidence was provided that families differ on the warmth in the family as a group, we could test our second hypothesis. Several studies provided evidence that clusters based on affective relations among all family members were related to problem behavior of adolescents (Deković & Buist, 2005; Mathijssen, Koot, Verhulst, De Bruyn, & Oud, 1998; O' Connor et al., 1998; Schauerte, Branje, & Van Aken, 2003). In these studies, the highest level of problem behavior was found for adolescents from families with negative relationships among all family members, while the lowest level of problem behavior was found for adolescents from families with positive relationships among all family members. Although these researchers did not test whether their specific configurations of affective relationships within the family really represented properties unique to the family as a group independent from individual characteristics of family members and family relationships, their findings imply that the warmth in the family as a group (i.e., the general level of the quality of all family relationships) may be negatively associated with adolescent problem behavior. Our second hypothesis was that the warmth in the family as a group would be negatively related to adolescent problem behavior.

Previous research suggests that the cumulative effect of distressed family relationships is a more important correlate of adolescent outcomes than individual characteristics of family members. In a prior SRM study focusing on correlates of adolescent problem behavior, for example, the justice or trust in the family as a group was more strongly related to problem behavior outcomes than individual characteristics of family members (Delsing, Oud, De Bruyn, Scholte, & Van Aken, 2005). These results led to our third hypothesis that the family factor would be more strongly related to adolescent problem behavior than the actor or partner factors. In other words, we expected that the warmth in the family as a group would be most strongly associated with adolescent problem behavior.

We analyzed two models in which the warmth in the family as a group was related to adolescent problem behavior, one for externalizing problem behavior and one for internalizing problem behavior. We hypothesized that the warmth in the family as a group would be strongly related to both adolescent externalizing and internalizing problem behavior. Based on the social learning perspective (Bandura, 1977), we expected that adolescents from families with low warmth and high hostility in the family as a group may learn to use more externalizing problem behavior through behavioral conditioning and by imitating behaviors they have observed or seen rewarded in their families. Furthermore, we expected that the stress associated with low warmth and high hostility in the family as a group also manifests itself in internalizing problems (Sternberg et al., 1993).

Research Questions and Main Hypotheses- Study 3

In the third empirical study, the SRM was used to assess whether family members' ratings of each other's problem behavior represent the intended characteristics of family members who are targeted on problem behavior (partner factors, also called target factors). Furthermore, it was assessed whether the validity of family members' ratings of problem behavior is compromised by effects due to characteristics of family members who report on problem behavior (actor factors, also called perceiver factors), and characteristics of the family as a group (family factor). This was assessed at two waves, approximately ten months apart.

Previous research suggests that family members' ratings of children or adolescents' problem behavior may represent characteristics of the children or adolescents who are targeted by these ratings. In several studies, modest correlations were found between different family members' ratings of children or adolescents' problem behavior (see e.g., Achenbach, McConaughy, & Howell, 1987; Van Der Ende & Verhulst, 2005). These findings might imply that characteristics of children or adolescents influence the judgments on their problem behavior and thus affect the degree to which different family members agree on their problem behavior. Research evidence also indicates that family members' ratings of children or adolescents' problem behavior may be biased by characteristics of family members who report on problem behavior and characteristics of the family as a group. In many studies, higher levels of children or adolescents' problem behavior reported

by family members (e.g., mothers) were found to be associated with higher levels of neuroticism or depressive symptoms in the family members themselves (see e.g., De Los Reyes & Kazdin, 2005; Kroes, Veerman, & De Bruyn, 2003; Kroes, Veerman, & De Bruyn, 2005). Furthermore, there is some evidence that characteristics of the family as a group such as ethnicity/race, family stress, and SES are related to discrepancies in family members ratings of children or adolescents' problem behavior (see e.g., De Los Reyes & Kazdin, 2005). We hypothesized that these findings would hold for family members' ratings of the problem behavior of all members (i.e., parents and adolescents). Consequently, we hypothesized that partner factors, actor factors, and a family factor would be found in family members' ratings of each other's problem behavior.

In addition, we determined exactly how much of the variance was accounted for by each of the SRM factors. Generally, no more than one-third of the total variance in interpersonal ratings is due to the individuals targeted by the ratings, even when the perceivers know the targets fairly well, as where family members rate each other (Kenny, 1994). In large part, perceivers do not agree because they have relatively idiosyncratic theories about targets (Park, DeKay, & Kraus, 1994). Furthermore, it has been shown that there is significant overlap in a perceiver's judgments of different targets (Kenny, 1994). Consequently, we expected that the absolute value of the amount of variance explained in family members' ratings of problem behavior would be greater for actor factors (also called perceiver factors) than for partner factors (also called target factors). Because the variance in interpersonal ratings due to the family factor had not been assessed as much as the actor and partner factors, we did not formulate specific hypotheses about the relative contribution of the family factor in explaining differences between family members' ratings of problem behavior.

Our final hypothesis was that the absolute value of the amount of variance explained in family members' ratings of problem behavior by partner factors would be greater for judgments of externalizing problem behavior than for judgments of internalizing problem behavior. This hypothesis was based on previous research which suggested that there is greater correspondence evident in informants' ratings of externalizing problems compared with internalizing problems (Achenbach et al., 1987; Duhig, Renk, Epstein, & Phares, 2000). Externalizing problems of targets are hypothesized to elicit more similar reports

from family members than internalizing problems, because externalizing behavioral problems are more visible for family members.

Aims of the Studies - II

The attention of the first three empirical studies is focused on the individual level (e.g., ratings of family members' problem behavior) and the group level (e.g., ratings of warmth in the family as a group) of complexity within families. The final empirical study focuses on relationships between family members at the dyadic level of complexity. Research on family relationships has focused predominantly on the parent-adolescent relationship. As being an important part of an adolescent's everyday social environment, family relationships such as the parent-adolescent relationship could be involved in the connection between adolescent personality and problem behavior either by introducing some input to which the adolescent must respond, or by being an output that the adolescent shapes in some way (Shiner & Caspi, 2003). In the final and fourth empirical study we explored the role of the quality of the parent-adolescent relationship in explaining the association between adolescent personality and problem behavior.

Research Questions and Main Hypotheses- Study 4

In the fourth empirical study we tested two models that conceptualized the influencing role of the quality of the parent-adolescent relationship in the association between adolescent personality traits and externalizing and internalizing problem behavior. In the mediation model, the quality of the parent-adolescent relationship was hypothesized to channel the effects of adolescent personality on problem behavior. In the moderation model, the quality of the parent-adolescent relationship was expected to function as an external condition which affects the association between adolescent personality and problem behavior.

Hypotheses about which links between personality traits and problem behavior would be mediated or moderated could not be formulated because the quality of the parent-adolescent relationship has not been studied as a variable that affects the association between adolescent personality and problem behavior. Therefore, we tentatively based our expectations on research evidence from studies in which parental behavior was studied as a

mediator or moderator variable in the relationship between adolescent personality and problem behavior. Theoretical support for a mediating role of parental behavior is provided by Patterson's (1997) macro model of parenting that explains how the effects of children's characteristics on children's adjustment are mediated by parenting practices. Empirical support for this model was found in a study by Prinzie et al. (2004). Prinzie et al. found that the associations between children's benevolence (comparable with agreeableness) and emotional stability and children's externalizing problem behavior were mediated by parental negative discipline. Children's benevolence also contributed directly to children's externalizing problem behavior. Assuming that parental negative discipline is associated with a negative quality of the parent-adolescent relationship, we tentatively expected a partially mediating role of the parent-adolescent relationship in explaining the association between adolescent agreeableness and externalizing problem behavior (i.e., both direct and mediated links between agreeableness and externalizing problem behavior) and a fully mediating role of the parent-adolescent relationship in explaining the association between adolescent emotional stability and externalizing problem behavior (i.e., only a mediated link between emotional stability and externalizing problem behavior). No expectations were formulated for the mediating role of the parent-adolescent relationship in explaining the association between adolescent personality and internalizing problem behavior.

The goodness-of-fit theory (Thomas & Chess, 1977) provides support for a moderating role of parental behavior in explaining the association between children's temperament and behavioral problems. Furthermore, empirical support was found that parental behavior affected the association between children's personality traits and behavioral problems. In studies by Van Leeuwen, Mervielde, Braet, and Bosmans (2004) and Prinzie et al. (2004) it was found that children who score low on benevolence and conscientiousness and who were exposed to negative parental control exhibited higher levels of externalizing problem behavior. Parental behavior was not found to moderate the association between personality and internalizing problem behavior. Based on these findings, we tentatively expected a moderating role of the parent-adolescent relationship in explaining the links between agreeableness and conscientiousness on the one hand and externalizing problem behavior on the other hand. We expected no moderating role of the parent-adolescent relationship in explaining links between personality traits and internalizing problem behavior.

Data Set and Measures

The data for the empirical studies described in this thesis were gathered from fathers, mothers, and two adolescent children in 69 families (detailed descriptions of the dataset can be found in the studies described in this thesis). In accordance with a round-robin design, each family member was asked to rate the personality and problem behavior of the other three family members, and characteristics of the relationships with the other three family members (received warmth and hostility, quality of communication). Furthermore, each family member rated the warmth in the family as a group. Family members provided these ratings at two waves, approximately ten months apart. The Quick Big Five Personality Questionnaire (QBF; Vermulst & Gerris, 2005) was used to assess family members' personality. The QBF assesses five basic personality dimensions that provide a generalizable and comprehensive taxonomy of traits (Goldberg, 1990; 1993). The Nijmegen Problem Behavior List (NPBL; Scholte, De Bruyn, & Vermulst, 2005) was used to assess family members' problem behavior. The NPBL was chosen because it is explicitly designed for studies that focus on family members' perceptions of each other's problem behavior (e.g., Delsing et al., 2005; Janssens, De Bruyn, Manders, & Scholte, 2005). The NPBL can also be used to assess problem behavior as it occurs in subclinical community samples. Two scales of the Relational Support Inventory (RSI; Scholte et al., 2001), a self-report questionnaire that is also appropriate for application in a round-robin study, were used to assess family members' perceptions of the warmth and hostility received from each other. The items of the *Warmth* scale were rephrased to assess family members' perceptions of the warmth in the family as a group. A 9-item version (Gerris et al., 1998) of the Parent-Adolescent Communication Scale (Olson et al., 1983) was used to assess the quality of communication between family members. More information about the measures can be found in the studies described in this thesis.

Analyses

In three studies in the present thesis, SRM analysis was performed on our round-robin family data. SRM analysis can be explained as follows (Cook, 2000): In our four-person families (i.e., fathers, mothers, and two adolescents), twelve family measures were obtained, one from each actor in relation to each of his or her three partners. The

components of the SRM were estimated from these observed data. This was accomplished by fitting the SRM to the variance-covariance of the data using the statistical program LISREL (Jöreskog & Sörbom, 2001). Fitting the SRM involved two steps: (a) specifying that the variance in each of the observed measures be partitioned into actor, partner, relationship, and family factors, and (b) specifying the correlation between the appropriate actor, partner, and relationship factors (e.g., reciprocity correlations).

In partitioning the observed variance into the factors of the SRM, each observed variable is treated as a dependent variable, and the factors of the SRM are the independent variables. For instance, the effects hypothesized to account for the older adolescent sibling's rating of warmth received from mother were (a) older adolescent sibling actor effect, (b) mother partner effect, (c) the older adolescent sibling -mother relationship effect, and (d) the family effect. The SRM factors are latent variables in a confirmatory factor analysis. Forcing the observed measures to load on the appropriate factors provides information on the amount of variance in the observed measure accounted for by each of the components. Factor loadings are usually fixed at 1.0.

An SRM factor is important if it accounts for significant variance in the raw scores of the observed measures. For example, measures of older adolescent siblings' perceived warmth from mothers, fathers' perceived warmth from mothers, and younger adolescent siblings' perceived warmth from mothers all involve the mother as a partner. If the variance for mother partner factors is significant, it means that variance across families in these three observed measures is accounted for by characteristics of mothers. The results of the SRM analyses were typically reported in terms of the variances of each factor and the significance of the variances. In one study (Chapter 4), the results were also expressed in terms of the percentage of variance in the measured variable explained by each of the relevant SRM factors.

The second step in the SRM analyses involved the specification of the correlations among the factors of the SRM. Two kinds of reciprocity correlations were specified: actor-partner correlations and relationship reciprocity correlations. Actor-partner correlations (e.g., the correlation of mother actor factors with mother partner factors) indicate the extent to which a person elicits from others (the partner effect) dispositions similar to those he or she generally has towards others (the actor effect). Thus, the actor-partner correlation is an

estimate at the individual level of analysis. In the present thesis, actor-partner correlations were estimated separately for mothers, fathers, older adolescent siblings, and younger adolescent siblings. Reciprocity at the dyadic level of analysis is indicated by the correlation of relationship factors (e.g., mother-father with father-mother). Six dyadic reciprocity correlations were estimated: mother-father, mother-older adolescent sibling, mother-younger adolescent sibling, father-older adolescent sibling, father-younger adolescent sibling, and older adolescent sibling-younger adolescent sibling).

Latent variables require a minimum of two indicators (i.e., observed measures) in order to be estimated. Round-robin data from four-person families provided three indicators for each of the actor and partner factors, and all 12 observed measures served as indicators of the family factor. There was only one observed measure available that could serve as an indicator for each of the relationship factors. Therefore, the relationship variance became part of the residual variance (i.e., variance that is not explained by the family, actor, or partner factors).

Outline of this Dissertation

The thesis consists of four studies, all of which have been published in or (re)submitted to international journals. Chapter 2, *"Level Validity of Self-Report Whole-Family Measures",* describes a study in which the level validity of family members' ratings of warmth in the family as a group is tested. Chapter 3, "*Family Warmth and Adolescent Problem Behavior: A Social Relations Model Analysis*", relates the warmth in the family as a group to adolescent problem behavior. Chapter 4, "*Perceptions of Problem Behavior in Adolescents' Families: Target, Perceiver, and Family Effects*", concerns a study on the effects of the target, the perceiver, and the family on the variance in family members' ratings of each other's problem behavior. In Chapter 5, *"Adolescent Personality, Problem Behavior and the Quality of the Parent-Adolescent Relationship*", the role of the quality of the parent-adolescent relationship in explaining the association between adolescent personality and problem behavior is assessed. Finally, in Chapter 6, the results of the empirical studies are summarized and discussed.

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Chapter 2

Level Validity of Self-Report Whole-Family Measures*

This article introduces an approach to testing the level validity (i.e., whether an instrument measures family functioning at the level of the system it purports to assess) of family members' ratings of whole-family warmth. Two parents and two adolescents in 69 families rated the warmth in each of their family relationships and in the family as a whole. Family members' ratings of whole-family warmth not only assessed family functioning at the family level (i.e., characteristics of the family as a whole), but also at the individual level of analysis (i.e., characteristics of family members), indicating a lack of level validity. Evidence was provided for the level validity of a latent variable based on family members' ratings of whole-family warmth. The findings underscore the importance of more systematic evaluations of the level validity of individual ratings of whole-family functioning.

Introduction

Family researchers have increasingly recognized the importance of expanding their focus to units beyond the dyad in understanding family processes (Cox & Paley, 1997). In an attempt to extend the unit of analysis in family research to the larger family unit, some researchers have used instruments in which family members are asked to rate the family as a whole. Well-known examples of instruments that assess the larger family unit are the Family Environment Scale (FES; Moos & Moos, 1981) and the Family Adaptability and Cohesion Evaluation Scales (FACES; Olson, Portner, & Lavee, 1985). The items in such measures are designed to assess the family level of the family system directly, based on the ratings of informants. For example, "People in my family look out for each other" is the type of item used for rating whole-family functioning.

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An important question that has been raised about instruments that directly assess a particular level of the family system (in this case the family level) is whether they assess family functioning at the level of the system they purport to assess (i.e., level validity). Re-analysis of existing data has shown that ratings targeting the dyadic subsystems in the family lacked strong level validity for the dyadic level of the family system (Cook & Kenny, 2006). In this article we introduce an approach to testing the level validity of instruments that directly assess family functioning at the family level of analysis. The approach is illustrated by testing the level validity of family members' ratings of familial warmth.

Several researchers have expressed criticisms or concerns about measures that directly assess the family level of the family system (Cole & Jordan, 1989; Cook & Kenny, 2006; Dakof, 1996). An important question that has been raised is whether the family is to be conceived as a collection of individuals with their own unique perspectives on the family or whether the family should be considered a unified entity reflected in the perspectives of the individuals in the family. This conceptualization of the family as either a collection of individuals or a unit of shared experiences has implications for family assessment. If the family is viewed as a collection of individuals, a family member's rating of the family reflects the unique experience of that family member. If the family is considered as a unit, a family member's rating of the family reflects shared experience representing interpersonal processes occurring within the family (Dakof, 1996).

It may be that the family is both a collection of individuals with unique perspectives on their family and a whole or unit (Dakof, 1996). A family member's rating of the family may reflect both the unique experience of that family member and shared experience representing interpersonal processes occurring within the family. As a consequence, the unique variance in a family member's rating of the family that is due to characteristics of the rater has to be separated from shared variance that is due to characteristics of the family. In basic research studies, this is easily accomplished using structural equation modeling (e.g., Jacob & Windle, 1999). However, such analyses require a relatively large sample of families. When assessing an individual family, a different approach is needed to separate a family member's unique perspective from a family member's shared experience of the family (Cook & Kenny, 2004).

Another criticism about measures that directly assess the family level of the family system is related to the complexity of families. Cole and Jordan (1989) emphasized that a family consists of a number of subsystems which may differ considerably from each other. Therefore, treating the family as the unit of analysis by using family members' ratings of characteristics of the family as a whole may gloss over important information about subsystems within the family. A conceptualization of the family as a larger family system that can be understood by the relations among its subsystems goes further toward specifying the complexity of families. Cook and Kenny (2006) are even more emphatic that the measurement of family should specify the complexity of the system. They argue that it is the architecture of the system, the way the individuals fit together, that distinguishes the family system from groups in which there is less interdependence. A family member's rating of the family as a whole does not capture the way family members fit with one another. Unique relationships and the patterns among these relationships are ignored by these ratings, yet these patterns are what constitute the "whole" when it is said that "the whole is greater than the sum of the parts."

A third criticism about measures that directly assess the family level of the family system is psychometric. The items in such measures, such as "People in my family look out for each other," are double-barrelled (Judd, Smith, & Kidder, 1991). That means that the items are subject to responses they were not intended to accommodate. A family member's response to such items could reflect the behavior of any individual in the family, the characteristics of one or more subsystems in the family, or the characteristics of the family as a whole. Because the "family as a whole" is an abstraction (not truly a "thing"), such items lack the specificity that clinical and scientific applications demand (Cook & Kenny, 2006).

Directed relationship measures (e.g., "My mother looks out for me") have been recommended as one means to provide respondents with clear and specific targets for their ratings of family functioning (Cook & Kenny, 2006). Moreover, when collected within a round-robin design (i.e., everyone rates everyone), such items can be analyzed using the Social Relations Model (SRM: Kenny & La Voie, 1984; Cook, 1994). Studies applying the SRM to family relationships data have consistently uncovered factors at the individual, dyadic, and family level of analysis (Branje, Van Aken, & Van Lieshout, 2002; Cook,

1994, 2000, 2001; Cook, Kenny, & Goldstein, 1991; Delsing, Oud, De Bruyn, & Van Aken, 2003; Delsing, Oud, De Bruyn, Scholte, & Van Aken, 2005).

Note that even with directed relationship items, the ratings contain variance due to factors at multiple levels of the family system. This has important implications for the assessment of family functioning. It means that the interpretation of such items in their raw form will be problematic. Knowledge that a rating of family functioning on these items differs from the norm cannot be interpreted unambiguously. How can one know whether the individual or the family is dysfunctional if the assessment items are affected by both individual and family level factors? It is clinically and scientifically essential to understand the contribution of each level of the system to the individual's rating of family functioning on these items. For directed relationship items this can be accomplished using the SRM.

In prior research (Cook & Kenny, 2006), the level validity of measures of dyadic subsystem functioning was tested by modifying the proposed structural equation model to include individual level factors. After the inclusion of the individual level factors, the validity of the dyad level factors was shown to be weak at best. Unfortunately this approach cannot be used to test the level validity of ratings of whole-family functioning. As an alternative we developed the following approach. First, we collected measures of family warmth using two different measurement strategies. Strategy 1 involved having each family member rate the warmth in their family as a whole using items such as "People in my family show their love for each other." The second measurement strategy involved having family members rate the warmth of each of their relationships within a round-robin design using directed relationship measures (e.g., My mother shows her love for me"). Because data was collected from four-person families, it was possible to model the complete SRM from these directed relationship scores, including the family factor, the four perceiver or actor factors, and the four target or partner factors (see Method section). Relationship specific factors were not estimated separate from the residual variance in this analysis.

Because in SRM analysis factors at all levels are estimated controlling for factors at the other levels of the system, the level validity of the factors is tested by the very process of estimating the model. It therefore serves as a 'gold standard' for testing the level validity of measures obtained through other approaches. The core feature in our test of the level validity of whole-family ratings is to predict measures of whole-family warmth (Strategy 1)

using the factors of the SRM derived from the directed relationship measures (Strategy 2). Our criteria for validity are (1) the measure of whole-family functioning must be significantly predicted by the SRM family factor, and (2) the measure must not be significantly predicted by any other SRM factors in addition to the SRM family factor.

The rationale for requiring that the measure of whole-family functioning be significantly related to the SRM family factor is consistent with standard tests of validity. Our criteria that the whole-family rating could not be significantly related to any other SRM factors follows from the fact that a measure that is confounded by systematic variance due to some other factor than the one being measured would likely result in spurious findings. Consequently, even if the family factors from both models were significantly related to each other, if a measure of whole-family functioning was predicted by any of the other factors of the SRM, it would indicate that the measure lacks level validity.

First, we tested the level validity of each of four family members' ratings of whole-family warmth. Previous research demonstrated that the rating of a family informant does not only contain "true-score" variance, but also includes systematic variance unique to the perspective of the rater (Cole & Jordan, 1989; Cook & Goldstein, 1993; Jacob & Windle, 1999). Therefore, we hypothesized that the individual ratings of whole-family warmth would be predicted not only by the SRM family factor, but also by SRM actor factors (sometimes called rater factors). As noted above, if any of the other SRM factors significantly predict family members' ratings of whole-family functioning besides the SRM family factor, we would conclude that the ratings lack level validity.

In a second set of analyses, we tested the validity of a latent variable measure of family warmth as indicated by the four individual ratings. In principle, a latent variable based on the four family member ratings of family warmth will not be affected by the perspectives of individual family members and errors of measurement (Cook & Goldstein, 1993). Consequently, we hypothesized that the latent variable measure of family warmth would be predicted only by the SRM family factor and not by other SRM factors. If the latent family warmth measure is predicted only by the SRM family factor, evidence is provided for the level validity of the latent family warmth measure.

Method

Participants

Families were recruited via 16 secondary schools in The Netherlands. Schools with different types of curriculum were selected in three different regions. A letter was handed to the students, addressed to the students and their parents, that informed them about the goal and procedures of the research project, the criteria with respect to participating, and the registration procedure. The criteria for participating in this study were being part of a household with two parents and at least two adolescents between the ages of 11 and 18. Families were paid Euro 45.5 for their participation in this study. Participants included 69 families with two adolescents and both of their parents. The two adolescents were distinguished as older and younger adolescents. The age of the older adolescents (35 boys, 34 girls) was on average 15.6 years (SD= 1.31). The age of the younger adolescents (32 boys, 37 girls) was on average 13.3 years (SD= 1.18). The average age of fathers and mothers was 47 and 45 years respectively, ranging from 40 to 58.6 years and from 36.9 to 55.4 years. The highest level of education was secondary education for 37% of the fathers and 51% of the mothers; 30% of the fathers and 29% of the mothers finished higher education; and 33% of the fathers and 20% of the mothers obtained a university degree. Of the fathers, 97% were employed, whereas 74% of the mothers were employed. Ninety-eight percent of the participants were Dutch.

Measures

Both parents and adolescents were asked to rate whole-family warmth on family-as-a-whole items. Secondly, both parents and adolescents were asked to rate the warmth received from each of the other family members on directed relationship items.

Family-as-a-Whole-Items. The original three items of the subscale Warmth of the Relational Support Inventory (RSI; Scholte, Van Lieshout, & Van Aken, 2001) were rephrased to rate whole-family warmth (“People in my family show their love for each other”, “People in my family show their respect for each other”, “People in my family support each other in what they are doing”). Fathers, mothers, the older adolescents, and the younger adolescents rated each item on a 7-point Likert scale anchored at the extremes by

1 = very untrue to 7 = very true. Cronbach's alpha's for the family-as-a-whole items warmth averaged α = .81 with a range of α = .78 to α = .88.

Directed Relationship Items. The original items of the subscale Warmth of the Relational Support Inventory were used to rate the perceived warmth in family relationships ("This person shows his or her love for me", "This person shows his or her respect for me", "This person supports me in what I am doing"). Fathers, mothers, the older adolescents, and the younger adolescents rated each item on a 7-point Likert scale like the one for the whole-family ratings. Cronbach's alpha's for the directed relationship items averaged α = .78 with a range of α = .69 to α = .84.

Statistical Analyses

The Social Relations Model (SRM) Analysis. The directed relationship items measuring perceived warmth data in family relationships were analyzed using the SRM. The application of the SRM required data collected according to a round-robin design. As previously noted, each participating family member rated the warmth received from each of the other family members. In our two parent-two adolescent families, this design produced data on 12 relationships (4 family members × 3 partners each). Generally there will be variability across families on each of these measures (e.g., mother's perception of warmth received from father). The SRM was used to identify the sources of this variability. According to the family version of the SRM (Cook, 1993, 1994; Kashy & Kenny, 1990), each of the 12 measures consists of four sources of systematic variance; a family effect, an actor effect, a partner effect, and a relationship effect. For instance, the variance in mothers' perceptions of warmth received from fathers were specified to be a function of the variance in the family effect, the mother actor effect, the father partner effect, and the mother-father relationship effect.

The family effect reflects factors that may cause all members of families to be similar; for example, racial, religious, cultural, and economic variables (Cook, 2000). Variability in the level of mothers' perceptions of warmth received from fathers could be due to factors having a common effect on all family members. All 12 measures of perceived warmth in family relationships must be affected by the family factor for it to be significant. Independent of the family effect, the actor effect reflects consistency in an individuals'

thoughts, feelings, or behavior when viewed across multiple relationships, thereby creating a kind of cross-situational consistency (Cook, 2000). For example, mother's perception of warmth received from father could reflect the tendency of mother to perceive warmth in all her personal relationships. The partner effect reflects consistency in the thoughts, feelings, or behavior that individuals elicit from others (Cook, 2000). For example, mother's perception of warmth from father may reflect father's characteristic level of warmth, such that other people in general have the same experience of the father. In two parent-two adolescent families there are 4 actor and partner factors (for fathers, mothers, the older adolescents, and the younger adolescents). A relationship effect reflects the unique adjustment that one person makes to another, independent of family, actor, or partner effects (Cook, 2000). For example, a sexual conflict may affect mother's relationship with father without affecting her relationship to other family members. There are 12 relationship effects (4 family members x 3 partners) in two parent-two adolescent families.

The SRM factors were estimated from the perceived warmth data by fitting the SRM to the variance-covariance matrix of the data using the structural equation modeling program LISREL 8.50 (Jöreskog & Sörbom, 2001). The first step in fitting the SRM consists of specifying that the variance in each of the observed relationship measures be partitioned into family, actor, partner, and relationship factors. A SRM-analysis is essentially a confirmatory factor analysis in which the SRM factors are the latent variables and the perceptions of family members are the observed variables (Cook, 1994). Factor loadings are usually fixed at 1.0. Latent variables require a minimum of two indicators (i.e., observed measures) in order to be estimated. Round-robin data from four-person families provide three indicators for each of the actor and partner factors, and all 12 observed measures serve as indicators of the family factor. Because there was only one measure of each familial relationship available in the present study, an identified factor for each relationship effect could not be estimated. As a consequence, the systematic variance in the observed measure that is due to the relationship became part of the residual variance, the variance that is not explained by the family, actor, or partner factors (Cook, 1994).

The second step of fitting the SRM consists of specifying two kinds of reciprocity correlations: individual reciprocity correlations and dyadic reciprocity correlations. Individual reciprocity correlations are indicated by the correlation of family members' actor

factors with their partner factors. If the individual reciprocity correlation for mothers is significant and positive, it means that mothers who generally feel that they receive warmth from others are experienced by other family members as giving warmth. Dyadic reciprocity correlations are indicated by the correlation between the residual terms representing two persons' unique relationships with each other. For example, wives who feel warmth from their husbands may have husbands who feel warmth from their wives. In the present case, individual reciprocity correlations were estimated separately for fathers, mothers, older adolescents, and younger adolescents and six dyadic reciprocity correlations were estimated: father-mother, father-older adolescent, father-younger adolescent, mother-older adolescent, mother-younger adolescent, and older adolescent-younger adolescent.

Relation Between the SRM Factors and the Family Warmth Measures. After having excluded the non-significant SRM effects and non-significant reciprocity correlations from the SRM-analysis described above, we included the family warmth measures that were obtained from ratings of the family as a whole. We tested two models. In the first model we assessed the impact of the SRM factors on each of four family members' ratings of whole-family warmth. In accordance with our first hypothesis, each individual rating of whole-family warmth is regressed on the SRM family factor and the rater's own actor factor in this model. In the second model we assessed the impact of the SRM factors on a latent family warmth measure. Consistent with our second hypothesis, the latent family warmth measure is regressed on the SRM family factor in this model. As indicators of the latent family warmth measure we used fathers', mothers', the older adolescents', and the younger adolescents' ratings on whole-family warmth. The loading for fathers' ratings of whole-family warmth on the latent family warmth measure was fixed at 1.0. The loadings of mothers', the older adolescents', and the younger adolescents' ratings of whole-family warmth on the latent family warmth measure were specified as free to be estimated. A latent variable based on multiple family member ratings will not be affected by the perspectives of individual family members (Cook & Goldstein, 1993). The unique perspectives of family members are contained in the residuals of the individual ratings. Because both the residuals of the individual ratings and the actor factors reflect the unique perspectives of family members, we allowed the residuals to be correlated with their

corresponding actor factor in the second model. For example, the residual of mothers' ratings of whole-family warmth was correlated with mothers' actor factor, and so on.

Model Evaluation. The fit of the models was examined by looking at the $\chi 2$-test, the Bentler Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA). To indicate a good fit of the model, the $\chi 2$-test should preferably be non-significant. However, the $\chi 2$-test is very sensitive to sample size. That is, if the sample size is small, then the $\chi 2$ statistic may be non-significant even though differences between observed and model-implied covariances are relatively large (Kline, 1998). Consequently, we also used two alternative model fit indexes, the CFI (Bentler, 1990) and the RMSEA (Steiger, 1990). These two indexes are more appropriate for small samples. CFI values of .90 or greater reflect an adequate fit. Browne and Cudeck (1993) suggest that values of the RMSEA of .05 or less indicate a close fit, values between .05 and .08 indicate adequate fit, whereas values greater than .10 indicate room for improvement in the model.

Results

Descriptive Statistics

The means and standard deviations of the 12 measures of perceived warmth in family relationships are shown in Table 1, together with their intercorrelations. Family members reported relatively high levels of warmth received from each other (a score of approximately 5 on a 7-point Likert-scale). Adolescent siblings reported somewhat higher levels of warmth received from their mothers (a score just under 6 on the same scale) and somewhat lower levels of warmth received from each other (a score just above 4 on the same scale). Furthermore, for each family member (father, mother, older adolescent, and younger adolescent), the ratings of warmth received from the other three family members were positively associated with each other. Few of the younger adolescents' perceptions of warmth in family relationships were related to other family members' perceptions of warmth in their family relationships.

Table 2.1

Means and Standard Deviations of and Correlations Among Ratings of Perceived Warmth in 69 Four-Person Families.

Relationship	1	2	3	4	5	6	7	8	9	10	11	12
1. FM	-											
2. FO	.56**	-										
3. FY	.40**	.79**	-									
4. MF	.54**	.26*	.10	-								
5. MO	.48**	.41**	.25*	.58**	-							
6. MY	.26*	.27*	.28*	.33**	.72**	-						
7. OF	.29*	.37**	.36**	.22	.37**	.19	-					
8. OM	.33**	.32**	.26*	.23	.39**	.30*	.73**	-				
9. OY	.23	.21	.26*	.10	.31**	.41**	.62**	.59**	-			
10. YF	.05	-.00	.15	.03	.14	.22	.21	.13	.24*	-		
11. YM	.17	.08	.16	.07	.18	.31**	.17	.20	.28*	.78**	-	
12. YO	.05	.10	.26*	.03	.19	.36**	.21	.20	.56**	.40**	.38**	-
M	5.34	4.93	5.08	5.41	4.96	5.07	5.48	5.85	4.36	5.47	5.75	4.13
SD	0.94	0.97	0.89	1.06	0.96	0.87	1.13	1.08	1.38	1.09	1.05	1.55

Note. * $p < .05$, ** $p < .01$, all two tailed; FM = Father 's perceived warmth from Mother, FO = Father's perceived warmth from Older adolescent, FY = Father's perceived warmth from younger adolescent, MF = Mother's perceived warmth from father etc.

Testing the SRM Model of Perceived Warmth in Family Relationships

The initial fit of the SRM-analysis was marginally acceptable. The chi-square test was significant ($\chi 2$ (47) = 70.42, $p < .05$), the RMSEA corresponded to the upper limit of .08 for an adequate fit, and the CFI was well above the .90 criterion (.94). The modification index, however, indicated that the loading of one variable should not be fixed at 1.0. The loading for fathers' ratings of warmth received from mothers on the actor factor for fathers was respecified as "free" to be estimated. With this modification, the chi-square test of the SRM-analysis for perceived warmth in family relationships was not significant, ($\chi 2$ (46) = 55.66, $p = .16$). A CFI of .98 and a RMSEA of .04 also indicated an excellent fit. The

parameter estimates of the variances for the family factor and for family members' actor and partner factors are shown in Table 2.

Table 2.2

Variance Estimates for the Social Relations Model Analysis of Perceived Warmth: Family, Actor, and Partner Factors.

Source of Variance	Role	
Family		0.239**
Actor	Father	0.507**
	Mother	0.347**
	Older adolescent	0.612**
	Younger adolescent	0.775**
Partner	Father	0.054
	Mother	0.057
	Older adolescent	0.035
	Younger adolescent	0.118*

Note. * $p < .05$. ** $p < .01$, all one tailed.

The significance of the between-family variances of the SRM factors was tested with a one-tailed *t*-test. The family factor, the actor factors, and the partner factor of the younger adolescent were significant. This indicates that there are between-family differences in the general level of perceived warmth within the family, the tendency of each family member to perceive warmth from other family members, and family members' perceptions of warmth received from the younger adolescent.

Other findings emerged from the estimation of individual and dyadic reciprocity correlations. For the individual level reciprocities, only the correlation for the younger adolescent is valid because this was the only family member with a reliable partner factor. The correlation was significant ($r = .56$, $Z = 5.18$, $p < .05$), indicating that adolescents who say they receive more warmth from other family members are experienced by other family members as giving more warmth. At the dyadic level of analysis, perceived warmth was

reciprocated within the father-mother relationship (r = .24, Z = 1.96, p = .05) and the older adolescent-younger adolescent relationship (r = .28, Z = 2.32, p < .05). This implies that in families where fathers feel more warmth from mothers, mothers also feel more warmth from fathers and in families where older adolescents feel more warmth from younger adolescents, younger adolescents also feel more warmth from older adolescents.

Evaluating the Level Validity of Ratings of Warmth that Target the Family as a Whole

To assess the level validity of the ratings of whole-family warmth, two models were tested in which the individual ratings and a latent measure based on these ratings were regressed on the SRM factors. The standardized regression coefficients obtained from these analyses are shown in Table 3.

Table 2.3

Standardized Regression Coefficients For SRM Factors Predicting the Family Warmth Measures.

		Family	Actor			
			F	M	O	Y
Model 1:	Ratings Fathers	0.61**	0.70**			
	Ratings Mothers	0.79**		0.23*		
	Ratings Ol. Ad.s	0.65**			0.48**	
	Ratings Yo. Ad.s	0.59**				0.46**
Model 2:	Latent Family Warmth Measure	0.90**				

Note. * p < .05. ** p < .01, all one tailed. Ol. Ad.s = Older Adolescents. Yo. Ad.s = Younger Adolescents.

Model 1: Relations Between the SRM Factors and each of Four Family Members' Ratings of Whole-Family Warmth. The model evaluation criteria of the original model, in which each individual rating of whole-family warmth was regressed on the SRM family factor and the rater's own actor factor, indicated a lack of fit ($\chi 2$ (102) = 184.86, p < .05; CFI = 0.87; RMSEA = 0.10). Modification indices showed that allowing the following

three pairs of residuals to covary would improve the fit of the model: (1) the residuals of fathers' ratings on warmth received from older adolescents and fathers' ratings on warmth received from younger adolescents; (2) the residuals of the younger adolescents' ratings on warmth received from fathers and the younger adolescents' ratings on warmth received from mothers; and (3) the residuals of the older adolescents' ratings on family warmth and the older adolescents' ratings on warmth received from younger adolescents. With these modifications, the model had a satisfactory fit: $\chi 2$ (99) = 135.70, $p < .05$, CFI = .94 and RMSEA = .07.

As shown in Table 3, all four individual ratings of whole-family warmth were predicted not only by the family factor, but also by the raters' own actor factors, indicating a lack of level validity. All four individual ratings were shown to assess not only whole-family functioning at the family level (family factor), but also the unique perspectives of the raters at the individual level (actor factors). Furthermore, only mothers' ratings of whole-family warmth were substantially more highly related to the family factor than to individual level factors (e.g., mother actor factor).

Model 2: Relations Between the SRM Factors and the Latent Family Warmth Measure. The model evaluation criteria indicated that the original model in which the latent family warmth measure was regressed on the SRM family factor did not adequately account for the data ($\chi 2$ (101) =187.19, $p < .05$; CFI = 0.87; RMSEA = 0.11). The modification indices showed that the same three pairs of residuals should be allowed to covary as in Model 1. Adding these correlations resulted in a model that fit the data well. The chi-square test was significant ($\chi 2$ (98) = 130.02, $p = .02$), but the CFI was well above the .90 criterion (.95) and the RMSEA of .06 indicated an adequate fit.

As shown in Table 3, the latent variable measure of family warmth was strongly predicted by the family factor, providing evidence of level validity. In comparison with individual family members' ratings in model 1, the latent family warmth measure provides a more level valid method of measuring whole-family warmth. Significant loadings were found for all individual ratings on the latent family warmth measure. The loadings were 0.595 for fathers' ratings on family warmth, 0.805 for mothers' ratings on family warmth, 0.647 and 0.526 for the older adolescents' and younger adolescents' ratings on family

warmth. This implies that there is a shared perspective of family members on whole-family warmth independent of the unique perspectives of family members.

The residuals for each family member's rating of whole-family warmth, after removing variance due to the latent variable, were all significantly correlated with the corresponding SRM actor factor. The correlation between the residual of fathers' ratings of whole-family warmth and fathers' actor factor was $r = .53$, between the residual of mothers' ratings of whole-family warmth and mother's actor factor $r = .42$, between the older adolescents' ratings of whole-family warmth and the older adolescents' actor factor $r = .63$, and between the younger adolescents' ratings of whole-family warmth and the younger adolescents' actor factor $r = .62$. Thus, even though the latent variable for whole-family warmth can be estimated without confounding by rater effects, this confirms again that the observed measures of family-level warmth are significantly affected by individual-level factors.

Discussion

In this study, we assessed the level validity of two types of family warmth measures. First, we tested the level validity of each of four family members' ratings of whole-family warmth. Our hypothesis, based on prior research (Cole & Jordan, 1989; Cook and Kenny, 2006; Jacob & Windle, 1999), that the individual ratings of whole-family warmth would be predicted not only by the SRM family factor but also by SRM actor factors, was confirmed. In a second set of analyses, we tested the level validity of a latent family warmth measure. In agreement with our second hypothesis, we found that the latent variable measure of family warmth was predicted only by the SRM family factor and not by other SRM factors.

The individual ratings of whole family warmth were predicted by individual level SRM factors (i.e., actor factors) in addition to the family factor, indicating a lack of level validity. These findings support Cook and Kenny's (2006) critique on the use of measures that directly assess dyad-level or whole-family levels of family functioning and underscore the importance of separating out the effects of individual level factors when estimating higher-order factors (e.g., dyadic subsystems or the family as a whole). In contrast with the findings of Cook and Kenny, however, our findings also show that individual ratings

targeting the family do measure the intended family level. All individual ratings were significantly associated with the SRM family factor.

In the first model, only mothers' ratings of whole-family warmth were substantially more highly related to the family factor than to individual level factors (e.g., mother actor factor). This could suggest that mothers are more sensitive perceivers of the family climate than the other family members. In previous research it was suggested that mothers' perspective might be the most valid perspective on father's negativity toward the child (Cook and Goldstein, 1993). Future research may shed more light on whether mothers' perspective may also be the most valid perspective on the general warmth climate in the family. This could be done by testing whether mothers' ratings predict the family warmth measure better than the ratings of other family members.

We found evidence of a shared perspective on family warmth, indicated by significant loadings of all family members' ratings on the latent family warmth measure. This is in agreement with previous findings that mother, father, and child ratings of the family as a whole converge to define a latent variable for whole-family functioning (Jacob & Windle, 1999). Other studies also found evidence for a shared perspective of mothers, fathers, and children on characteristics of dyadic subsystems (Cole & Jordan, 1989; Cook & Goldstein, 1993; Martin & Cole, 1993). It is possible that family members share a distorted or biased view of their relationships (Reiss, 1981) and this common distortion is driving the common factor loading for their ratings on family warmth (Cook & Goldstein, 1993). The demonstration that the latent family warmth measure is correlated with a level-valid measure is essential in determining whether the latent family warmth measure really represents whole-family warmth. We found evidence for the level validity of the latent family warmth measure in the sense that it was highly predicted by the SRM family factor and not by other individual level factors, indicating that the latent family warmth measure only assesses the family level of family functioning which it purports to measure.

Our findings also show that there is a component in individual family members' ratings of whole-family warmth that is unique from the common perspective and that correlates significantly with the actor factors that represent family members' tendencies to perceive warmth in their personal relationships. The general tendency to view other family members

as warm, not only affects family members' ratings of warmth from a particular family member, but is also related to their ratings on whole-family warmth.

It appears that to assess the specific effects of the family level of family functioning, special adjustments have to be made to individual ratings of whole-family functioning to partial out the rater effects. In the second model, in which we found evidence for the level validity of a latent family warmth measure, two special adjustments were made to individual ratings of whole-family functioning. First, by creating a latent variable, rater effects were statistically controlled (Cook & Goldstein, 1993). Secondly, the rater effect in each family member's rating of whole-family functioning was correlated with the accompanying actor factor. Without these adjustments, the effects of the family level of family functioning cannot be disentangled from rater effects in individual ratings of whole-family functioning.

Our findings have important implications for research and the clinical application of family assessment instruments. Researchers should be aware that an association between family members' ratings of the family as a whole and relevant outcome variables will likely be confounded by rater effects. The clinical use of whole-family measures (e.g., comparisons to normative scores) is also problematic. Because the observed measures are affected both by individual and family factors, an extreme score on such measures has an ambiguous interpretation. This is not trivial because such evaluations could be used to determine whether individual or family level interventions are employed.

In the future, alternative measures have to be used which enable the separation of the true score variance from the potentially distorting effects of rater variance. The latent variable approach and SRM analysis provide statistical control for rater variance. SRM analysis can be used in applied contexts to assess the functioning of individual families (see e.g., Cook & Kenny, 2004). To compare individual families and family members with each other, however, standard scores have to be developed. Further research will need to focus on developing standard scores for specific family configurations and age groups. This would enable us to turn SRM analysis from a basic research tool into an applied, clinical family assessment tool.

Notwithstanding the importance of current findings, several limitations should be noted. Our study would be stronger and more sensitive if it had a larger sample than 69

families. Kashy and Kenny (1990) have suggested that as few as 50 families may be adequate for SRM analysis. In this study we used an SRM-analysis to predict other measures, however. One of these other measures is a latent variable. When a latent variables approach is used, a sample of 69 families is considered small (Cook & Goldstein, 1993). Secondly, we have to keep in mind that the participants of our study were members of relatively well functioning, highly educated, two-parent families. Further research may clarify whether these findings can be generalized to families of different social backgrounds and to families that function less well. Finally, we assessed the level validity of whole-family measures for only one construct, family warmth. Further research may clarify whether generalizations can be made to whole-family measures of other constructs. Nevertheless, our findings underscore the importance of more systematic evaluations of the level validity of measures that directly assess particular levels of the family system.

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Chapter 3

Family Warmth and Adolescent Problem Behavior: A Social Relations Model Analysis*

The present study examined the association between a family climate of warmth and adolescent externalizing and internalizing problem behavior. Data were gathered from the father, the mother, and two of their adolescent children in 69 families. The application of the Social Relations Model enabled us to assess the family climate of warmth controlling for other sources of variance such as characteristics of family members and relationships. The family climate of warmth was strongly related to adolescent externalizing and internalizing problem behavior. Adolescents from families with less warm climates showed more of these problem behaviors. However, associations between individual characteristics of family members and adolescent problem behavior were also found: Younger adolescents who perceived less warmth from their family members were reported to have more externalizing and internalizing problems. Older adolescents with younger siblings who were generally perceived as more warm were reported to have more internalizing problem behavior. Our findings provide support for the usefulness of the Social Relations Model when studying the association between family warmth and adolescent problem behavior by demonstrating that the family climate of warmth, independent from characteristics of family members and relationships, is related to adolescent problem behavior.

Introduction

Although the family environment is considered to be crucial in shaping the child or adolescent's potential for developing behavioral problems (see e.g., Moos, 1975), relatively few attempts have been made to systematically assess the social climate of families. This may be due to difficulties in measuring characteristics of the family as a whole (Cook, 1994; Deković & Buist, 2005; O' Connor, Hetherington, & Reiss, 1998). One of these

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difficulties in measuring characteristics of the family as a whole is the confounding of whole-family characteristics with factors operating at lower levels of the family. As argued by Cook and Kenny (2006), individual family members' ratings on whole-family functioning may appear to measure whole-family characteristics, but they may be significantly affected by characteristics of individual family members or dyads within the family (e.g., the parent-adolescent relationship).

A number of studies have reported negative associations between the social climate of the family (e.g., family support, cohesion) and adolescent problem behavior (Braungart-Rieker, Rende, Plomin, & De Fries, 1995; Cuffe, McKeown, Addy, & Garrison, 2005; Gorman-Smith, Tolan, Henry, & Florsheim, 2000; Halpern, 2004; Steinhausen, Gavez, & Metze, 2005). In none of these studies, however, was it tested whether characteristics of the family member who reports on the social climate of the family (i.e., the informant) rather than the actual social climate of the family was responsible for the associations found.

Recently, several studies provided evidence that clusters based on affective relations among all family members were related to problem behavior of adolescents (Deković & Buist, 2005; Mathijssen, Koot, Verhulst, De Bruyn, & Oud, 1998; O' Connor et al., 1998; Schauerte, Branje, & Van Aken, 2003). In these studies, the highest level of problem behavior was found for adolescents from families with negative relationships among all family members, while the lowest level of problem behavior was found for adolescents from families with positive relationships among all family members. These findings imply that a family climate (i.e., the general level of the quality of all family relationships) has an important effect on adolescent problem behavior. However, these researchers did not test whether their specific configurations of affective relationships within the family really represented properties unique to the family as a whole independent from characteristics of individual family members.

In contrast to cluster analysis, Social Relations Model analysis (SRM: Cook, 1994; Cook & Kenny, 2004; Kashy & Kenny, 1990), allows one to test the effects of the general family climate (i.e., the SRM family component) while controlling for individual differences among the perceivers and targets of the ratings. Specifically, perceiver effects (also called actor effects) and target effects (also called partner effects) are estimated independent of the effect of the family as a whole. Perceiver effects refer to the tendency of

a family member to view others in a certain way. Target effects reflect how a family member is viewed by others in general. Thus, the application of the SRM enabled us to assess the effect of the family that could be neither reduced to, nor derived from, the effects of individuals in the family. According to the social climate perspective of Moos (1975), families may provide quite different social climates for parents and children. Consequently, our first hypothesis was that an SRM family component could significantly account for interpersonal perceptions of warmth in family relationships. This would imply that families could be distinguished from each other on the family climate of warmth. The testing of this hypothesis was essential. Only when such interfamily variance in the family climate of warmth existed, we could test our second hypothesis. Previous studies (Deković & Buist, 2005; Mathijssen et al., 1998; O' Connor et al., 1998; Schauerte et al., 2003) provided the empirical basis for our second hypothesis that the family climate of warmth (i.e., the SRM family component) would be negatively related to adolescent problem behavior.

In a prior SRM study focusing on correlates of adolescent problem behavior (Delsing, Oud, De Bruyn, Scholte, & Van Aken, 2005), the family climate of justice or trust within the family was more strongly related to problem behavior outcomes than the tendency of individual family members to perceive justice and trust from others or the tendency of individual family members to be perceived as trustworthy or just by others. These results led to our third hypothesis. Hypothesis 3 was that the SRM family component would be more strongly related to adolescent problem behavior than the SRM perceiver or target effects. In other words, we expected that the family climate of warmth would be most strongly associated with adolescent problem behavior. This suggests that the cumulative effect of distressed family relationships is a more important correlate of adolescent outcomes than characteristics of individual family members.

From a social learning perspective (Bandura, 1977), adolescents learn through behavioral conditioning and by imitating behaviors they have observed or seen rewarded in their families. Adolescents from families with a family climate of low warmth and high hostility may learn to use more externalizing problem behavior. Furthermore, the stress associated with a family climate of low warmth and high hostility may also manifest itself in internalizing problems (Sternberg et al., 1993). Since a family climate of warmth could be negatively associated with externalizing as well as internalizing problem behavior, we

analyzed two models in which a family climate of warmth was related to adolescent problem behavior, one for externalizing problem behavior and one for internalizing problem behavior.

Method

Participants

Families were recruited via 16 secondary schools in The Netherlands. Schools with different types of curriculum were selected in three different regions. A letter was handed to the students, addressed to the students and their parents, informing them about the goals and procedures of the research project, the criteria with respect to participating, and the registration procedure. The criteria for participating in this study were being part of a household with a) two parents and b) at least two adolescents between the ages of 11 and 18. Families were given Euro 45.5 for their participation in this study. Sixty-nine families were recruited. The adolescents were distinguished by their birth order as the older adolescent and the younger adolescent. The age of the older adolescents (35 boys, 34 girls) was on average 15.6 years (SD= 1.31). The age of the younger adolescents (32 boys, 37 girls) was on average 13.3 years (SD= 1.18). The average age of fathers and mothers was 47 and 45 years respectively, ranging from 40 to 58.6 years and from 36.9 to 55.4 years. The highest level of education was secondary education for 37% of the fathers and 51% of the mothers; whereas 30% of the fathers and 29% of the mothers finished higher education and 33% of the fathers and 20% of the mothers obtained a university degree. Of the fathers, 97% were employed, whereas 74% of the mothers were employed. Ninety-eight percent of the participants were Dutch.

Measures

Warmth. The warmth subscale of the Relational Support Inventory (RSI; Scholte, Van Lieshout, & Van Aken, 2001) was completed by all four family members. In accordance with a round-robin design, they each rated the warmth they received from each of the other three family members. The warmth scale consists of three items (“This person shows his or her love for me”, “This person shows his or her respect for me”, “This person supports me in what I am doing”). Each item is rated on a 7-point scale anchored at the extremes by (1)

very untrue of this person to (7) *very true of this person*. Cronbach's alpha's for perceived warmth in family relationships were on average α = .78 with a range of α = .69 to α = .84.

Adolescent Problem Behavior. The Nijmegen Problem Behavior List (NPBL; Scholte, De Bruyn, & Vermulst, 2005) was used to assess the older and younger adolescents' externalizing and internalizing problem behavior. The items of the NPBL were selected for their appropriateness to assess externalizing and internalizing problem behavior as it occurs in subclinical community samples. The scale for externalizing problem behavior consists of seven items (e.g., "This person fights a lot") and the scale for internalizing problem behavior consists of nine items (e.g., "This person withdraws from other people"). The older and younger adolescents' externalizing and internalizing problem behavior was rated on a 7-point scale by fathers, mothers, the adolescents themselves and their siblings. Cronbach's alpha's for externalizing behavior averaged α = .81 with a range of α = .77 to α = .86 for the older adolescent and averaged α = .70 with a range of α = .63 to α = .79 for the younger adolescent. Cronbach's alpha's for internalizing behavior averaged α = .71 with a range of α = .56 to α = .78 for the older adolescent and averaged α = .78 with a range of α = .69 to α = .86 for the younger adolescent.

Statistical Analyses

The Social Relations Model (SRM): Perceived Warmth in Family Relationships. Structural Equation Modeling (SEM) and the software package LISREL 8.50 (Jöreskog & Sörbom, 2001) were used to analyze the perceived warmth data by means of the SRM (Cook, 1994; Cook & Kenny, 2004; Kashy & Kenny, 1990). In accordance with the SRM, each family member's rating of the warmth received from another family member was considered to be a function of four sources of variance: a family component, an actor component, a partner component, and a relationship component. The family component measures the general level of warmth that family members perceive among each other. The actor component measures the individual tendency of a family member to perceive other family members as warm. The partner component measures the extent to which other family members perceive a particular family member as warm. Finally, the relationship component measures the extent to which one family member perceives another family member as warm, after controlling for the family, the actor, and the partner components. In

our sample of two parent-two adolescent families, we estimated one family variance, four actor variances (one for each family member) and four partner variances (one for each family member). We did not specify relationship components in our model (see also Manders et al., 2005). Thus, variance due to the unique relationship of one family member to another family member is part of the residual variance (i.e., variance unexplained by the family, actor, and partner components). Only statistically significant SRM component variances were used in the tests of our hypotheses.

We also estimated reciprocity at two levels of analysis. At the individual level reciprocity is measured by the correlation between a family member's actor and partner component. Such a correlation (if significant and positive) would indicate that the more a family member perceives other family members as warm, the more he or she is perceived by those other family members as being warm. At the dyadic level reciprocity is measured by the correlation between the residual terms representing two family members' unique relationships with each other. A significant positive dyadic reciprocity correlation would indicate that a family member who perceives another family member as warm, is perceived by that other family member as being warm. In our sample of two parent-two adolescent families, four individual reciprocities (for fathers, mothers, older adolescents, and younger adolescents) and six dyadic reciprocities (for father-mother, father-older adolescent, father-younger adolescent, mother-older adolescent, mother-younger adolescent, and older adolescent-younger adolescent relationship) were estimated.

Relations Between the SRM Components and the Problem Behavior Variables. After having excluded the non-significant individual and dyadic reciprocities in the SRM analyses described before, latent variable measures of problem behaviors were included in the SEM models. The latent variables measure the common factor in the ratings of fathers, mothers, the adolescents themselves, and their siblings, on the externalizing and internalizing problem behaviors. One of the paths from the latent variable to the observed variables (i.e., the ratings of fathers, mothers, the adolescents themselves, and their siblings) was fixed at 1.0 and the other loadings were free to vary.

In the first model, we related the SRM components to the externalizing problem behavior of the older adolescent. In subsequent models, we related the SRM components to the externalizing problem behavior of the younger adolescent (Model 2), the internalizing

problem behavior of the older adolescent (Model 3), and the internalizing problem behavior of the younger adolescent (model 4). Because a model in which all SRM components are simultaneously related to adolescent problem behavior is not identified and our main interest was in the family component, we first estimated the association between the family component and adolescent problem behavior. We added the association of actor and partner components with adolescent problem behavior, if they were significant and improved the fit of the models. The $\chi 2$ difference test (criterion: $p < .05$) was used to judge the improvement of the fit of the models.

Model Evaluation. The fit of the models was evaluated using the $\chi 2$ Goodness of Fit test, the Bentler Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA). We used the CFI because it has been recommended for relatively small samples (Bentler, 1990), and the RMSEA (Steiger, 1990) because it is considered one of the best indicators of fit regardless of sample size. CFI values of .90 or greater reflect an adequate fit. Browne and Cudeck (1993) suggest that values of the RMSEA of .05 or less indicate a close fit, values between .05 and .08 indicate an adequate fit, whereas values greater than .10 indicate the need for improvement in the model.

Results

The Social Relations Model (SRM): Perceived Warmth in Family Relationships

The first step in our analysis was to estimate the components of the SRM in perceptions of warmth to determine which contain significant variance (see also Manders et al., 2005). In this step we were primarily interested in testing Hypothesis 1; that there is a significant family factor for perceived warmth. We found that the family variance (.239); the actor variances for fathers (.507), mothers (.347), older adolescents (.612), and younger adolescents (.775); and the partner variance for younger adolescents (.118) were significant ($Z > 1.65$, $p < .05$). Thus, Hypothesis 1 was supported. [1]

Relations Between the SRM Components and the Problem Behavior Variables

To test our second hypothesis, we estimated four models in which the association between the SRM components in perceptions of warmth and adolescent problem behavior were estimated. The model fit indices of these four models are presented in Table 1 (fit

indices are obtained from the models in which the significant associations between all SRM components and adolescent problem behavior were estimated simultaneously).[2]

Table 3.1

Fit Indices for Models Assessing Relations Between SRM Components Warmth and Adolescent Externalizing and Internalizing Problem Behavior.

	χ2	df	χ2/df	CFI	RMSEA
Model 1: Externalizing Older Adolescent	140.72	101	1.39	.92	.05
Model 2: Externalizing Younger Adolescent	137.43	100	1.37	.93	.04
Model 3: Internalizing Older Adolescent	144.42	100	1.44	.91	.05
Model 4: Internalizing Younger Adolescent	130.71	100	1.31	.94	.05

The chi-square goodness of fit tests of all four models were significant ($p < .05$), indicating a lack of fit. However, the alternative fit indexes supported the models. One recommendation is that the χ2/df ratio should be less than 3 (Kline, 1998). As shown in Table 1, the χ2/df ratio of all four models was less than 1.5. Furthermore, the CFI values were above the .90 criterion for all models (ranged from .91 to .94) and the RMSEA values were .05 or less for all models (ranged from .04 to .05). Overall, these values indicate a good fit.

The correlation coefficients that were obtained by relating the SRM components in perceptions of warmth to adolescent problem behavior are shown in Table 2.

Table 3.2

Estimated Relations Between SRM Components Warmth and Adolescent Externalizing and Internalizing Problem Behavior.

	Family	Actor Y	Partner Y
Model 1:			
Externalizing	-.75**		
Older Adolescent			
Model 2:			
Externalizing	-.76**	-.39**	
Younger Adolescent			
Model 3:			
Internalizing	-.35*		-.46**
Older Adolescent			
Model 4:			
Internalizing	-.40**	-.40**	
Younger Adolescent			

Note. * $p \leq .01$, ** $p \leq .001$, all two tailed; Y= younger adolescent.

In accordance with our second hypothesis, the coefficients between the family component and adolescent problem behavior were significant (negative) in all four models. This indicated that the family climate of warmth was negatively related to both externalizing and internalizing problem behavior of older and younger adolescents. In other words, older and younger adolescents from families with a relatively warm family climate showed less externalizing and internalizing problem behavior.

We performed chi-square difference tests to examine whether adding the association of any of the other SRM components with adolescent problem behavior would lead to an improvement in model fit. As Table 2 reveals (see second, third, and fourth model), adding

the association of one of the actor and partner components with adolescent problem behavior led to a fit improvement. Chi-square differences with $\Delta df = 1$ ranged from 6.02 to 8.07 (all p's $< .05$). The younger adolescent actor component was found to be negatively related to the younger adolescents' externalizing and internalizing problem behavior (see Table 2, model 2 and 4). This implied that younger adolescents who perceived more warmth from their family members showed less externalizing and internalizing problem behavior. In Table 2 (third model), it can be seen that, the younger adolescent partner component was positively related to the older adolescents' internalizing problem behavior, indicating that older adolescents with a younger sibling who was perceived as relatively warm showed more internalizing problem behavior.

When looking at the correlation coefficients (see Table 2, model 3 and 4), the family component did not seem to be more strongly related to adolescent internalizing problem behavior than the other SRM components. The family component was found to be the only SRM component related to the older adolescent externalizing problem behavior (see Table 2, model 1). With respect to the younger adolescent (see Table 2, model 2), the family component appeared to be more strongly associated with externalizing problem behavior than the other SRM component (the younger adolescent actor component). To examine whether the family component was more strongly related to the younger adolescent externalizing problem behavior than the younger adolescent actor component, we tested a model in which we included equality constraints to equalize the correlation between the family component and younger adolescent externalizing problem behavior and the correlation between the younger adolescent actor component and younger adolescent externalizing problem behavior. If the fit of this model turned out to be significantly worse than the initial second model, we would conclude that the family component was more strongly associated with the younger adolescent externalizing problem behavior than the younger adolescent actor component. The chi-square difference test yielded a $\Delta \chi 2$ (1) of 2.94, which was not statistically significant. This indicated that the family component was not found to be more strongly related to the younger adolescent externalizing problem behavior than the younger adolescent actor component. Thus, we could not provide consistent evidence for both older and younger adolescents that the family component was more strongly associated with their externalizing problem behavior than the actor or partner

components. Our third hypothesis, that the family component would be more strongly related to adolescent externalizing and internalizing problem behavior than the actor or partner components could not be supported.

Discussion

The general aim of this study was to assess the association between a family climate of warmth and adolescent externalizing and internalizing problem behavior. The SRM was applied to assess the family climate of warmth controlling for other sources of variance such as characteristics of family members and relationships. In accordance with our first hypothesis, significant between-family variance was found for the SRM family component in interpersonal perceptions of warmth, indicating that families differ in the family climate of warmth. Our second hypothesis was also supported. A family climate of warmth was found to be negatively related with both adolescent externalizing and internalizing problem behavior. We did not find support for our third hypothesis that the family component would be more strongly related to adolescent externalizing and internalizing problem behavior than the SRM perceiver effects (i.e., actor effects) or target effects (i.e., partner effects).

The negative associations we found between a family climate of warmth and adolescent problem behavior are in line with previous studies that assessed the impact of a larger network of affective family relationships on adolescent problem behavior (Deković & Buist, 2005; Mathijssen et al., 1998; O' Connor et al., 1998; Schauerte et al., 2003). Our findings show that a network of high or low affective family relationships may result in a shared family climate with a high or low affective quality that is related to adolescent problem behavior independent from the affective quality of specific family relationships. This shared family climate was found to be associated with externalizing problem behavior as well as with internalizing problem behavior.

The absolute size of the correlations (see Table 2) suggests that the family climate of warmth is more strongly related to adolescent externalizing problem behavior than to internalizing problem behavior. This could provide support for the social learning perspective (Bandura, 1977). Adolescents from families with a family climate of low warmth or high hostility, for example, may learn externalizing problem behavior more easily than internalizing problem behavior by behavioral conditioning and imitating

behavior. Additional research is needed to assess whether an actual difference exists between the associations of the family climate of warmth with adolescent externalizing and internalizing problem behavior. Our suggestions for future research would imply using a larger sample size and comparing two models, one in which both correlations between the family climate and externalizing and internalizing problem behavior are estimated, and one in which both correlations are equalized to each other. This enables the application of a chi-square difference test to determine which model accounts best for the data.

We did not find evidence that the family climate of warmth was more strongly associated with adolescent externalizing and internalizing problem behavior than characteristics of individual family members. This is in contrast to previous research in which adolescent externalizing and internalizing problem behavior was found to be best predicted by the family climate of justice or trust within the family rather than by family members' tendency to perceive justice and trust from others or by family members' tendency to be perceived as trustworthy or just by others (Delsing et al., 2005). These contrasting findings may suggest that the family climate is more important for explaining adolescent problem behavior than characteristics of individual family members with regard to the concepts of justice and trust (see e.g., Boszormenyi-Nagy & Spark, 1984), but not for the concept of warmth. Another explanation for these contrasting findings is that Delsing et al. (2005) did not actually test whether the family climate of justice and trust was more strongly related to adolescent problem behavior than characteristics of individual family members by using equality constraints and a chi-square difference test, as in our study (see Results section). Their conclusions were based on the size of the standardized regression coefficients, amounts of variance explained, and the consistency of the associations.

In general, our findings provide support for the usefulness of the Social Relations Model when studying the association between family warmth and adolescent problem behavior. The application of the Social Relations Model enabled us to provide evidence that the family climate of warmth, independent from characteristics of family members and relationships, is related to both adolescent externalizing and internalizing problem behavior. The family climate of warmth was not the only component related to adolescent problem behavior, however. We also found some associations between characteristics of individual family members and adolescent problem behavior. For younger adolescents, for example,

we found an association between the tendency to perceive warmth from family members and adolescent problem behavior. This is in line with previous findings that perceived support is important for the adaptive development of children and adolescents (e.g., Acitelli, 1996; Wills & Cleary, 1996).

Surprisingly, for older adolescents, we did not find an association between the tendency to perceive warmth from family members and adolescent problem behavior. Although the effect of perceived support from family members on adolescent problem behavior was found to decrease with increasing age of the adolescents, perceived support from family members still remained an important determinant of older adolescent problem behavior (e.g., Helsen, Vollebergh, & Meeus, 2000). On the basis of this finding we would expect a less strong, but still significant association between the older adolescent's tendency to perceive warmth from family members and the older adolescent's problem behavior. The association between the older adolescent's tendency to perceive warmth from family members and the older adolescent's problem behavior may have become non-significant in our study, because we controlled for the effects of the family climate of warmth unlike previous studies.

Also somewhat surprisingly, the parent partner components were not associated with adolescent externalizing and internalizing problem behavior. This implies that an adolescent's level of externalizing and internalizing problem behavior is not related to the extent to which the parents are perceived as warm. This finding is in contrast with previous research in which an association between affective characteristics of parents and adolescent outcomes was found (e.g., Ge, Best, Conger, & Simons, 1996; Rothbaum & Weisz, 1994; Stice & Barrera, 1995). Two possible explanations may be provided for these contrasting findings (see also Delsing et al., 2005). As mentioned before, the first possible explanation is that previous research reported spurious associations that would not have been found if contextual effects of whole-family functioning had been controlled as in our study. The second explanation may be that the unique behavior of one parent to one child, rather than one parent's behavior to all family members, is associated with adolescent problem behavior.

Finally, we found an unexpected association between the tendency of the younger adolescent to be perceived as warm by family members and older adolescent internalizing

problem behavior. A possible venue for interpreting this finding is the social comparison framework (Festinger, 1954). Recall that the partner component for older adolescents (i.e., the tendency of the older adolescents to be perceived as warm by family members) was not significant. This indicates that the older adolescents are receiving less consistent information from family members than the younger adolescents and therefore it may be the older adolescents who are triggered to spontaneously compare themselves with their (younger) siblings (see Gilbert, Giesler, & Morris, 1995). This may lead to feelings of uncertainty about the self (see Stapel & Blanton, 2004) that contribute to the development of older adolescents' internalizing problem behavior.

Several limitations of this study should be noted. First, we examined concurrent associations and due to this causal conclusions regarding the associations described above should be drawn cautiously. For example, two causal explanations can be given for the association between the family component and adolescent problem behavior. A family climate of low warmth could have caused adolescent problem behavior, but it is also possible that adolescent problem behavior had a negative impact on the general level of perceived warmth within the family. Patterson's coercive family process model (Patterson, Reid, & Dishion, 1998) supports the idea that adolescent problem behavior may have a negative impact on the family climate of warmth. In this model, family members are assumed to be part of a network of interactive and interdependent relationships in which the problem behavior of adolescents modifies that of other family members. Consequently, family members may become increasingly similar in their problem behavior with one another leading to a family climate characterized by high problem behavior and low warmth. Additional longitudinal research is needed to assess the causal direction between the family climate of warmth and adolescent problem behavior. Second, genetic factors may have influenced the association between the family component and adolescent problem behavior. This is not very likely, however, because the family component reflects perceptions that are shared by all family members. Considering that parents normally do not share genes and siblings only share 50% of their genes, the similarity between the perceptions of parents and adolescents is not easily explained by genetics (see also Delsing et al., 2005).

Furthermore, we have to stress that the generalizability of this study is limited to relatively well functioning intact families with at least two adolescent children. Additional research is needed to assess whether results may be different for less well-functioning families, families with a more varied composition, and families with younger children. In spite of the limitations mentioned above, the present study provides clear support for the usefulness of the Social Relations Model when studying the association between family warmth and adolescent problem behavior by demonstrating that the family climate of warmth, independent from characteristics of family members and relationships, is related to adolescent problem behavior.

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Notes

[1] We also estimated the individual and dyadic reciprocities. A significant and positive individual reciprocity was found for the younger adolescent (r = .56, Z = 5.18, p < .05). Furthermore, the dyadic reciprocities within the father-mother relationship (r = .24, Z = 1.96, p = .05) and the older adolescent-younger adolescent relationship (r = .28, Z = 2.32, p < .05) were significant and positive. On the basis of these findings we excluded the individual reciprocities of fathers, mothers, and older adolescents and the dyadic reciprocities in the father-older adolescent, father-younger adolescent, mother-older adolescent, and mother-younger adolescent relationship from further analyses.

[2] The modification indices that were obtained by testing these models indicated that the loading for fathers' ratings of warmth received from mothers on the actor factor for fathers should not be fixed at 1.0 and that the residuals of the younger adolescents' ratings of warmth received from fathers and mothers should be allowed to correlate. Therefore, we respecified the loading for fathers' ratings of warmth received from mothers on the actor component for fathers as "free" to be estimated and we allowed the residuals of the younger adolescents' ratings of warmth received from fathers and mothers to correlate in the final models.

Chapter 4

Perceptions of Problem Behavior in Adolescents' Families: Target, Perceiver, and Family Effects[*]

In this study we examined whether variance in perceptions of externalizing and internalizing problem behavior could be explained by target, perceiver, and family effects. Two parents and two adolescents in 69 families judged each other's externalizing and internalizing problem behavior. Social Relations Model analysis showed that family members' judgments on the externalizing and internalizing problem behavior of all family members (i.e., fathers, mothers, and two adolescent children) represent characteristics of targets, perceivers, and the family. We argue that the Social Relations Model approach can be an effective means to separate and remove the confounding effects due to the rater (the perceiver) and the family from the measure of an individual's problem behavior.

Introduction

Social psychologists have long been interested in how individuals generate attributions and explanations for the behavior of others because it has potentially important implications for how these individuals guide and direct their social behavior. People's reactions to others derive from their perceptions of how and why others behave like they do, and these perceptions may or may not be accurate. Different informants may agree or differ in the way they judge the behavior of a particular person. Most research on informant agreement and discrepancies in the judgment of behavior focused on the problem behavior of children or adolescents (for an overview, see De Los Reyes & Kazdin, 2005). Only modest agreement is found among different informants' ratings on the problem behavior of children or adolescents (Achenbach, McConaughy, & Howell, 1987; Kroes, Veerman, & De Bruyn, 2005; Stanger & Lewis, 1993). One of the reasons that different informants may disagree

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on a child's problem behavior is that they see the child in a different context (Kenrick & Funder, 1988; Kolko & Kazdin, 1993). Child behaviors may vary across situations, and different informants observe children in different situations. Situational factors may not play such an important role when family members are used as informants, because family members share the same family context. Because many studies rely on judgments of family members on the problem behavior of children, the agreement between informants that share the same family context deserves special attention.

Judgments of problem behavior within the family context may be a function of three different sources of influence. The source of influence most related to inter-informant agreement is the *target effect*. The target effect reflects the degree to which characteristics of the individual who is targeted by the rating, influence the judgments on his or her problem behavior, and thus the agreement between different family members on his or her problem behavior. The second source of influence is the *perceiver effect*. The perceiver effect reflects the degree to which a family member perceives the behavior of all family members to be similar. It is generally interpreted as rater bias, saying more about the rater than about the family member who is targeted by the rating. As such, perceiver effects may compromise the validity of problem behavior judgments. The validity of problem behavior judgments may also be compromised by the *family effect*, an additional source of influence that occurs only when all raters are family members. The family effect reflects factors that may cause all members of the family to be similar in their perceptions of problem behavior; for example racial, religious, cultural, and economic variables (Cook, 2000). However, rather than being just an additional confound, the family effect may also reflect valuable additional diagnostic information about the degree to which the average family member in different families shows behavioral problems. It is, to some extent, a measure of the shared environment.

Previous research suggests that family members' judgments of a child or adolescent's problem behavior may reflect characteristics of the target, perceiver, and the family. In several studies, modest correlations have been found between different family members' ratings of a child or adolescent's problem behavior (see e.g., Achenbach et al., 1987; Van Der Ende & Verhulst, 2005). These findings might imply that characteristics of targets (i.e., the children or adolescents who are targeted by the ratings) influence the judgments on their

problem behavior and thus affect the degree to which different family members agree on their problem behavior. Research evidence also indicates that characteristics of perceivers such as personality (e.g., neuroticism) and psychopathology (e.g., depression, anxiety) may bias their ratings of a child or adolescent's problem behavior (see e.g., De Los Reyes & Kazdin, 2005; Kroes, Veerman, & De Bruyn, 2003). Finally, there is some evidence that characteristics of the family such as ethnicity/race, family stress, and SES are related to informant discrepancies in the assessment of a child or adolescent's problem behavior (see e.g., De Los Reyes & Kazdin, 2005).

If characteristics of perceivers and the family significantly bias family members' ratings of problem behavior, this may have important implications for the diagnosis and treatment of children's behavioral problems. Informant ratings on instruments such as the Child Behavior Checklist (CBCL; Achenbach, 1991) are widely used to assess children's problem behavior and, thus, to guide clinical interventions and assess clinical outcomes. However, previous research has not fully evaluated the relative contribution of target, perceiver, and family characteristics in family members' judgments of problem behavior. In this study, the Social Relations Model (SRM: Cook, 1994; Cook & Kenny, 2004; Kashy & Kenny, 1990), is tested on data from a family round-robin design in which each family member rates the problem behavior of all other family members. This analysis measures the contribution of characteristics of targets, perceivers, and the family to the total variance of family members' perceptions while controlling for each of the other components (see Method section). We also assess whether these three effects still explain significant amounts of variance in family members' perceptions of problem behavior approximately ten months later. On the basis of previous research (Achenbach et al., 1987; De Los Reyes & Kazdin, 2005; Kroes et al., 2003; Van Der Ende & Verhulst, 2005), we hypothesize that target, perceiver, and family effects will all be found in family members' perceptions of each other's problem behavior.

In addition to determining whether perceiver, target, and family characteristics make a statistically significant contribution to variance in perceptions of problem behavior, we will also determine exactly how much of the variance is accounted for by each of these effects. Generally, no more than one-third of the total variance in interpersonal perceptions is due to the target even when the perceivers know the target fairly well, such as in this study where

family members rate each other (Kenny, 1994). In large part, perceivers do not agree because they have relatively idiosyncratic theories about targets (Park, DeKay, & Kraus, 1994). Furthermore, it has been shown that there is significant overlap in a perceiver's judgments of different targets (Kenny, 1994). Consequently, we expect that the absolute value of the amount of variance explained in family members' perceptions of problem behavior will be greater for perceiver effects than for target effects. Because the variance in interpersonal perceptions due to the family effect has not been assessed as much as the perceiver and target effects, we do not formulate specific hypotheses about the relative contribution of the family effect in explaining differences between family members' perceptions of problem behavior.

Informant discrepancies in the assessment of a child or adolescent's problem behavior have been studied with respect to both externalizing problem behavior (e.g., drug use, alcohol use and delinquent activities) and internalizing problem behavior (e.g., anxiety and depression). This research suggests that there is greater correspondence evident in informants' ratings of externalizing problems compared with internalizing problems (Achenbach et al., 1987; Duhig, Renk, Epstein, & Phares, 2000). We expect that these findings not only hold for judgments of children's problem behavior, but also for judgments of parents' problem behavior. Therefore, we hypothesize that the absolute value of the amount of variance explained in family members' perceptions of problem behavior by target effects will be greater for judgments of externalizing problem behavior than for judgments of internalizing problem behavior.

In sum, we will test three hypotheses in this study. Our first hypothesis is that target and perceiver effects and a family effect will all be found in family members' perceptions of each other's problem behavior. Our second hypothesis is that the absolute value of the amount of variance explained in family members' perceptions of problem behavior will be greater for perceiver effects than for target effects. Finally, our third hypothesis is that the absolute value of the amount of variance explained in family members' perceptions of problem behavior by target effects will be greater for judgments of externalizing problem behavior than for judgments of internalizing problem behavior.

Method

Participants

Families were recruited from 16 secondary schools in The Netherlands. Schools with different types of curriculum were selected in three different regions. A letter was handed to the students, addressed to the students and their parents, informing them about the goals and procedures of the research project, the criteria with respect to participating, and the registration procedure. The criteria for participating in this study were being part of a household with a) two parents and b) at least two adolescents between the ages of 11 and 18. Families were given Euro 45.5 for their participation in this study. Sixty-nine families were recruited. The adolescents were distinguished by their birth order as the older adolescent and the younger adolescent. The age of the older adolescents (35 boys, 34 girls) was on average 15.6 years (SD= 1.31). The age of the younger adolescents (32 boys, 37 girls) was on average 13.3 years (SD= 1.18). The average age of fathers and mothers was 47 and 45 years respectively, ranging from 40 to 58.6 years and from 36.9 to 55.4 years. The highest level of education was secondary education for 37% of the fathers and 51% of the mothers; whereas 30% of the fathers and 29% of the mothers finished higher education and 33% of the fathers and 20% of the mothers obtained a university degree. Of the fathers, 97% were employed, whereas 74% of the mothers were employed. Ninety-eight percent of the participants were Dutch.

Measures

Externalizing and Internalizing Problem Behavior. The Nijmegen Problem Behavior List (NPBL; Scholte, De Bruyn, & Vermulst, 2005) was used to assess family members' problem behavior. The NPBL is a research instrument designed for studies that focus on family members' perceptions of each other's problem behavior (e.g., Delsing, Oud, De Bruyn, Scholte, & Van Aken, 2005; Janssens, De Bruyn, Manders, & Scholte, 2005). The items of the NPBL describe subclinical variants of the type of behavior that is assessed in the work of Achenbach (see Achenbach & Rescola, 2001). The items reflected two broad unidimensional factors; externalizing and internalizing problem behavior. The scale for externalizing problem behavior consists of seven items (e.g., "This person fights a lot") and the scale for internalizing problem behavior consists of nine items (e.g., "This person

withdraws from other people"). The items are rated on 7-point Likert scales anchored at the extremes by *1 = very untrue to 7 = very true*.

In this study, fathers, mothers, the older adolescents, and the younger adolescents rated each other on both dimensions of the NPBL. Cronbach's alpha's for family members perceptions of each other's problem behavior were on average α = .75 with a range of α = .63 to α = .86 for externalizing problem behavior, and α = .72 with a range of α = .56 to α = .81 for internalizing problem behavior. In the second wave, Cronbach's alpha's were on average α = .77 with a range of α = .56 to α = .84 for externalizing problem behavior, and α = .74 with a range of α = .67 to α = .78 for internalizing problem behavior.

Statistical Analyses

SRM; Target, Perceiver, and Family Effects in Perceived Problem Behavior. LISREL 8.50 (Jöreskog & Sörbom, 2001) was used to estimate the components of the Social Relations Model (Kenny & La Voie, 1984). The application of SRM to family data requires data from a round-robin design (i.e., each family member was asked to rate the problem behavior of the other family members). In our two parent-two adolescent families, this design resulted in 12 judgments of problem behavior (4 family members rating three family members each). According to the family version of the SRM (Cook, 1993, 1994; Kashy & Kenny, 1990), four sources of systematic variance can be identified in each of these 12 judgments of problem behavior; a target effect, a perceiver effect, a relationship effect, and a family effect. For instance, mother's perception of adolescent's problem behavior can be specified as a function of the adolescent target effect, the mother perceiver effect, the mother-adolescent relationship effect, and the family effect.

A SRM-analysis can be conceived as a confirmatory analysis, in which the SRM components are the latent variables and the round-robin data are the observed variables (Cook, 1994). Thus, the components of the SRM were estimated by fitting the SRM to the variance-covariance matrix of the 12 measures of perceived problem behavior. Contrary to confirmatory analysis, the factor loadings are usually fixed at 1.0 and the variance in the latent variables is estimated. However, latent variables require a minimum of two indicators (i.e., observed variables) in order to be estimated. Because there was only one measure for each of the 12 perceptions of problem behavior, an latent variable for the relationship

components could not be estimated. Consequently, the systematic relationship variance became part of the residual variance.

The second step of fitting the SRM consists of specifying two kinds of reciprocity correlations: individual and dyadic reciprocity correlations. The individual reciprocity correlations are specified by correlating each family member's perceiver and target effects. If mother's perceiver and target effects are significantly correlated, it means that mothers who perceive other family members to be high in problem behavior are seen as high in problem behavior themselves. Dyadic reciprocity correlations are specified by correlating the residual terms representing two person's unique relationships with each other. For example, adolescents who perceive their mothers to be high in problem behavior may be seen by their mothers to be high in problem behavior too. Individual reciprocity correlations were estimated separately for fathers, mothers, older adolescents, and younger adolescents. Dyadic reciprocity correlations were estimated for the father-mother, father-older adolescent, father-younger adolescent, mother-older adolescent, mother-younger adolescent, and older adolescent-younger adolescent dyads.

Model Evaluation. The fit of the models was evaluated using the $\chi 2$ Goodness of Fit test, the Bentler Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA). We used the CFI because it has been recommended for relatively small samples (Bentler, 1990), and the RMSEA (Steiger, 1990) because it is considered one of the best indicators of fit regardless of sample size. CFI values of .90 or greater reflect an adequate fit. Browne and Cudeck (1993) suggest that values of the RMSEA of .05 or less indicate a close fit, values between .05 and .08 indicate an adequate fit, whereas values greater than .10 indicate the need for improvement in the model.

Results

Data Preparation and Screening

Prior to conducting the analyses, the assumptions of normality were checked. In the externalizing problem behavior data, values of skewness ranged from .736 to 2.982 (from 1.028 to 2.564 in the second wave) and values of kurtosis ranged from .013 to 12.502 (from .655 to 9.332 in the second wave). After a logarithmic transformation of the externalizing problem behavior data, the maximum values of skewness and kurtosis were 1.306 and

1.942 (1.301 and 1.914 in the second wave), respectively. For the sake of clarity, a logarithmic transformation was also performed on the internalizing problem behavior data. This transformation resulted in maximum absolute values of -.751 (-1.075 second wave) for skewness and 1.088 (1.431 second wave) for kurtosis. As a result of the logarithmic transformation of the data, the values for skewness and kurtosis were acceptable. Most researchers consider values greater than 3.0 as "extremely" skewed and values from 8.0 to over 20.0 have been described as indicating "extreme" kurtosis (Kline, 1998).

SRM; Target, Perceiver, and Family Effects in Perceived Problem Behavior

To test our first hypothesis, we assessed with SRM analysis whether significant target and perceiver variances and a significant family variance could be found in family members' perceptions of each other's problem behavior. We tested two models, one for externalizing problem behavior and one for internalizing problem behavior. The fit of the externalizing problem behavior model was acceptable. The chi-square test was significant, $\chi 2$ (N =69, df = 47) = 72.84, p = .01, indicating a lack of fit. However, a RMSEA of .08 and a CFI of .96 indicated that the model could be accepted without modification. For perceptions of internalizing problem behavior, the SRM model also fitted the data adequately. The chi-square test was significant, $\chi 2$ (N = 69, df = 47) = 64.62, p = .04, but a RMSEA of .06 indicated an adequate fit. Finally, the CFI of .97 was well above the .90 criterion.

Both models were analyzed again approximately ten months later to determine if the findings would replicate. In the second wave, the initial fit of the model for perceived externalizing problem behavior was not adequate. The modification indices indicated that allowing the residuals of fathers' ratings on the problem behavior of the older and younger adolescents to co vary would improve the fit of the model. This adjustment did not alter the significance of effects and only slightly changed their variance. The adjusted model resulted in a $\chi 2$ (N = 69, df = 46) = 64.73, p = .04. The RMSEA was .07 and the CFI .97, which indicated that there was an adequate fit for the model. The fit of the model for perceived internalizing problem behavior did not differ much from the first wave: A $\chi 2$ (N = 69, df = 47) = 64.46, p = .05, a RMSEA of .04 and a CFI of .96. Overall, these values

suggest that the SRM fits the data on perceptions of internalizing problem behavior reasonably well in the second wave.

The variances of the SRM effects for perceived externalizing and internalizing problem behavior in both the first and second wave are shown in Table 1. The significance of the between-family variance in the various SRM effects was tested with a one-tailed *Z*-test. As shown in the columns labelled "First Wave, Externalizing Problems" and "Second Wave, Externalizing Problems", we found that all four target and perceiver effects (for fathers, mothers, older adolescents, and younger adolescents) and the family effect explained significant amounts of variance in perceptions of externalizing problem behavior in the first wave as well as in the second wave. This indicates that there are between-family differences in the degree to which fathers, mothers, older adolescents, and younger adolescents elicit perceptions of externalizing problem behavior in their family members (target effects for fathers, mothers, older adolescents, younger adolescents); in the degree to which fathers, mothers, older adolescents, and younger adolescents perceive externalizing problem behavior in their family members (perceiver effects for fathers, mothers, older adolescents, younger adolescents); and in the general level of externalizing problem behavior that family members perceive among each other (family effect). Our first hypothesis that target and perceiver effects and the family effect could be found in family members' perceptions of each other's problem behavior is supported for perceptions of externalizing problem behavior.

Reading down the column in Table 1 labelled "First Wave, Internalizing Problems", one can see that we found three significant target effects (for mothers, older adolescents, and younger adolescents), four significant perceiver effects (for fathers, mothers, older adolescents, and younger adolescents), and a significant family effect in perceptions of internalizing problem behavior in the first wave. The non-significant target effect for fathers indicates that across families, there was no variability in how much fathers are perceived to be internalizers. As can be seen in the column labelled "Second Wave, Internalizing Problems", we also found four reliable perceiver effects (for fathers, mothers, older adolescents, and younger adolescents) and a reliable family effect in perceptions of internalizing problem behavior.

Table 4.1

Variance Estimates for the Social Relations Model Analyses of Perceived Externalizing and Internalizing Problem Behavior: Target, Perceiver, and Family Effects.

Source of Variance	Role	First Wave		Second Wave	
		Externalizing Problems	Internalizing Problems	Externalizing Problems	Internalizing Problems
Target					
	Father	0.005*	0.003	0.014**	0.012**
	Mother	0.010**	0.010**	0.007*	0.004
	Adolescent 1	0.026***	0.035***	0.022***	0.033***
	Adolescent 2	0.014***	0.020***	0.006*	0.018***
Perceiver					
	Father	0.042***	0.031***	0.039***	0.037***
	Mother	0.065***	0.030***	0.056***	0.029***
	Adolescent 1	0.085***	0.078***	0.071***	0.038***
	Adolescent 2	0.068***	0.083***	0.071***	0.076***
Family		0.018**	0.011*	0.018**	0.012**

Note. * $p < .05$, ** $p < .01$, *** $p < .001$, all one tailed; Adolescent 1= older adolescent, Adolescent 2= younger adolescent.

The variances of the target effects of fathers, older adolescents, and younger adolescents were significant, but the target effect of mothers was not significant. Thus, we found between-family differences in (a) the degree to which older adolescents and younger adolescents elicit perceptions of internalizing problem behavior in their family members (i.e., the target effects), (b) the degree to which fathers, mothers, older adolescents, and younger adolescents perceive internalizing problem behavior in their family members (i.e., the perceiver effects), and (c) the general level of internalizing problem behavior that family members perceive among each other (family effect). Between-family differences in the degree to which mothers elicit perceptions of internalizing problem behavior (target

effect mothers) in the first wave did not replicate in the second wave. In the second wave, between-family differences in the degree to which fathers elicit perceptions of internalizing problem behavior (target effect fathers) were found that had not been significant in the first wave. For perceptions of internalizing problem behavior, our first hypothesis is supported with respect to two target effects (for both adolescents), four perceiver effects (for fathers, mothers, older adolescents, and younger adolescents), and the family effect. The first hypothesis was not supported with regard to two target effects (for fathers and mothers) in perceptions of internalizing problem behavior.

Other findings that were not directly related to our hypotheses emerged from the estimation of individual and dyadic reciprocity correlations. We found some significant individual reciprocity correlations. For externalizing problem behavior, a perceiver-target correlation was found for older adolescents ($r = .67$, $Z = 6.64$, $p < .01$ first wave; $r = .58$, $Z = 5.36$, $p < .01$ second wave) in both the first and second wave, indicating that older adolescents who perceive more externalizing problem behavior in other family members tend to be perceived by their family members as higher in externalizing problem behavior. In the first wave, we also found a perceiver-target correlation for younger adolescents ($r = .29$, $Z = 2.42$, $p < .05$) with respect to externalizing problem behavior. This implies that younger adolescents who perceive more externalizing problem behavior in other family members tend to be perceived by their family members as higher in externalizing problem behavior.

For internalizing problem behavior, we found that the perceiver-target correlation for fathers was significant in the first wave ($r = .24$, $Z = 1.98$, $p < .05$). Fathers who perceive more internalizing problem behavior in other family members tend to be perceived by their family members as higher in internalizing problem behavior in the first wave. In the second wave, the perceiver-target correlations for older adolescents ($r = -0.31$, $Z = -2.58$, $p < .01$) and younger adolescents ($r = -.29$, $Z = -2.48$, $p < .01$) were significant. Older and younger adolescents who perceive more internalizing problem behavior in other family members tend to be perceived by their family members as lower in internalizing problem behavior. We found no significant dyadic reciprocity correlations for perceptions of externalizing and internalizing problem behavior in either the first or the second wave.

The Relative Contributions of Target, Perceiver, and Family Effects in Perceptions of Externalizing and Internalizing Problem Behavior

To test our second and third hypothesis, the percentage of variance explained by the SRM effects was assessed for each of the 12 family members' perceptions of each other's problem behavior. For example, the total variance in fathers' perceptions of mothers' externalizing problem behavior is the sum of: the target variance for mothers (see Table 1, .010), the perceiver variance for fathers (see Table 1, .042); the family variance (see Table 1, .018); and any remaining unexplained variance (.301, not in Table 1). In this case the sum is .371. The relative perceiver variance in fathers' perceptions of mothers' externalizing problem behavior is computed by dividing the fathers' perceiver variance by the total variance (i.e., .042/.371=11.32%). The contributions of the different SRM effects to the variance in perceptions of externalizing problem behavior as well as in perceptions of internalizing problem behavior were next averaged for all 12 family members' perceptions of each other's problem behavior. In Table 2, the relative amounts of variance accounted for by the SRM target and perceiver effects and the family effect are presented.

As can be seen in Table 2, SRM target variance explained from 4.5 to 6.5% of the variance in perceptions of externalizing problem behavior and from 7.5 to 8% in perceptions of internalizing problem behavior, while SRM perceiver variance explained from 24% to 31% of the variance in perceptions of externalizing problem behavior and from 20% to 25% in perceptions of internalizing problem behavior. In agreement with our second hypothesis, the absolute value of the amount of variance explained in family members' perceptions of problem behavior was found to be greater for perceiver effects than for target effects. Our third hypothesis that the absolute value of the amount of variance explained in family members' perceptions of problem behavior by target effects is greater for judgments of externalizing problem behavior than for judgments of internalizing problem behavior was not supported. We did not find evidence of greater agreement between family members in their ratings of externalizing problem behavior compared with their ratings of internalizing problems. Our findings suggest a tendency of greater correspondence in perceptions of internalizing problem behavior.

Table 4.2

The Relative Amounts of Variance in Perceptions of Externalizing and Internalizing Problem Behavior Accounted for by the SRM Target, Perceiver, and Family Effects.

Source of Variance	First Wave		Second Wave	
	Externalizing Problems	Internalizing Problems	Externalizing Problems	Internalizing Problems
SRM Target Effects	6.41%	7.85%	4.46%	7.50%
SRM Perceiver Effects	30.69%	25.39%	24.06%	20.39%
SRM Family Effects	8.64%	4.81%	7.27%	5.03%
Unexplained/ SRM Relationship Effects	54.25%	61.95%	64.23%	67.09%

About 54% to 64% of the variance in externalizing problem behavior and 62% to 67% of the variance in internalizing problem behavior is unexplained. Considering that the systematic relationship variance became part of the residual variance (see Method section), part of this variance can be accounted for by characteristics of specific relationships between family members (i.e., SRM relationship effects). However, because these components also contain non-systematic (error) variance, we cannot draw conclusions about their relative importance. For those components only containing systematic variance, the largest absolute value of the amount of variance explained in family members' perceptions of problem behavior is accounted for by the SRM perceiver effects. For externalizing behavior, the absolute value of the amount of variance explained by the SRM family effect is slightly greater than the average for the SRM target effects, whereas for internalizing problem behavior the absolute value of the amount of variance explained by the SRM target effects is slightly greater than by the SRM family effect.

Discussion

In this study, our first hypothesis was that target and perceiver effects and a family effect could be found in family members' perceptions of each other's problem behavior. Our second hypothesis was that the absolute value of the amount of variance explained in

family members' perceptions of problem behavior would be greater for perceiver effects than for target effects. Finally, our third hypothesis was that the absolute value of the amount of variance explained in family members' perceptions of problem behavior by target effects would be greater for judgments of externalizing problem behavior than for judgments of internalizing problem behavior. We found support for the first and second hypothesis. Our third hypothesis was not confirmed.

Previous research suggested that family members' judgments of a child or adolescent's problem behavior may reflect characteristics of the target, perceiver, and the family (see e.g., Achenbach et al., 1987; De Los Reyes & Kazdin, 2005; Kroes et al., 2003; Van Der Ende & Verhulst, 2005). However, in these prior studies the contributions of perceivers, targets, and family characteristics were not assessed with statistical controls for each other. In general, the results of the present study provide this additional level of empirical support that family members' judgments on problem behavior (i.e., fathers, mothers, and two adolescent children) reflect characteristics of targets, perceivers, and the family as a group.

We found that between-family differences in perceived externalizing and internalizing problem behavior can be explained by characteristics of individual family members on whom problem behaviors are reported (i.e., the targets). The SRM target variances were significant for each family member with respect to perceptions of externalizing problem behavior and for three out of four family members in perceptions of internalizing problem behavior in both the first and second wave. Generally, these findings show that different family members agree on the problem behavior of individual family members. However, for perceived internalizing problem behavior, the target variance for fathers in the first wave and the target variance for mothers in the second wave were not significant. Consequently, in some instances differences in perceptions of internalizing problem behavior are not all explained by characteristics of the person being rated. It may be that the internalizing problem behavior of fathers and mothers is not always observable by all family members because parents may not show their emotional problems to their children.

The SRM perceiver variances were significant for each family member with respect to both perceptions of externalizing and internalizing problem behavior. These results were replicated in the second wave. These findings show that there are between-family differences in the extent to which individuals notice higher or lower levels of problem

behavior in their family members. Furthermore, this means that individual family members have a generalized perspective on the externalizing and internalizing problem behavior of their family members. Thus, when a person perceives a particular family member as high in externalizing or internalizing problem behavior, he or she also tends to perceive the other family members as high in externalizing or internalizing problem behavior. These findings further substantiate the risk of perceiver bias in ratings of problem behavior.

Finally, we found significant SRM family variance in family members' perceptions of each other's externalizing and internalizing problem behavior, both in the first as well as in the second wave. Thus, between-family differences in perceived externalizing and internalizing problem behavior can be explained by characteristics of the family as a group. The level of perceived externalizing and internalizing problem behavior is greater in some families -taken as a group- than in other families. It can be concluded that an individual's perceptions of externalizing and internalizing problem behavior is biased, in part, by the shared family climate. The application of the SRM enabled us to show that this family climate of problem behavior affects an individual's perceptions of externalizing and internalizing problem behavior when characteristics of individual family members (i.e., SRM perceiver and target effects) are taken into account.

The results for the individual reciprocity correlations with respect to externalizing problem behavior show that adolescents who perceive other family members as high in externalizing problem behavior are perceived by those family members to be high on problem behavior themselves. Baumrind (1980) described how such feedback loops may occur within families: "Within a reciprocal and interacting system such as the family, individuals produce by their own behavior the environmental conditions that affect their own as well as others' behavior. One person's behavior is simultaneously a response to environmental stimuli and a stimulus to others' responses within the interactive system of social exchange" (p. 640). Internalizing problem behavior of adolescent family members does not appear to be reciprocally determined. In the second wave, adolescents who perceived less problem behavior in their family members were perceived as higher on internalizing problem behavior themselves and vice versa. A social comparison process seems to be operating with respect to internalizing problems of adolescents. Internalizing adolescents may use themselves as a baseline for rating the internalizing problem behavior

of others. Thus, the more adolescents perceive themselves as having internalizing problems, the less they may rate others as having internalizing problem behavior. This conclusion cannot be drawn firmly, however, because we did not find individual reciprocity correlations for adolescents with respect to internalizing problem behavior in the first wave. Fathers do not appear to engage in a social comparison process with respect to their internalizing problem behavior. Fathers who perceived more internalizing problem behavior in their family members were perceived as higher on internalizing problem behavior themselves in the first wave. This finding may indicate that fathers could have a tendency to project their internalizing problems on their family members, but in the second wave we did not find support for such a conclusion.

The absolute value of the amount of variance explained in family members' perceptions of externalizing and internalizing problem behavior was found to be greater for perceiver effects than for target effects. This shows that, family members' judgments of each other's externalizing and internalizing problem behavior are determined more by their generalized perceptions about all family members' problem behavior, than by characteristics of the family members who are targeted on their problem behavior. This provides further empirical support that the validity of family members' judgments of each other's problem behavior is compromised, that is, their judgments say more about the rater (perceiver) than about the family member on whom problem behaviors are reported.

We did not find that the absolute value of the amount of variance explained in family members' perceptions of problem behavior by target effects was greater for judgments of externalizing than for internalizing problem behavior. This is in contrast with previous studies that found greater levels of correspondence for informants' ratings of child externalizing problem behavior compared with informants' ratings of internalizing problems (Achenbach et al., 1987; Duhig et al., 2000). A possible explanation is that the greater levels of correspondence for externalizing problem behavior that were found in previous studies would not have been found if effects due to characteristics of family members who report on family members (i.e., perceiver effects) and contextual effects of whole-family functioning (i.e., family effect) had been controlled as in our study.

The present study shows that the clinical use of family members' ratings to assess problem behavior of individuals is not valid, because these ratings are confounded by

perceiver and family effects. Considering that invalid ratings of an individual's problem behavior may have important implications for the diagnosis and treatment of individuals, it is important to separate the true score variance representing characteristics of the targets from the potentially distorting effects of perceivers and the family. By means of the SRM, the effects due to the perceiver and the family can be separated and removed from the measure of an individual's problem behavior (the target effect). SRM analysis can also be used in applied context such as assessing the functioning of individual families or family members (see e.g., Cook, & Kenny, 2004).

Several limitations of this study should be noted. Kashy and Kenny (1990) have suggested that as few as 50 families may be adequate for SRM analysis. Nonetheless, our study would be stronger and more sensitive if it would have had a larger sample than 69 families. We also have to stress that the generalizability of this study is limited to relatively high functioning intact families with adolescent children. Results may be different for low-functioning families, families with a more varied composition, and families with younger children. Finally, the SRM provides information about the sources of variance in perceptions of problem behavior, but it does not identify the constructs that cause or explain the variance. For example, if all family members perceive the older adolescent as high in problem behavior, we do not know what specific characteristics of the older adolescent elicit these perceptions in his or her family members. Notwithstanding the limitations mentioned, this study advances the literature on problem behavior in families by demonstrating that the SRM can be an effective means to separate and remove the confounding effects due to the rater and the family from the measure of an individual's problem behavior.

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Chapter 5

Adolescent Personality, Problem Behavior and the Quality of the Parent-Adolescent Relationship*

The relationship between adolescent personality and problem behavior has been well established. However, relatively little attention has been given to the role of the social environment in the association between adolescent personality and problem behavior. We tested the mediating and moderating role of the quality of the parent-adolescent relationship in the associations between adolescents' personality traits and problem behavior. The sample consisted of 140 adolescents (11 to 18 years of age) and both their parents. Results supported a mediating role of the father/mother-adolescent relationship in the associations between Agreeableness, Emotional Stability, and Conscientiousness and externalizing problem behavior. The father/mother-adolescent relationship did not mediate the associations between personality traits and internalizing problem behavior. We also found support for a moderating role of the father/mother –adolescent relationships in the association between Emotional Stability and both externalizing and internalizing problem behaviors. Other moderated effects were specific for parent, personality trait and type of problem behavior.

Introduction

The relationship between adolescent personality and problem behavior has been well established (Cooper, Agocha, & Sheldon, 2000; Ehler, Evans, & McGhee, 1999; Heaven, 1996; Hoyle, Fejfar, & Miller, 2000; Loukas, Krull, Chassin, & Carle, 2000). In a recent review and theoretical analysis, Shiner and Caspi (2003) described several processes that could be involved in the connection between Big Five personality traits and psychopathology and emphasized that the (social) environment plays a role in all these

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processes: “Either by introducing some input to which the child must respond, or by being an output that the child shapes in some way” (p. 19). Very few studies, however, empirically examined the role of the (social) environment in the association between adolescent personality and problem behavior.

In this study, we explored the role of the quality of the parent-adolescent relationship in the association between adolescent personality and problem behavior. The quality of the parent-adolescent relationship may influence the relationship between adolescent personality and problem behavior according at least two different models. In the mediation model, personality exerts its effect on problem behavior through the quality of the parent-adolescent relationship. In the moderation model, the quality of the parent-adolescent relationship is an external factor which is supposed to affect the relationship between adolescent personality and problem behavior (see Holmbeck, 1997, for a thorough discussion of mediated and moderated effects).

Two associations that have been demonstrated frequently in the literature provide empirical support for an indirect effect of adolescent personality on problem behavior through the quality of the parent-adolescent relationship, namely the association between adolescent personality and the quality of the parent-adolescent relationship and the association between the quality of the parent-adolescent relationship and adolescent problem behavior.

With respect to the association between adolescent personality and the quality of the parent-adolescent relationship, Branje, van Lieshout, and van Aken (2004) showed that adolescents’ Agreeableness and Conscientiousness were positively related to both adolescents’ perceived support from parents and parents’ perceived support from adolescents. The findings with respect to Agreeableness were supported in a study by Branje, van Lieshout, and van Aken (2005) for all relationships between parents and adolescents except for the mother-younger adolescent relationship. Results with respect to Conscientiousness are not consistent. Asendorpf and van Aken (2003) found a positive effect of adolescents’ Conscientiousness on perceived support from fathers, but not on perceived support from mothers. Asendorpf and Wilpers (1998) found an effect of Conscientiousness on family relationships with both parents, but they assessed family

interaction rather than perceived support. Finally, Neyer and Asendorpf (2001) found no effects of Conscientiousness on family relationships.

A large body of cross-sectional research has demonstrated negative associations between the parent-adolescent relationship and externalizing behavior problems like drug use, alcohol use and delinquent activities (Clark & Shields, 1997; Rothbaum & Weisz, 1994; Smetana, Crean, & Daddis, 2002), and internalizing behavior problems such as anxiety and depression (Rapee, 1997). In longitudinal studies, the quality of the parent-adolescent relationship has been found to predict externalizing problem behavior like conduct problems (Ge, Best, Conger, & Simons, 1996), substance use (Barnes, Farrell, & Banerjee, 1994; Stice & Barrera, 1995), and delinquent activities (Barnes et al., 1994), and internalizing problem behavior such as anxiety and depression (Brage & Meredith, 1994; Ge et al., 1996).

Finch and Graziano (2001) and Finch, Okun, Pool, and Ruehlman (1999) found empirical support for an indirect effect of adolescent personality on problem behavior through social relations. Adolescents' Agreeableness and Neuroticism exerted an effect on depression through two qualities of social relations (social support and negative social exchange), while adolescents' Extraversion exerted an effect on depression through one of these qualities of social relations (social support). Neuroticism also exerted a direct effect on depression. Only in the study of Finch et al. (1999), Extraversion also contributed directly to depression.

Patterson (1997) described a macro model of parenting that explains how the effects of children's characteristics on children's adjustment are mediated by parenting practices. Prinzie et al. (2004) found that the associations between children's Benevolence (comparable with Agreeableness) and Emotional Stability (positive labeling of Neuroticism) and children's externalizing problem behavior were mediated by parenting variables regarding negative discipline. Children's Benevolence also contributed directly to children's externalizing problem behavior.

The goodness-of-fit theory (Thomas & Chess, 1977) provides theoretical support for the moderation model. According to this theory, for example, behavioral problems may arise when there is a mismatch between a difficult temperament and parental behavior. Temperament has an effect on problem behavior in conjunction with particular parental

behavior. Several studies (see e.g., Kochanska, 1997; Paterson & Sanson, 1999) provided empirical support that parental behavior moderated the association between children's difficult temperament and psycho-social development.

Recently, Van Leeuwen, Mervielde, Braet, and Bosmans (2004) and Prinzie et al. (2003) found that negative parental control affected the associations between children's Benevolence and Conscientiousness and externalizing problem behavior. Children with low scores on Benevolence or Conscientiousness who were exposed to negative parental control exhibited higher levels of externalizing behavior. In the study by Van Leeuwen et al. (2004) positive parenting moderated the relationship between Benevolence and externalizing problem behavior. Children rated low on Benevolence were more likely to show externalizing behavior in particular when parents showed low levels of positive parenting. However, this last finding was not stable across judges and across time. With internalizing problem behavior as the outcome variable, parental behavior did not moderate the association between personality and problem behavior.

The present study continues to explore the role that the social environment plays in the relationships between adolescents' Big Five personality traits and adolescents' problem behavior. Our study extends the present research by focusing on the mediating versus moderating role of the quality of the parent-adolescent relationship. The construct parent-adolescent relationship is a relational construct. It refers to the relationship as perceived by both partners in the relationship, in this case adolescents and parents. To our knowledge, our study is one of the first studies that assessed whether the models are the same for the quality of the father-adolescent and mother-adolescent relationships as a mediator and moderator variable and for externalizing and internalizing problem behavior as outcome variables.

Because the quality of the parent-adolescent relationship has not been studied as a variable that affects the relationship between adolescent personality and problem behavior, we did not formulate hypotheses about which specific trait-problem behavior relationships would be mediated or moderated. However, the studies by Prinzie et al. (2003, 2004) and Van Leeuwen et al. (2004) that studied parental behavior as a mediator or moderator variable let us to expect some trends. Assuming that positive parenting and negative parental control are associated with a positive and negative quality of the parent-adolescent

relationship, we tentatively formulated the following expectations. The Prinzie et al. (2004) study lets us to expect both direct and mediated links between Agreeableness and externalizing problem behavior and only mediated links between Emotional Stability and externalizing problem behavior. Based on the studies of Prinzie et al. (2003) and Van Leeuwen et. al. (2004) we tentatively expected moderated links between Agreeableness and Conscientiousness on the one hand and externalizing problem behavior on the other hand. The study of Van Leeuwen et al. lets us to tentatively expect no moderated links between the Big Five personality traits and internalizing problem behavior.

Both Prinzie et al. (2003) and Van Leeuwen et al. (2004) interpreted the interaction between personality and parental behavior as reflecting the moderator effect of personality rather than of parental behavior. Therefore, we tentatively formulated our expectations with respect to the moderating role of the quality of the parent-adolescent relationship. Because in statistical interactions both sides (personality and parental behavior) are involved, we expected that the interaction between personality and parental behavior that was found in the studies of Prinzie et al. and Van Leeuwen et al. can also be interpreted as reflecting the moderator effect of parental behavior. As far as we know, this study is the first to explore the viability of attributing a moderator status to the parent-adolescent relationship. It must also be stressed that in either view (personality as the moderator or parental behavior as the moderator), personality is at stake.

A shortcoming of previous work on the association between personality, parent-adolescent relationships and problem behavior is their heavy reliance on adolescents' self-reports (Galambos, Barker, & Almeida, 2003). In this study we used reports of adolescents and their parents to assess parent-adolescent relationships and reports of siblings and parents to assess adolescent personality and problem behavior.

Method

Procedure

Families were recruited via 16 secondary schools in The Netherlands. Schools with different types of curriculum were selected in three different regions. A letter that was addressed to parents and to students themselves that informed them about the goal and procedures of the research project, the criteria with respect to participating, and the

registration procedure was handed to the students. The response rate was 5%. This rather low percentage may be due to the fact that many families did not meet the criteria for participating in this study that included being part of a household with two parents and at least two adolescents between the ages of 11 and 18. Two parents and two adolescents had to be willing to participate in the study. Another reason is that many families felt resistance to participate in the observation part of the study. For the present study, only questionnaire data were used.

Participants

Participants included 140 adolescents (68 males and 72 females) and both their parents. The age of the adolescents ranged from 11 to 18 years (M = 14.4 years, SD = 1.7 years). The average age of fathers and mothers was 47 and 45 years, respectively, ranging from 40 to 58.6 years and from 36.9 to 55.4 years. Ninety-eight per cent of the participants were Dutch. The percentages of the educational levels of adolescents were: primary education, 8.7%; general secondary education, 25.4%; senior/higher general secondary education, 31.9%; pre-university education, 30.4%; and secondary vocational education, 3.6%. For fathers, the percentages for secondary education (general or senior/higher secondary education and pre-university education), higher vocational education, and university were 37.1%, 30%, and 32.9%, while they were 51.4%, 28.6%, and 20% for mothers. With respect to the occupations held by the parents, 1.5% of fathers worked in their own household, 5.8% were in service, unskilled, or skilled labour occupations; 76.8% were in managerial, sales, or clerical occupations; 15.9% were in professional/technical occupations. Corresponding figures for mothers were 22.4%, 3%, 64.2%, and 10,5%.

Measures

All measures were rated on a 7-point Likert scale, ranging from 1) very untrue of this person to 7) very true of this person with 4) sometimes untrue, sometimes true of this person in between.

Adolescent Personality. The Quick Big Five Personality Questionnaire (QBF; Vermulst & Gerris, 2005), consisting of 30 adjective Big Five personality markers selected from Goldberg (1992), was used to assess adolescents' personality. The QBF has good

psychometric properties. Fathers, mothers, and the siblings of the adolescents rated the 30 adjectives. Five personality traits were rated: Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Openness to Experience. These personality traits can be described as follows (Branje, van Lieshout, & van Aken, 2004): Extraversion measures the extent to which the person actively engages the world or avoids intense (social) experience (e.g., "This is a talkative person"). Agreeableness measures the interpersonal nature of the person and can range from warm and committed to others versus antagonistic (e.g., "This is a sympathetic person"). Conscientiousness measures the degree of organization, persistence, and motivation during the fulfilment of goal-directed task behaviors (e.g., "This is a punctual person"). Emotional Stability measures the extent to which a person is emotionally stable or plagued by unpleasant experiences and distressing emotions (e.g., "This is an anxious person (recoded)')". Openness to Experience assesses the depth, complexity, and quality of a person's mental and experiential life along with the flexibility of his or her information processing (e.g., ""This is a versatile person"). The internal consistencies (Cronbach's alpha) of the different traits of adolescents' personality rated by different family members were on average $\alpha = .82$ with a range of $\alpha = .71$ to $\alpha = .86$ for all judgments by the sibling, $\alpha = .84$ with a range of $\alpha = .79$ to $\alpha = .90$ for all judgments by father, and $\alpha = .84$ with a range of $\alpha = .80$ to $\alpha = .91$ for all judgments by mother.

Parent-Adolescent Warmth and Hostility. Two scales of the Relational Support Inventory (RSI; Scholte, van Lieshout, & van Aken, 2001) were used to measure warmth and hostility in the parent-adolescent relationship. The scales warmth and hostility each consisted of three items (e.g., "This person shows his love for me"; "This person ridicules and humiliates me"). Fathers, mothers, and adolescents rated the six items for the parent-adolescent relationship. Cronbach's alpha's for the quality of parent-adolescent warmth and hostility were on average $\alpha = .73$ with a range of $\alpha = .65$ for hostility of adolescent rated by father to $\alpha = .79$ for warmth of mother rated by the adolescent.

Parent-Adolescent Communication. A nine-item version (Gerris et al., 1998) of the Parent-Adolescent Communication Scale (Olson et al., 1983) was used to assess the quality of parent-adolescent communication. Examples of items are: "I am very satisfied with how this person and I talk together" and "If I were in trouble, I could tell this person". Fathers,

mothers, and adolescents rated the nine items for the parent-adolescent relationship. Cronbach's alpha's for the quality of parent-adolescent communication were on average α = .81 with a range of α = .79 for communication of father rated by the adolescent and communication of adolescent rated by mother to α = .83 for communication of adolescent rated by father.

Adolescent Problem Behavior. A self-report questionnaire (the Nijmegen Problem Behavior List; Scholte, Vermulst, & De Bruyn, 2005) developed to assess subclinical problem behavior in community samples was used to assess adolescents' externalizing and internalizing problem behaviors. Subclinical behavior was defined as behavior that is not psychiatric but deviant enough to raise concern about the person's psychological well-being. Items were selected that represented the subclinical part of the behavior that is assessed in Achenbach's Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983). In contrast with the QBF, items refer to specific problem behavior and respondents were instructed to rate the items considering their behavior in the present. The items reflected two broad unidimensional factors; externalizing and internalizing problem behaviors. The scale externalizing problem behavior consisted of seven items (e.g., "This person fights a lot") and the scale internalizing problem behavior consisted of nine items (e.g., "This person withdraws from other people"). Fathers, mothers, and the siblings of the adolescents rated the 16 items. Cronbach's alpha's for externalizing and internalizing problem behaviors were α = .71 and α = .81 for the judgments by the sibling, α = .74 and α = .76 for the judgments by father, and α = .77 and α = .83 for the judgments by mother.

Statistical Analyses

Latent Variables and Factor Scores. For the analyses with respect to the mediation model, ratings of fathers, mothers, and siblings were used to tap the latent variables of adolescents' Big Five personality traits and externalizing and internalizing problem behaviors. Thus, latent variables were created that reflect a) other reports on the five personality traits of adolescents by three different informants (fathers, mothers and siblings) and b) other reports of adolescents' externalizing and internalizing problem behavior by three different informants (fathers, mothers and siblings). Ratings of parents and adolescents on different scales (parent-adolescent warmth, hostility, and communication)

were used to tap the latent variable of the quality of the father-adolescent and mother-adolescent relationship. Thus, latent variables were created that reflect a) self-reports on the quality of the father-adolescent relationship by two different informants (fathers and adolescents) on three scales (father-adolescent warmth, hostility, and communication) and b) self-reports on the quality of the mother-adolescent relationship by two different informants (mothers and adolescents) on three scales (mother-adolescent warmth, hostility, and communication).

Aggregated scores were created for the analyses with respect to the moderation models. By means of exploratory principal components analyses one common factor score was extracted from the ratings provided by fathers, mothers, and siblings on adolescents' Big Five personality traits and on adolescents' externalizing and internalizing problem behavior. Thus, factor scores were created that reflect a) other reports on the five personality traits of adolescents by three different informants (fathers, mothers and siblings) and b) other reports of adolescents' externalizing and internalizing problem behavior by three different informants (fathers, mothers and siblings). The explained variances ranged from 58% to 70.5% for adolescents' personality traits. The explained variances for adolescents' externalizing and internalizing problem behaviors were 64% and 60% respectively. Cronbach's alpha's for adolescents' personality traits ranged from $\alpha = .78$ to $\alpha = .88$ and were $\alpha = .86$ and $\alpha = .80$ for adolescents' externalizing and internalizing problem behaviors respectively.

To assess the quality of the parent-adolescent relationship, scores from different informants (parents and adolescents) on different scales (warmth, hostility and communication) were aggregated. The father-adolescent and mother-adolescent relationships were assessed separately, because two separate factor scores were extracted with principal components analyses for the father and mother data. Therefore, common factor scores were extracted that reflect a) self-reports on the quality of the father-adolescent relationship by two different informants (fathers and adolescents) on three scales (father-adolescent warmth, hostility and communication) and b) self-reports on the quality of the mother-adolescent relationship by two different informants (mothers and adolescents) on three scales (mother-adolescent warmth, hostility and communication). The explained variances for the quality of the father-adolescent and mother-adolescent

relationship were 49.4% and 52.4% respectively. Cronbach's alpha's for the quality of the father-adolescent and mother-adolescent relationship were $\alpha = .78$ and $\alpha = .78$, respectively.

The use of latent variables and factor scores is valuable because they reflect the common core of the judgements of the different informants, reduce measurement error, and hence increase the power of statistical tests for mediation and moderation models (Chaplin, 1991; Jaccard & Wan, 1995; Van Leeuwen et al., 2004). Furthermore, the use of factor scores centre the variables because factor scores are standardised. Aiken and West (1991) recommended using centred variables to assess moderation models to diminish problems with multicollinearity.

Testing the Mediation Model. LISREL 8.50 (Jöreskog & Sörbom, 2001) was used to test the mediating role of the quality of the parent-adolescent relationship in the association between adolescent personality and problem behavior. The fit of the model was examined by looking at the $\chi 2$-test, the Bentler Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA). As indicators of a good fit, a $\chi 2/df$ ratio of less than 3.00, a CFI value greater than 0.90, and an RMSEA value smaller than 0.05 were used.

As outlined by Holmbeck (1997), three models were tested to assess the mediating role of the quality of the parent-adolescent relationship in the association between adolescent personality and problem behavior. When there is a latent predictor variable (adolescent personality), a hypothesized latent mediator variable (the quality of the parent-adolescent relationship), and a latent outcome variable (adolescent problem behavior), the fit of the direct effect model (effect of adolescent personality on problem behavior) is assessed first. Assuming an adequate fit of the direct effect model, the fit of the overall model (effect of adolescent personality on problem behavior through the quality of the parent-adolescent relationship) is assessed under two conditions: (a) when the direct path (effect of adolescent personality on problem behavior) is constrained to zero (overall model without direct path), and (b) when the direct path is not constrained to zero (overall model with direct path). If the quality of the parent-adolescent relationship completely mediates the association between personality and problem behavior, the overall model with direct path should not provide a significant improvement in fit over the overall model without direct path. When the overall model with direct path provides a significant improvement in fit over the overall

model without direct path, the quality of the parent-adolescent relationship partially mediates the association between personality and problem behavior.

Testing the Moderation Model. To test the moderating role of the quality of the parent-adolescent relationship in the association between adolescent personality and problem behavior, multiple regression analyses were conducted separately for externalizing and internalizing problem behavior and for the quality of the father-adolescent and mother-adolescent relationships. As recommended by Aiken and West (1991), a step-down hierarchical approach was used (for an example see Prinzie et al., 2003). All linear effects (effects of adolescent' personality on problem behavior and effects of the quality of the parent-adolescent relationship on problem behavior) were entered into the regression equation together with all possible interactions between adolescent personality and the quality of the parent-adolescent relationship. Non significant effects were then omitted sequentially, starting with the interaction terms between adolescent personality and the quality of the parent-adolescent relationship. Multicollinearity among the predictors was assessed with the Variance Inflation Factor (VIF) statistic. For externalizing problem behavior, the VIF ranged from 1.12 to 1.79 for the father data and from 1.11 to 1.52 for the mother data. With respect to internalizing problem behavior, the VIF ranged from 1.21 to 1.30 for the father data and from 1.10 to 1.21 for the mother data. These values are within the acceptable range (Stevens, 2002).

Results

Descriptive Statistics

Preliminary analyses showed that on average, adolescents were found to be relatively extravert (M = 5.05, SD = 0.91), agreeable (M = 5.50, SD = 0.58), emotionally stable (M= 4.96, SD= 0.83), and open to new experiences (M = 4.76, SD = 0.73) according to their parents and siblings. Parents and siblings rated the items with respect to Conscientiousness to be sometimes true and sometimes untrue for adolescents (M = 4.02, SD = 1.01). According to their parents and siblings, adolescents scored relatively low on externalizing (M = 1.70, SD = 0.52) and internalizing problem behavior (M = 2.84, SD = 0.64). Parents and siblings reported significantly less adolescent externalizing problem behavior than adolescent internalizing problem behavior (t (139) = -19.71, $p < 0.01$). Relatively high

levels of the quality of the father-adolescent relationship (M = 5.43, SD = 0.67) and the quality of the mother-adolescent relationship (M = 5.66, SD = 0.66) were reported by parents and adolescents. Significantly higher levels of the quality of the parent-adolescent relationship were reported for the mother-adolescent relationship than for the father-adolescent relationship by parents and adolescents (t (139) = 4.41, $p < 0.01$).

The Association Among Adolescent Personality and Problem Behavior, and the Quality of the Parent-Adolescent Relationship

The correlations among adolescent personality and problem behavior and the quality of the parent-adolescent relationship are presented in Table 1. Adolescents' personality traits were positively associated with the quality of the father-adolescent relationship. Adolescents' personality traits were also positively related to the quality of the mother-adolescent relationship, except for Openness to Experience. Adolescents' Agreeableness, Conscientiousness, and Emotional Stability were negatively related to externalizing problem behavior, while adolescents' Extraversion, Agreeableness, and Emotional Stability showed negative correlations with internalizing problem behavior. Finally, a higher quality of the mother-adolescent and father-adolescent relationship appeared to be associated with less externalizing and internalizing problems.

Table 5.1

Correlations Among Adolescent Personality, Problem Behavior and the Quality of the Parent-Adolescent Relationship.

Variable	1	2	3	4	5	6	7	8	9
Personality									
1. Extraversion	-	.30**	-.15	.41**	.16	.21*	.30**	-.13	-.77**
2. Agreeableness		-	.29**	.21*	.29**	.53**	.63**	-.47**	-.29**
3. Conscientiousness			-	-.04	.06	.28**	.32**	-.29**	.14
4. Emotional Stability				-	-.19*	.31**	.38**	-.32**	-.62**
5. Openness to Experience					-	.16	.17*	-.10	-.01
Parent-Adolescent Relationship									
6. Quality of the mother-adolescent relationship						-	.54**	-.61**	-.29**
7. Quality of the father-adolescent relationship							-	-.62**	-.35**
Problem Behavior									
8. Externalizing Problem Behavior								-	.33**
9. Internalizing Problem Behavior									-

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

Mediation Model

Externalizing Problem Behavior. First, the direct effect model was tested for externalizing problem behavior (see left side on Table 2). The fit was good. The $\chi 2/df$ ratio was 1.36, the CFI 0.96 and the RMSEA 0.04. Adolescents' Agreeableness ($\beta = -0.38$, $t = -2.61$), Emotional Stability ($\beta = -0.20$, $t = -2.59$), and Conscientiousness ($\beta = -0.16$, $t = -2.60$) were related to externalizing problem behavior.

Second, the overall model without direct path was tested. The fit was acceptable for the father and mother data. For the father data the $\chi 2/df$ ratio was 1.86, the CFI 0.92 and the RMSEA 0.07. For the mother data, the $\chi 2/df$ ratio was 1.64, the CFI 0.93 and the RMSEA 0.06. Adolescents' Agreeableness ($\beta = 0.56$, $t = 3.75$ father; $\beta = 0.49$, $t = 3.30$ mother),

Emotional Stability (β = 0.18, *t* = 3.60 father; β = 0.12, *t* = 2.09 mother), and Conscientiousness (β = 0.11, *t* = 2.49 father; β = 0.12, *t* = 2.28 mother) were found to be significantly related to the quality of the father-adolescent and mother-adolescent relationships. The quality of the father-adolescent (β = -0.99, *t* = -4.47) and mother-adolescent relationship (β = -0.87, *t* = -4.97) were found to be significantly related to externalizing problem behavior.

Table 5.2

Model Fit Indices for Externalizing and Internalizing Problem Behavior in Father-Adolescent Relationship and Mother-Adolescent Relationship Data.

	Externalizing Problem Behavior				Internalizing Problem Behavior			
Path analysis	χ2	df	CFI	RMSEA	χ2	df	CFI	RMSEA
1. Direct effect model	138.87	102	0.96	0.04	134.90	107	0.97	0.04
Father-adolescent relationship								
2. Overall model without direct path	197.17	106	0.92	0.07	151.80	65	0.91	0.09
3. Overall model with direct path	194.01	103	0.92	0.07	128.68	63	0.94	0.08
Mother-adolescent relationship								
2. Overall model without direct path	172.18	105	0.93	0.06	183.46	69	0.89	0.11
3. Overall model with direct path	167.69	102	0.94	0.06	144.38	67	0.92	0.08

Third, the overall model with direct path yielded almost the same fit as the overall model without direct path. For the father data, the χ2/df ratio was 1.88, the CFI .92 and the RMSEA 0.07. For the mother data, the χ2/df ratio was 1.64, the CFI 0.94 and the RMSEA

0.06. Only adolescents' Conscientiousness was found to be marginally related to externalizing problem behavior (β = -0.95, *t* = -1.95 father; β = -0.10, *t* = -1.68 mother).

A comparison of the overall model with direct path with the overall model without direct path yielded a Δ $\chi 2$ (3) of 3.16 for the father data and a Δ $\chi 2$ (3) of 4.49 for the mother data, which were not statistically significant. The overall model with direct path did not yield a better fit than the overall model without direct path. This means that the quality of the parent-adolescent relationship completely mediated the association between personality and externalizing problem behavior. As was shown in testing the overall model without direct path, the quality of the parent-adolescent relationship mediated the association between adolescents' Agreeableness, Emotional Stability and Conscientiousness and adolescents' externalizing problem behavior.

Internalizing Problem Behavior. For internalizing problem behavior, the direct effect model was also tested first (see right side of Table 2). The fit was good. The $\chi 2$/df ratio was 1.26, the CFI 0.97 and the RMSEA 0.04. Adolescents' Extraversion (β = -0.30, *t* = -4.90) and Emotional Stability (β = -0.31, *t* = -4.16) were related to internalizing problem behavior.

Second, the overall model without direct path was assessed. The fit was not adequate for the father and mother data. For the father data, the $\chi 2$/df ratio was 2.34, the CFI 0.91 and the RMSEA 0.09. For the mother data, the $\chi 2$/df ratio was 2.66, the CFI 0.89 and the RMSEA 0.11. Adolescents' Extraversion (β = 0.19, *t* = 2.66 father; β = 0.23, *t* = 2.71 mother) and Emotional Stability (β = 0.23, *t* = 2.72 father; β = 0.32, *t* = 3.15 mother) were related to the quality of the parent-adolescent relationship. The quality of the father-adolescent (β =-0.41, *t* =-2.64) and mother-adolescent (β = -0.86, *t* = -3.77) relationship were related to internalizing problem behavior.

Third, the overall model with direct path yielded a better fit. For the father data, the $\chi 2$/df ratio was 2.04, the CFI 0.94 and the RMSEA 0.08. For the mother data, the $\chi 2$/df ratio was 2.15, the CFI 0.92 and the RMSEA 0.08. In this model, Emotional Stability was related to the quality of the father-adolescent (β = 0.32, *t* = 3.02) and mother-adolescent (β = 0.20, *t* = 2.48) relationships. Extraversion (β = -0.34, *t* = -5.16 father; β = -0.37, *t* = -5.31 mother) and Emotional Stability (β = -0.28, *t* = -3.21 father; β = -0.29, *t* = -3.74 mother) were associated with internalizing problem behavior.

A comparison of the overall model with direct path with the overall model without direct path yielded a Δ $\chi 2$ (2) of 23.12 for the father data and a Δ $\chi 2$ (2) of 39.09 for the mother data, which were statistically significant ($p < 0.001$). Therefore, the quality of the parent-adolescent relationship was not found to mediate the association between adolescent personality and internalizing problem behavior. For internalizing problem behavior, a model was found with direct effects from adolescents' Emotional Stability on both the quality of the parent-adolescent relationship and internalizing problem behavior and from adolescents' Extraversion on internalizing problem behavior.

Moderation Model

Externalizing Problem Behavior. For externalizing problem behavior, the regression model with respect to the father data accounted for 44% of the variance in problem behavior (F (4, 135) = 26.97, $p < 0.001$) and the model with regard to the mother data accounted for 45% of the variance in problem behavior (F (3, 136) = 36.70, $p < 0.001$). The regression model for externalizing problem behavior is shown in Table 3.

Table 5.3

Regression Model Predicting Adolescent Externalizing Problem Behavior.

	Father-Adolescent			Mother-Adolescent		
Predictor	b	SE	β	b	SE	β
Agreeableness	-.21*	.09	-.21*	-.28**	.08	-.28**
Parent-Adolescent Relationship	-.50**	.08	-.50**	-.43**	.08	-.43**
Emotional Stability × Parent-Adolescent Relationship	.14*	.06	.15*	.21**	.06	.24**
Conscientiousness × Parent-Adolescent Relationship	.15*	.07	.14*			

Note. * $p < .05$, ** $p < .01$. $R^2 = .44$ for father-adolescent relationship $R^2 = .45$ for mother-adolescent relationship.

Low levels of Agreeableness and the quality of the parent-adolescent relationship predicted higher levels of externalizing problem behavior. Furthermore, the quality of the parent-adolescent relationship was found to moderate the association between Emotional Stability and externalizing problem behavior. Emotional Stability was more strongly related to externalizing problem behavior for adolescents with a lower quality of the relationship with their parents than for those with a higher quality of the relationship with their parents. The findings described above were supported for the father and mother data. An extra interaction effect was found for the father data, however, between Conscientiousness and the father-adolescent relationship. Conscientiousness was more strongly related to externalizing problem behavior for adolescents with a lower quality of the relationship with their fathers than for those with a higher quality of the relationship with their fathers.

Internalizing Problem Behavior. For internalizing problem behavior, the regression model with respect to the father data accounted for 63% of the variance in problem behavior (F (4, 135) = 57.70, $p < 0.001$) and the model with regard to the mother data accounted for 62% of the variance in problem behavior (F (4, 135) = 55.23, $p < 0.001$). The regression model for internalizing problem behavior is shown in Table 4.

Low levels of Extraversion and Emotional Stability predicted higher levels of internalizing problem behavior. Furthermore, the quality of the parent-adolescent relationship was found to moderate the association between Emotional Stability and internalizing problem behavior. Adolescents with high scores on Emotional Stability with a higher quality of the relationship with their parents showed reduced levels of internalizing problem behavior. The findings described above were supported for the father and mother data. An extra interaction effect was found for the father data, however, between Agreeableness and the father-adolescent relationship. Adolescents with high scores on Agreeableness with a higher quality of the father-adolescent relationship showed reduced levels of internalizing problem behavior. For the mother data, an extra interaction effect was found between Conscientiousness and the mother-adolescent relationship. Adolescents with low scores on Conscientiousness who had a lower quality of the relationship with their mothers scored elevated levels of internalizing problem behavior compared to adolescents with low scores on Conscientiousness who had a higher quality of the relationship with their mothers.

Table 5.4

Regression Model Predicting Adolescent Internalizing Problem Behavior.

Predictor	Father-Adolescent b	SE	β	Mother-Adolescent b	SE	β
Extraversion	-.52**	.06	-.52**	-.50**	.06	-.50**
Emotional Stability	-.45**	.06	-.45**	-.42**	.06	-.42**
Emotional Stability × Parent-Adolescent Relationship	-.19**	.06	-.20**	-.11*	.05	-.13*
Agreeableness × Parent-Adolescent Relationship	.17**	.05	.19**			
Conscientiousness × Parent-Adolescent Relationship				.16**	.05	.16**

Note. * p < .05, ** p < .01. R^2 =.63 for father-adolescent relationship R^2 =.62 for mother-adolescent relationship.

Discussion

In this study we tested two models, a mediation and moderation model, which conceptualize the influencing role of the quality of parent-adolescent relationship in the association between adolescent personality and problem behavior. We found support for a mediating role of the parent-adolescent relationship in the associations between Agreeableness, Emotional Stability and Conscientiousness on the one hand and externalizing problem behavior on the other hand in the father as well as in the mother data. The parent-adolescent relationship did not mediate the associations between personality traits and internalizing problem behavior in both the father and mother data. We also found support for a moderating role of the parent–adolescent relationship in the associations between Emotional Stability and both externalizing and internalizing problem behaviors in the father and mother data. Other moderated effects were specific for parent, personality trait and type of problem behavior. The father-adolescent relationship moderated the association between Conscientiousness and externalizing behavior, and that between

Agreeableness and internalizing problem behavior. The mother-adolescent relationship moderated the association between Conscientiousness and internalizing problem behavior.

The associations between Agreeableness, Emotional Stability, and Conscientiousness and problem behavior were fully explained by the parent-adolescent relationship in the mediation model that was tested for externalizing problem behavior. In the mediation model that was tested for internalizing problem behavior, Extraversion and Emotional Stability were directly associated with internalizing problem behavior. In the moderation models, not only moderated links were found between personality and problem behavior, but personality was also directly associated with problem behavior. Agreeableness was negatively associated with externalizing problem behavior and Extraversion and Emotional Stability were negatively related to internalizing problem behavior. Openness to experience did not have any empirical association with problem behavior.

Mediation Model

Our finding that agreeable and emotionally stable adolescents showed less externalizing problem behavior because of a good quality of the father-adolescent and mother-adolescent relationships is in accordance with previous research. Prinzie et al. (2004) found that agreeable and emotional stable children showed lower levels of externalizing problem behavior due to lower levels of negative parental discipline. Prinzie et al. suggested that children with positive traits like Agreeableness (Benevolence) and Emotional Stability may be better able to obey their parents which may result in a positive, favourable rearing climate. Our findings support this explanation, assuming that the quality of the parent-adolescent relationship indeed reflects such a rearing climate. However, Prinzie et al. found both direct and mediated links between Agreeableness and externalizing problem behavior, while in this study only mediated links seem to be sufficient in explaining the association between Agreeableness and externalizing problem behavior.

We also found that conscientious adolescents showed lower levels of externalizing problem behavior because of a higher quality of the parent-adolescent relationship. According to Loukas et al. (2000), Conscientiousness primarily reflects the presence of impulse control. In this sense this trait may be conceived as a positive trait which, as suggested by Prinzie et al. (2004), may result in a positive, favourable rearing climate.

We did not find support for a mediating role of the quality of the parent-adolescent relationship in the association between adolescents' personality and internalizing problem behavior. This contrasts with the findings reported by Finch and Graziano (2001) and Finch et al. (1999). However, the comparison with the Finch studies is difficult to make. In the Finch studies, social relations were assessed as a mediator variable and only one facet of internalizing problem behavior, depression, was measured as the dependent variable. Moreover, in the Finch studies college undergraduates were studied and we cannot generalize across an age span in which complicated processes and changes in the association between personality and social relations take place (see e.g., Asendorpf & van Aken, 2003).

In both the father and mother data, Extraversion and Emotional Stability were negatively linked with internalizing problem behavior. Consequently, we have to conclude that, in contrast with the findings for externalizing problem behavior, the link between adolescent personality and internalizing problem behavior is not mediated but direct only. A possible explanation is that internalizing problem behavior is less noticed by parents than externalizing problem behavior which prevents parents from interfering and, as a consequence, mediating between their child's trait and their internalizing behavior.

A possible threat for the validity of the link between Emotional Stability and internalizing problem behavior is that the measures used might have items in common. The measures do not have items in common, however. Emotional Stability and the other Big Five personality traits were measured with the QBF scales developed in the Goldberg (1992) tradition. Ratings of adjectives were used that describe traits. Externalizing and internalizing problem behavior were assessed with the NPBL. Ratings of statements were used that describe specific behaviors of the person. Furthermore, the rater was asked to evaluate the person's problem behavior in the present which defines behavior as a state. Moreover, Emotional Stability was directly linked to the quality of the parent-adolescent relationship as well and the findings are consistent with previous studies (Costa & McCrae, 1980; Finch & Graziano, 2001; Finch et al., 1999; Russell, Booth, Reed, & Laughin, 1997; Watson & Clark, 1984).

Moderation Model

The quality of the parent-adolescent relationship was found to moderate the associations between adolescents' Emotional Stability and Conscientiousness (only for father data) and adolescents' externalizing problem behavior. Adolescents who scored low on Emotional Stability and whose relationships with their parents were of a lower quality were particular at risk for developing externalizing behavioral problems. Adolescents who scored low on Conscientiousness and whose relationships with their fathers were of a lower quality showed more externalizing problem behavior. In studies by Van Leeuwen et al. (2004) and Prinzie et al. (2003) children with low scores on Conscientiousness who were exposed to negative parental control also showed elevated levels of externalizing behavior. Our results suggest that adolescents with low scores on Emotional Stability may also be more vulnerable to the effects of a low quality of the parent-adolescent relationship in developing externalizing problems, maybe because adolescents with low scores on Emotional Stability, unlike adolescents with high scores on Emotional Stability, have more difficulty regulating their behavior on their own.

In the studies of Van Leeuwen et al. (2004) and Prinzie et al. (2003) negative parental control moderated the association between Benevolence and externalizing problem behavior, while in our study the parent-adolescent relationship did not moderate the association between Agreeableness and externalizing problem behavior. One of the reasons that can be brought forward for this inconsistent finding is that Benevolence is broader in content than Agreeableness (see Prinzie et al., 2003).

The moderating role of the parent-adolescent relationship in the association between adolescents' Conscientiousness and externalizing problem behavior was only supported for the father data. In a study of Asendorpf and van Aken (2003) it was argued that conscientious children may have a better relationship with their fathers and not with their mothers because fathers value Conscientiousness in their children more than mothers because of its importance for school achievement. So, highly conscientious adolescents may show less externalizing problem behavior when they have a better relationship with their father, because they are more affected by the concern of their fathers that externalizing problem behavior might jeopardize their performance at school.

Consistent with previous research, Agreeableness and the quality of the parent-adolescent relationship were also found to be independent predictors of adolescents' externalizing problem behavior (Clark & Shields, 1997; Ehler et al., 1999; Heaven, 1996; Hoyle et al., 2000; Loukas et al., 2000; Rothbaum & Weisz, 1994; Smetana, Crean, & Daddis, 2002). Low levels of Agreeableness and the quality of the parent-adolescent relationship predicted higher levels of externalizing problem behavior.

The quality of the parent-adolescent relationship was also found to moderate the associations between adolescents' Agreeableness, Conscientiousness, and Emotional Stability and adolescents' internalizing problem behavior. In the study of Van Leeuwen et al. (2004) negative parental control and positive parenting did not moderate the association between children's personality and internalizing problem behavior. Their findings suggested independent or additive contributions of child characteristics and parenting to internalizing problem behavior. Our results show that combined contributions of adolescents' personality and the quality of the parent-adolescent relationship may have an effect on internalizing problem behavior. Adolescents with low scores on Agreeableness, Conscientiousness, and Emotional Stability were found to show more internalizing problem behavior when the relationship with their parents was of a low quality. Consistent with the findings of Van Leeuwen et al. (2004), personality was also found to be an independent predictor of internalizing problem behavior. Low levels of Extraversion and Emotional Stability predicted higher levels of internalizing problem behavior.

The moderating role of the quality of the parent-adolescent relationship in the association between personality and internalizing problem behavior was not found to be stable across the father and mother data, however. The moderating role of the quality of the parent-adolescent relationship in the association between adolescents' Agreeableness and internalizing problem behavior was only supported for the father data, while the association between adolescents' Emotional Stability and internalizing problem behavior was only supported for the mother data.

Limitations and Further Directions

Several limitations of this study should be noted. First, we examined concurrent associations between adolescents' personality, problem behavior and the quality of the

parent-adolescent relationship, and therefore, the issue of directionality remained unaddressed. Additional longitudinal research is needed to assess changes over time in the ways in which adolescents' personality, problem behavior and the quality of the parent-adolescent relationship are related. Second, third variables may mediate or moderate the relationship between adolescent personality and problem behavior. The process of deviant peer association (Dishion & Owen, 2002), for example, may also shed more light on the association between personality and problem behavior. Third, we only used questionnaires to measure all variables which may lead to shared method variance. A multimethod measurement strategy that also includes observational measures would allow for a more accurate assessment of mediating or moderating processes. Fourth, considering the complexity of the models tested, the sample size was relatively small. Increasing the sample size is necessary to test the relative contribution of the mediation and moderation models in explaining adolescents' problem behavior. Finally, we focused on the quality of parent-adolescent relationship. Further research should clarify how such a relational variable is linked with the quality of parenting. This would enhance the understanding on how our findings are related to the findings of Prinzie et al. (2003, 2004) and Van Leeuwen et al. (2004) with respect to parenting.

Nevertheless, an important contribution of this study consists of providing evidence that adolescents' personality, problem behavior and the quality of the parent-adolescent relationship are related in meaningful and informative ways. Results suggest that the mechanisms and processes by which adolescent personality is linked to problem behavior may differ for externalizing and internalizing problem behavior (with respect to the mediator role of the quality of the parent-adolescent relationship) and for the father and mother data (with respect to the moderator role of the quality of the parent-adolescent relationship).

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Chapter 6

Summary and Discussion

The present thesis focuses on the individual, the dyadic, and the group level of complexity within families with adolescent children. The families that were studied in this thesis consisted of fathers, mothers, older adolescent siblings, and younger adolescent siblings. Effects at different levels of complexity were expected to be confounded in family members' ratings of warmth in the family as a group and the problem behavior of family members. More specifically, these ratings were expected to be affected by characteristics of family members (i.e., the individual level), by their dyadic relationships (i.e., the dyadic level), and by the climate of their families (i.e., the group level).

Family members' ratings of warmth in the family as a group and of other family members' problem behavior are frequently used for the assessment and treatment of individuals and their families. As described in the Introduction, if different levels are confounded in these ratings, this may lead to interventions and theoretical predictions at the inappropriate level of complexity within families. The first aim of the thesis was to assess whether family members' ratings of warmth in the family as a group measure family functioning at the level of complexity they are intended to measure (i.e., the group level). The second aim was to assess whether the warmth in the family as a group, independent from effects at lower levels of complexity (i.e., characteristics of family members and dyadic relationships), is related to adolescent problem behavior. The third aim of the thesis was to assess whether family members' ratings of each other's problem behavior are represented by the intended characteristics of the family members who are judged on their problem behavior, or by characteristics of the family members who report on problem behavior, by their dyadic relationships, and by the climate of their families.

Besides the individual level (e.g., family members' problem behavior) and the group level (e.g., family warmth), the present thesis also paid attention to the dyadic level of complexity, namely on the quality of the parent-adolescent relationship. As being an important part of an adolescent's everyday social environment, family relationships such as the parent-adolescent relationship could be involved in the connection between adolescent

personality and problem behavior (Shiner & Caspi, 2003). The fourth aim of the thesis was to assess the influencing role of the quality of the parent-adolescent relationship in the association between adolescent personality and problem behavior.

These four aims were addressed in four empirical studies. Below, first, the most important findings of each of these studies will be summarized. Second, some concluding remarks will be made.

Family Members' Ratings of Warmth in the Family as a Group

The first empirical study (Chapter 2) introduced an approach to test the level validity (i.e, whether an instrument measures family functioning at the level of complexity it purports to assess) of family members' ratings of warmth in the family as a group. SRM analysis allowed us to estimate factors at the level of the individual, the dyad, and the group. At the individual level, actor and partner factors were estimated. The actor factors reflect between-family differences in the tendency of family members to perceive similar warmth from all other members. The partner factors reflect between-family differences in the extent to which all family members perceive specific family members as equally warm. At the dyadic level, relationship factors reflect between-family differences in the extent to which family members perceive unique warmth from other specific family members. Finally, at the group level of complexity, the family factor reflects between-family differences in the extent to which all family members perceive similar warmth from all other members. Because in SRM analysis factors at all levels are estimated controlling for factors at other levels of complexity, the SRM factors served as a "gold standard" for testing the level validity of family members' ratings of warmth in the family as a group. Level validity was demonstrated (1) if family members' ratings of warmth in the family as a group were significantly associated with the family factor, and (2) if family members' ratings of warmth in the family as a group were not significantly associated with any other SRM factors in addition to the family factor.

In previous research it was demonstrated that ratings of family members do not only contain "true-score" variance, but also include systematic variance unique to the perspective of the rater (Cole & Jordan, 1989; Cook & Goldstein, 1993; Jacob & Windle, 1999). On the basis of these findings, we hypothesized that family members' ratings of

warmth in the family as a group would be predicted not only by the family factor, but also by actor factors (sometimes called rater factors), indicating a lack of level validity. This hypothesis was supported. We found that family members' ratings of warmth in the family as a group measure the intended group level, but also reflect rater variance at the individual level. This supports Cook and Kenny's (2006) critique on the use of measures that directly assess the dyadic or family level of complexity within families, by underscoring the importance of separating out individual factors (e.g., rater effects) when estimating higher-order factors (i.e., characteristics of dyadic relationships or the family as a group). Among all family members' ratings of warmth in the family as a group, only mothers' ratings were substantially more highly related to the family factor than to the actor factors. This suggests that mothers may be more sensitive perceivers of warmth in the family as a group than the other family members. In previous research, it was suggested that mothers' perspective might also be the most valid perspective to rate characteristics of dyadic relationships such as fathers' negativity toward the child (Cook & Goldstein, 1993).

In a second set of analyses, we tested the level validity of a latent variable measure of warmth in the family as a group as indicated by all family members' ratings. In principle, a latent variable based on multiple family members' ratings will not be affected by the individual perspectives of family members and errors of measurement (Cook & Goldstein, 1993). Consequently, we hypothesized that the latent variable measure of warmth in the family as a group would be predicted only by the family factor and not by other SRM factors, providing evidence for the level validity of the latent family warmth measure. This hypothesis was also supported. The latent variable measure of family warmth based on all family members' ratings was found to be highly predicted by the family factor and not by other SRM factors. Thus, evidence was provided that the latent variable measure of family warmth only assesses the intended group level. In addition, evidence was found for a shared perspective on family warmth, indicated by significant loadings of all family members' ratings on the latent variable measure of family warmth. This is in agreement with previous findings that mother, father, and child ratings of characteristics of the family as a group converge to define a latent variable representing the group level of complexity (Jacob & Windle, 1999). Not only evidence was found for a shared perspective, but also for a unique perspective of family members on family warmth that differs from this common

perspective. This unique perspective of family members on family warmth was found to be significantly related to the actor factors that represent family members' tendencies to perceive warmth in their personal relationships. Thus, the general tendency to perceive other family members as warm not only affects family members' ratings of warmth received from particular family members, but also influences their ratings of family warmth.

In sum, Chapter 2 shows that the use of family members' ratings to assess characteristics of the family as a group may not be valid because two sources of variance are combined in these ratings a) a true score component, and b) a rater component. Considering that these ratings are used for scientific and clinical purposes, it is important that in the future, alternative measures will be used which enable the separation of the true score variance from the potentially distorting effects of rater variance. The latent variable approach and SRM analysis provide statistical control for rater variance. SRM analysis can be used in applied contexts to assess the functioning of individual families (see e.g., Cook & Kenny, 2004). To compare individual families and family members with each other, however, standard scores have to be developed. Further research will need to focus on developing standard scores for specific family configurations and age groups. This would enable us to turn SRM analysis from a basic research tool into an applied, clinical family assessment tool.

Family Warmth and Adolescent Problem Behavior

The general aim of the second empirical study (Chapter 3) was to assess the association between the warmth in the family as a group and adolescent externalizing and internalizing problem behavior. SRM analysis was applied to assess the warmth in the family as a group (i.e., the family factor) controlling for other sources of variance such as effects of family members and dyadic relationships. According to the social climate perspective of Moos (1975), families may provide quite different social climates for parents and children. Consequently, our first hypothesis was that a family factor could significantly account for family members' ratings of the warmth received from each other. This would imply that families differ with respect to the warmth in the family as a group. In accordance with our

first hypothesis, significant between-family variance was found for the family factor in interpersonal perceptions of warmth. This enabled us to test our second hypothesis.

Several studies provided evidence that the larger network of affective family relationships has an impact on adolescent problem behavior (Deković & Buist, 2005; Mathijssen, Koot, Verhulst, De Bruyn, & Oud, 1998; O' Connor, Hetherington, & Reiss, 1998; Schauerte, Branje, & Van Aken, 2003). These findings might imply that the warmth in the family as a group (i.e., the general level of the quality of all family relationships) may be associated with adolescent problem behavior. Our second hypothesis was that the warmth in the family as a group is negatively related to both externalizing and internalizing adolescent problem behavior. This hypothesis was supported. Our findings show that a network of high or low affective family relationships may result in a shared family climate with a high or low affective quality that is related to adolescent externalizing and internalizing problem behavior, independent from the affective quality of specific family relationships.

Previous research suggests that the cumulative effect of distressed family relationships is a more important correlate of adolescent outcomes than individual characteristics of family members. In a prior SRM study focusing on correlates of adolescent problem behavior, for example, the justice or trust in the family as a group was more strongly related to problem behavior outcomes than individual characteristics of family members (Delsing, Oud, De Bruyn, Scholte, & Van Aken, 2005). These results led to our third hypothesis that the family factor would be more strongly related to adolescent problem behavior than the actor or partner factors. In other words, we expected that the warmth in the family as a group would be most strongly associated with adolescent problem behavior. No support was found for this hypothesis. The contrasting findings may suggest that characteristics of the family as a group are more important than individual characteristics of family members for explaining adolescent problem behavior with regard to the concepts of justice and trust (see e.g., Boszormenyi-Nagy & Spark, 1984), but not for the concept of warmth. Another explanation for these contrasting findings is that Delsing et al. (2005) did not actually test whether justice and trust in the family as a group is more strongly related to adolescent problem behavior than individual characteristics of family members.

In general, the findings of Chapter 3 provide support for the usefulness of SRM analysis when studying the association between family warmth and adolescent problem behavior. The application of SRM analysis enabled us to provide evidence that the warmth in the family as a group, independent from effects of family members and relationships, is related to both adolescent externalizing and internalizing problem behavior. Besides family warmth, individual characteristics of family members were also found to be associated with adolescent problem behavior. An association was found between the younger adolescent siblings' tendency to perceive warmth from family members (i.e., actor factor younger adolescent sibling) and their externalizing and internalizing problem behavior. This is in line with previous findings that perceived support is important for the adaptive development of children and adolescents (e.g., Acitelli, 1996; Wills & Cleary, 1996). On the basis of previous research a less strong, but still significant association was expected between the older adolescent siblings' tendency to perceive warmth from family members (i.e., actor factor older adolescent sibling) and their externalizing and internalizing problem behavior (e.g., Helsen, Vollebergh, & Meeus, 2000). Surprisingly, no such association was found. An explanation is that, in contrast to previous studies, effects due to family warmth were controlled for in this study.

Furthermore, an unexpected association between the tendency of younger adolescent siblings to be perceived as warm by family members (i.e., partner factor younger adolescent sibling) and older adolescent siblings' internalizing problem behavior was found. This finding was interpreted by using the social comparison theory (Festinger, 1954) as a frame of reference. The partner factor of the older adolescent sibling (i.e., the tendency of the older adolescent sibling to be perceived as warm by family members) was found to be not significant, indicating that the older adolescent siblings are receiving less consistent information from family members than the younger adolescent siblings. Therefore, it may be the older adolescent siblings who are triggered to spontaneously compare themselves with their (younger) siblings (see Gilbert, Giesler, & Morris, 1995). This may lead to feelings of uncertainty about the self (see Stapel & Blanton, 2004) that contribute to the development of older adolescent siblings' internalizing problem behavior. Also somewhat surprisingly, the tendency of parents to be perceived as warm by family members (i.e., partner factor mother and father) was not found to be associated with adolescent

externalizing and internalizing problem behavior. This finding is in contrast with previous research in which an association between affective characteristics of parents and adolescent outcomes was found (e.g., Ge, Best, Conger, & Simons, 1996; Rothbaum & Weisz, 1994; Stice & Barrera, 1995). A possible explanation for these contrasting findings is that the unique warm behavior of one parent to one child (i.e., relationship factor), rather than one parent's behavior to all family members (i.e., partner factor), is associated with adolescent problem behavior.

Family Members' Ratings of Problem Behavior

In the third empirical study (Chapter 4), SRM analysis was used to assess whether family members' ratings of each other's problem behavior represented the intended characteristics of the family members who are judged on their problem behavior (partner factors, also called target factors). Furthermore, it was assessed with SRM analysis whether the validity of family members' ratings of problem behavior is compromised by effects due to characteristics of the family members who report on problem behavior (actor factors, also called perceiver factors), and characteristics of the family as a group (family factor). This was assessed at two waves, approximately ten months apart.

Previous research suggested that family members' judgments on a child or adolescent's problem behavior may reflect characteristics of the child or adolescent who is judged on his or her problem behavior (i.e., the partner), characteristics of the family member who reports on problem behavior (i.e., the actor), and characteristics of the family as a group (see e.g., Achenbach, Mc Conaughy, & Howell, 1987; De Los Reyes & Kazdin, 2005; Kroes, Veerman, & De Bruyn, 2003; Van Der Ende & Verhulst, 2005). We hypothesized that these findings would hold for family members' ratings of the problem behavior of all members (i.e., parents and adolescents). Consequently, we hypothesized that partner factors, actor factors, and a family factor would be found in family members' ratings of each other's problem behavior.

In general, we found support for this hypothesis. Almost all partner factors accounted for variance in family members' ratings of each other's problem behavior. This implies that, in general, family members' judgments of problem behavior represent characteristics of the family members on whom problem behaviors are reported. Only the partner factor

for fathers (in the first wave) and the partner factor for mothers (in the second wave) did not account for variance in family members' ratings of each other's internalizing problem behavior. Consequently, in some instances differences in perceptions of internalizing problem behavior are not all explained by characteristics of the persons being rated. It may be that the internalizing problem behavior of fathers and mothers is not always observable by all family members because parents may not show their emotional problems to their children. Furthermore, all actor factors accounted for variance in family members' ratings of each other's problem behavior. This means that family members' judgments of problem behavior may be biased by the generalized perspective on problem behavior (i.e., the perceiver bias) of the family members who report on problem behavior. Finally, the family factor also accounted for variance in family members' ratings of each other's problem behavior. This suggests that family members' ratings of problem behavior are biased, in part, by the shared family climate.

In addition, one actor-partner correlation was found that replicated at the second wave. Adolescents who perceive other family members as high in externalizing problem behavior (actor factors older and younger adolescent sibling) are perceived by those family members to be high on externalizing problem behavior themselves (partner factors older and younger adolescent sibling). This might be the outcome of feedback loops which are described by Baumrind (1980): "Within a reciprocal and interacting system such as the family, individuals produce by their own behavior the environmental conditions that affect their own as well as others' behavior. One person's behavior is simultaneously a response to environmental stimuli and a stimulus to others' responses within the interactive system of social exchange" (p. 640).

We also determined exactly how much of the variance in family members' ratings of each other's problem behavior was accounted for by each of the SRM factors. Generally, no more than one-third of the total variance in interpersonal ratings is due to the individuals targeted by the ratings, even when the perceivers know the targets fairly well, as where family members rate each other (Kenny, 1994). In large part, perceivers do not agree because they have relatively idiosyncratic theories about targets (Park, DeKay, & Kraus, 1994). Furthermore, it has been shown that there is significant overlap in a perceiver's judgments of different targets (Kenny, 1994). Consequently, we hypothesized that the

absolute value of the amount of variance explained in family members' ratings of problem behavior would be greater for actor factors than for partner factors. We found support for this hypothesis. This provided further empirical support that the validity of family members' judgments of each other's problem behavior is compromised, that is, their judgments say more about the family members who report on problem behavior (i.e., the rater) than about the family members who are judged on their problem behavior.

In previous studies greater levels of correspondence for informants' ratings of child externalizing problem behavior compared with ratings of internalizing problems were found (Achenbach et al., 1987; Duhig, Renk, Epstein, & Phares, 2000). Based on these findings, our final hypothesis was that the absolute value of the amount of variance explained in family members' ratings of problem behavior by partner factors would be greater for judgments of externalizing problem behavior than for judgments of internalizing problem behavior. This hypothesis was not supported. Externalizing problems of targets were not found to elicit more similar reports from family members than internalizing problems. Maybe, greater levels of correspondence for externalizing problem behavior that were found in previous studies would not have been found if effects due to actor and family had been controlled for.

To conclude, Chapter 4 shows that the clinical use of family members' ratings to assess problem behavior of individuals is not valid, because these ratings are confounded by actor and family factors. Considering that invalid ratings of an individual's problem behavior may have important negative implications for the diagnosis and treatment of individuals, it is important to separate the true score variance representing characteristics of the partners from the potentially distorting effects of actors and the family. The SRM can be an effective means to handle measurement problems by removing confounding sources of variance (actor and family factors) from the measure of an individual's problem behavior (the partner factor). SRM analysis can be used in applied contexts, for example, to assess the problem behavior of a single family member (see e.g., Cook, & Kenny, 2004).

The Influencing Role of the Quality of the Parent-Adolescent Relationship

In the fourth empirical study (Chapter 5), we tested two models that conceptualized the influencing role of the quality of the parent-adolescent relationship in the association between adolescent personality traits and externalizing and internalizing problem behavior. In the mediation model, the quality of the parent-adolescent relationship was hypothesized to channel the effects of adolescent personality on problem behavior. In the moderation model, the quality of the parent-adolescent relationship was expected to function as an external condition which affects the association between adolescent personality and problem behavior. The mediation model was tested with a procedure outlined by Holmbeck (1997), and the moderation model by means of a step-down hierarchical regression approach, as recommended by Aiken and West (1991).

Hypotheses about which links between personality traits and problem behavior would be mediated or moderated could not be formulated because the quality of the parent-adolescent relationship has not been studied as a variable that affects the association between adolescent personality and problem behavior. In general, however, our findings are in accordance with previous research in which parental behavior was studied as a mediator or moderator variable in the relationship between adolescent personality and problem behavior. We found support for both models in somewhat different patterns depending on the relationship (i.e., father-adolescent or mother-adolescent relationship), personality trait and type of problem behavior involved.

With respect to the mediation model, the quality of the father/mother-adolescent relationship was found to mediate the effects of adolescent agreeableness, emotional stability and conscientiousness on adolescent externalizing problem behavior. In addition to previous research (Prinzie et al, 2004), our findings suggest that besides agreeable and emotionally stable adolescents, conscientious adolescents may have a better relationship with their parents which, in turn, leads to less externalizing problems. Conscientiousness primarily reflects the presence of impulse control (Loukas, Krull, Chassin, & Carle, 2000). In this sense this trait may also be conceived as a positive trait which, as suggested by Prinzie et al. (2004) may result in a positive relationship between parents and adolescents. The mediation model was not supported for adolescent internalizing problem behavior. In contrast with the findings of externalizing problem behavior, the link between adolescent

personality and internalizing problem behavior was not mediated by the quality of the parent-adolescent relationship, but direct only. Maybe, internalizing problem behavior is less noticed by parents than externalizing problem behavior which prevents parents from interfering and, as a consequence, of mediating between the adolescents' traits and their internalizing problem behavior.

With regard to the moderation model, the quality of the parent-adolescent relationship was found to moderate the associations between adolescent emotional stability and conscientiousness (only father-adolescent relationship) and adolescent externalizing problem behavior. In studies by Van Leeuwen, Mervielde, Braet, and Bosmans (2004) and Prinzie et al. (2003) children with low scores on conscientiousness who were exposed to negative parental control showed elevated levels of externalizing behavior. Our results suggest that adolescents with low scores on emotional stability may also be more vulnerable to the effects of a low quality of the parent-adolescent relationship in developing externalizing problems, maybe because adolescents with low scores on emotional stability have more difficulty regulating their behavior on their own.

Only the father-adolescent relationship moderated the association between adolescent conscientiousness and externalizing problem behavior. In a study of Asendorpf and Van Aken (2003) it was argued that conscientious children may have a better relationship with their fathers and not with their mothers because fathers value conscientiousness in their children more than mothers because of its importance for school achievement. So, high conscientious adolescents may show less externalizing problem behavior when they have a better relationship with their father because they are more affected by the concern of their fathers that externalizing problem behavior might jeopardize their performance at school. In the studies of Van Leeuwen et al. (2004) and Prinzie et al. (2003) negative parental control moderated the association between benevolence and externalizing problem behavior, while in our study the parent-adolescent relationship did not moderate the association between agreeableness and externalizing problem behavior. One of the reasons that can be brought forward for this inconsistent finding is that benevolence is broader in content than agreeableness (see Prinzie et al., 2003).

The moderation model was also supported for adolescent internalizing problem behavior. The quality of the parent-adolescent relationship moderated the association

between adolescent agreeableness, conscientiousness, and emotional stability on the one hand and adolescent internalizing problem behavior on the other hand. These findings show that the quality of the parent-adolescent relationship and adolescent personality may not only independently contribute to internalizing problem behavior (Van Leeuwen et al., 2004). The combined contributions of the quality of the parent-adolescent relationship and adolescent personality may also have an effect on internalizing problem behavior. However, these combined contributions were not all supported for both types of relationships (i.e., father-adolescent and mother-adolescent relationship).

General Concluding Remarks

An important feature of the thesis was the inclusion of multiple reporters within the family who rated warmth and family members' problem behavior in a round-robin design. This resulted in a better understanding of what is measured by ratings of perceived warmth and problem behavior in the family context (Chapter 2 and 4). Effects at different levels of complexity were found to be confounded in these ratings. Family members' ratings of family warmth in the family as a group not only represented warmth at the intended group level, but were also affected by characteristics of the family members who reported on warmth at the individual level. Family members' ratings of each other's problem behavior not only represented the intended characteristics of the family members who were judged on their problem behavior at the individual level, but were also affected by characteristics of the family members who reported on problem behavior at the individual level, and by the family climate of problem behavior at the group level of complexity. These findings show that it may not be clear whether theoretical predictions and interventions, that are frequently based on these ratings, focus (only) on the intended level of complexity.

In Chapter 3 it was shown that SRM analysis can be used to make theoretical predictions at an intended level of complexity without being affected by other levels. The application of SRM analysis enabled us to provide evidence that the warmth in the family as a group, is related to adolescent problem behavior, independent from effects of family members at the individual level and characteristics of dyadic relationships at the dyadic level. For researchers not only effects at the intended levels of complexity may be interesting. Effects at unintended levels of complexity, when measured, may become

valuable additional diagnostic information, rather than being confounds. For example, actor effects may provide information on a family member's unique experience of his or her family or family members, which may be key to understanding family problems.

SRM analysis can be used in applied contexts such as assessing the functioning of individual families (see Cook & Kenny, 2004; Manders, 2006). An important advantage of using SRM analysis as an applied clinical family assessment tool is the degree of specificity obtained about family functioning. Compared with other self-report assessment methods, SRM family assessment can provide a more fine-grained analysis of the psycho-social interior of the family by identifying problems at different levels of complexity within the family. This results in much greater specificity regarding the sources of disturbance and conflict (Cook & Kenny, 2004). This makes it an especially appropriate family assessment tool to guide clinical interventions and evaluate clinical outcomes.

In none of the SRM studies described in this thesis, specific hypotheses regarding relationship factors were formulated. Because two indicators were not available to identify each relationship factor, the systematic variance in the ratings that was due to relationship factors was contained in the residual variance. Consequently, we could not provide information on the dyadic level of complexity within families in the SRM studies. In Chapter 5, we used a different approach to assess the quality of the parent-adolescent relationship at the dyadic level. The quality of the parent-adolescent relationship was found to play an important role as a mediating and moderating variable in explaining the association between adolescent personality traits and problem behavior. This shows that relationships with parents are an important part of an adolescent's everyday social environment.

It should be noted that the generalizability of the findings of this thesis is limited to relatively high functioning intact families with adolescent children. Results may be different for low-functioning families, families with a more varied composition, and families with younger children. Furthermore, considering the complexity of the models tested, the sample size was relatively small. Increasing the sample size is necessary to test the relative contribution of the mediation and moderation models in explaining the association between adolescent personality, problem behavior and the quality of the parent-adolescent relationship. Although Kashy and Kenny (1990) have suggested that as few as

50 families may be adequate for SRM analysis, the findings of the three SRM studies described in this thesis would be stronger and more sensitive if a larger sample than 69 families was assessed. Furthermore, in two studies (Chapter 2 and 3), SRM factors were used to predict latent variable measures. When a latent variables approach is used, a sample of 69 families is considered small (Cook & Goldstein, 1993). The use of small samples can result in negative variances, correlations greater than 1.0, and failure of the model to converge on a solution (see Loehlin, 1987). No such problems were apparent in our studies. Furthermore, in general, our research findings were in agreement with those of previous research.

Because of the relatively small sample size and the complexity of the models tested, it was not possible to apply longitudinal analyses. Consequently, causal interpretations regarding the associations found should be drawn cautiously. Also, third variables may explain the associations found. The family is an open system and the perceptions and behaviors of family members toward each other are often influenced by forces coming outside the set of nuclear family relationships, such as adolescents' relationships with peers (Bronfenbrenner, 1979). Furthermore, research in behavior genetics shows that we cannot exclude the possibility that the associations found are influenced by genetic factors (Plomin, DeFries, McClearn, & Rutter, 1997; see also Reiss, Neiderhiser, Hetherington, & Plomin, 2000).

In some instances the findings of the SRM studies were found to differ from previous findings. A possible explanation that can be provided for these contrasting findings is that, with SRM analysis, factors are estimated while controlling for factors at other levels of complexity, while in most previous studies effects at other levels were not controlled for. In contradiction to previous research, for example, no associations were found between the older adolescent's tendency to perceive warmth from family members and the older adolescent's problem behavior, and between the tendency of parents to be perceived as warm by family members and adolescent problem behavior in Chapter 3. Previous research may have reported spurious associations that would not have been found if effects at the dyadic and group level of complexity (i.e., the effects of warmth in specific family relationships and the family as a group) had been controlled for.

The present thesis attempted to provide a structural analysis of families with adolescents by focusing on different levels of complexity. It was shown that SRM analysis can be used to disentangle effects at different levels of complexity in family members' ratings of warmth and each other's problem behavior. Future research may focus on developing alternative ways to disentangle these effects in family members' ratings. Furthermore, SRM analysis might be used to disentangle effects at different levels in family members' ratings with respect to other concepts than family warmth and family members' problem behavior. Future studies in which relationship variance is estimated independently from residual variance could shed light on the extent to which family members' ratings are determined by the specific adjustment a specific family member makes to another member. Finally, SRM analysis could be used for the assessment of the functioning of individual families and family members. To turn SRM analysis from a basic research tool into an applied, clinical family assessment tool, however, further research will need to focus on developing standard scores for specific family configurations and age groups.

Although SRM analysis provided information about actor, partner, and family variance in family members' ratings, it could not identify which family processes cause or explain this variance. For example, all family members were found to agree on the younger adolescent siblings' problem behavior (partner variance younger adolescent sibling) in Chapter 4. Thus in some families family members agree that the younger adolescent sibling is high in problem behavior, while in other families family members agree that the younger adolescent sibling is low in problem behavior. Unfortunately, we do not know what processes elicited these perceptions in the younger adolescent siblings' family members.

To gain a better insight in the family processes that precede these perceptions, future research could focus on combining SRM analysis with a dynamic systems approach. Dynamic systems theorists argue that developmental outcomes can be explained by a process called self-organization (Lewis, 2000). Self-organization refers to the spontaneous emergence of coherent, higher-order forms through recursive interactions among simpler components. Structural characteristics as revealed by SRM analysis may be explained as a result of the self-organization processes assessed by the dynamic systems approach. This can be illustrated by relating a specific dynamic systems method, the state space grid (Lewis, Lamey, & Douglas, 1999; Granic, Hollenstein, Dishion, & Patterson, 2003), to a

specific kind of reciprocity correlation, the relationship reciprocity correlation, assessed by SRM analysis.

With the dynamic systems state space grid method adapted by Granic et al. (2003), a dyad's behavioral trajectory (i.e., the sequence of behaviors) is plotted as it proceeds in real time on a grid representing all possible behavioral combinations. For example, four categories of behavior may be assessed such as hostile, negative, neutral, and positive behavior. The parent's behavior is represented on the X-axis and the child's behavior is represented on the y-axis. Each second the parent's and child's behavior can be plotted. Each cell on the grid represents a particular dyadic state (e.g., parent hostile; child hostile). With SRM analysis, relationship reciprocity correlations are specified by correlating two relationship factors (e.g., parent-child with child-parent). For example, parents who uniquely perceive their children to be hostile (i.e., relationship factor parent-child in perceptions of hostility) may be uniquely seen by their children to be hostile too (i.e., relationship factor child-parent in perceptions of hostility) .

The micro social interactions between parent and child that are plotted in the state space grid may explain the developmental outcome of a relationship reciprocity correlation. Over time, for example, interactions between parent and child may cluster in a particular cell of the state space grid such as the cell representing the parent's hostile behavior and the child's hostile behavior. The parent and child may have developed ways of interacting with each other characterized by a hostile reciprocal pattern. This could explain why the parent's perception of the child's hostility and the child's perception of the parent's hostility are correlated.

Future research might also profit from using observational measures which are especially suited for studying complex interactive family processes. Other recommendations for future research are assessing other outcome variables than warmth and problem behavior (negative as well as positive outcomes) and using larger and more heterogeneous samples.

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Samenvatting

(Summary in Dutch)

Dit proefschrift richt zich op het individuele, dyadische, en groepsniveau van complexiteit binnen gezinnen met adolescente kinderen. De gezinnen die werden bestudeerd bestonden uit vaders, moeders, en twee adolescente kinderen. Verschillende niveaus van complexiteit werden onderscheiden in beoordelingen van gezinsleden over de warmte in het gezin en elkaars probleemgedrag. Er werd verondersteld dat deze beoordelingen worden beïnvloed door kenmerken van gezinsleden (het individuele niveau), hun dyadische gezinsrelaties (het dyadische niveau), en het gezinsklimaat (het groepsniveau).

Beoordelingen van gezinsleden over de warmte in het gezin en elkaars probleemgedrag worden vaak gebruikt voor wetenschappelijke en klinische doeleinden. Als verschillende niveaus met elkaar verward worden in deze beoordelingen, kan dit leiden tot theoretische voorspellingen en interventies op het verkeerde niveau van complexiteit. Een bevinding dat een beoordeling van een gezinslid over kenmerken van het gezin als groep (bv. warmte in het gezin) een bepaalde uitkomstmaat voorspelt (bv. probleemgedrag adolescenten) kan bijvoorbeeld verkeerd worden geïnterpreteerd. Het kan zijn dat niet de warmte in het gezin, maar de neiging van de adolescent om warmte van anderen te ervaren, het probleemgedrag van de adolescent voorpelt. Daarnaast kan een interventie bijvoorbeeld verkeerd gericht worden op de gedragsproblemen van één persoon, die in plaats van een oorzaak een gevolg zijn van problemen in het gezin.

Het eerste doel van dit proefschrift was te onderzoeken of beoordelingen van gezinsleden over de warmte in het gezin het gezinsfunctioneren meten op het beoogde niveau van complexiteit (d.w.z. het groepsniveau). Het tweede doel was te onderzoeken of de warmte in het gezin, onafhankelijk van lagere niveaus van complexiteit (d.w.z. effecten van gezinsleden en gezinsrelaties) gerelateerd is aan probleemgedrag van adolescenten. Het derde doel was te onderzoeken of beoordelingen van gezinsleden over elkaars probleemgedrag de beoogde kenmerken van de gezinsleden representeren die worden

beoordeeld op hun probleemgedrag, of kenmerken van de gezinsleden die rapporteren over probleemgedrag, en het gezinsklimaat.

Naast het individuele (probleemgedrag van gezinsleden) en groepsniveau (warmte in het gezin) werd ook aandacht besteed aan kenmerken op het dyadische niveau van complexiteit, namelijk aan de kwaliteit van de ouder-adolescent relatie. Gezinsrelaties zoals de ouder-adolescent relatie zijn een belangrijk onderdeel van de dagelijkse sociale omgeving van adolescenten. Als zodanig kunnen zij betrokken zijn bij de relatie tussen de persoonlijkheid en het probleemgedrag van adolescenten. Het vierde doel van dit proefschrift was de rol van de kwaliteit van de ouder-adolescent relatie in het verklaren van de samenhang tussen de persoonlijkheid en het probleemgedrag van adolescenten te onderzoeken.

Deze vier doelen werden onderzocht in vier empirische studies. Eerst wordt ingegaan op elk van deze studies. Daarna wordt afgesloten met een aantal algemene concluderende opmerkingen.

Beoordelingen van Gezinsleden over de Warmte in het Gezin

In de eerste studie (Hoofdstuk 2) werd een benadering geïntroduceerd om de niveau validiteit (d.w.z. of een instrument het beoogde niveau van complexiteit meet) van de beoordelingen van gezinsleden over de warmte in het gezin als groep te meten. SRM analyse stelde ons in staat om factoren op verschillende niveaus te schatten. Op het individuele niveau, werden waarnemer- en partnerfactoren geschat. De waarnemerfactoren hebben betrekking op verschillen tussen gezinnen in de neiging van gezinsleden om warmte te ervaren van anderen. De partnerfactoren verwijzen naar verschillen tussen gezinnen in de neiging van gezinsleden om door anderen als warm te worden ervaren. Op het dyadische niveau, refereren relatiefactoren naar verschillen tussen gezinnen in de mate waarin gezinsleden warmte ervaren van andere gezinsleden. Tot slot, verwijst de gezinsfactor, op het groepsniveau, naar verschillen tussen gezinnen in de mate waarin alle gezinsleden warmte ervaren van elkaar. In SRM analyse wordt bij de schatting van alle factoren gecontroleerd voor factoren op andere niveaus. Daarom dienen de SRM factoren als een “gouden standaard” voor het testen van de niveau validiteit van de beoordelingen van gezinsleden over de warmte in het gezin als groep. Niveau validiteit wordt aangetoond (1)

als de beoordelingen van gezinsleden over de warmte in het gezin significant samenhangen met de gezinsfactor, en (2) als de beoordelingen van gezinsleden over de warmte in het gezin niet significant samenhangen met andere SRM factoren, in aanvulling op de gezinsfactor.

De beoordelingen van gezinsleden over de warmte in het gezin werden niet alleen voorspeld door de gezinsfactor, maar ook door de waarnemerfactoren. De niveau validiteit van deze beoordelingen werd dus niet aangetoond. Het bleek dat beoordelingen van gezinsleden over de warmte in het gezin niet alleen het beoogde groepsniveau weergeven, maar ook waarnemervariantie op het individuele niveau. Deze resultaten onderstrepen het belang van het scheiden van individuele factoren (d.w.z. waarnemerfactoren) wanneer factoren van hoger niveau worden geschat (d.w.z. effecten van dyadische gezinsrelaties of het gezin als groep). Alleen de beoordelingen van moeders bleken veel sterker gerelateerd aan de gezinsfactor dan aan de waarnemerfactoren. Dit suggereert dat moeders meer sensitieve waarnemers zouden kunnen zijn van de warmte in het gezin dan de andere gezinsleden.

In vervolganalyses werd de niveau validiteit van een latente variabele, gebaseerd op de beoordelingen van alle gezinsleden over de warmte in het gezin, onderzocht. In principe wordt een latente variabele niet beïnvloed door de unieke perspectieven van gezinsleden en door meetfouten. De latente variabele maat van warmte in het gezin werd alleen voorspeld door de gezinsfactor. De niveau validiteit van de latente variabele werd dus aangetoond, implicerend dat de latente variabele alleen het beoogde groepsniveau meet. Daarnaast bleken alle beoordelingen van gezinsleden over de warmte in het gezin significant te laden op de latente variabele. Dit duidt aan dat gezinsleden een gedeeld perspectief hebben op de warmte in het gezin. Er werd niet alleen bewijs gevonden voor een gedeeld perspectief, maar ook voor een uniek perspectief van gezinsleden op de warmte in het gezin die afwijkt van het gezamenlijke perspectief. Dit unieke perspectief van gezinsleden op de warmte in het gezin bleek samen te hangen met waarnemerfactoren, die de neiging van gezinsleden representeert om warmte te ervaren in hun persoonlijke relaties. De algemene neiging van gezinsleden om andere gezinsleden als warm te ervaren beïnvloedt dus niet alleen de beoordelingen van gezinsleden over de warmte die zij ontvangen van bepaalde gezinsleden, maar beïnvloedt ook hun beoordelingen over de warmte in het gezin.

Deze resultaten wijzen erop dat beoordelingen van gezinsleden over de warmte in het gezin mogelijk niet valide zijn, omdat twee bronnen van variantie gecombineerd zijn in deze beoordelingen a) een ware-score component, en b) een waarnemercomponent. Als in aanmerking wordt genomen dat deze beoordelingen vaak gebruikt worden voor wetenschappelijke en klinische doeleinden, is het van belang dat in de toekomst alternatieve maten worden gebruikt waarmee de ware-score variantie kan worden onderscheiden van de eventueel verstorende effecten van waarnemervariantie. De latente variabele benadering en SRM analyse controleren statistisch voor waarnemervariantie. SRM analyse kan in de praktijk worden gebruikt om het functioneren van individuele gezinnen te meten. Om individuele gezinnen en gezinsleden met elkaar te kunnen vergelijken moeten echter normscores worden ontwikkeld. Toekomstig onderzoek zal zich moeten richten op het ontwikkelen van normscores voor specifieke gezinsconstellaties en leeftijdsgroepen. Dit maakt het mogelijk om SRM analyse te veranderen van een onderzoeksinstrument in een toegepast, klinisch gezinsinstrument.

Warmte in het Gezin en Probleemgedrag van Adolescenten

Het doel van de tweede studie (Hoofdstuk 3) was de samenhang te onderzoeken tussen de warmte in het gezin en het externaliserend en internaliserend probleemgedrag van adolescenten. SRM analyse werd toegepast om de warmte in het gezin (d.w.z. de gezinsfactor) te meten, controlerend voor andere bronnen van variantie zoals effecten van gezinsleden en dyadische gezinsrelaties. Het bleek mogelijk een gezinsfactor te onderscheiden in de beoordelingen van gezinsleden over de warmte die zij van elkaar ontvangen. Dit toont aan dat gezinnen verschillen met betrekking tot de ervaren warmte in het gezin. Deze bevinding maakte het mogelijk om de gezinsfactor te relateren aan externaliserend en internaliserend probleemgedrag van adolescenten. De warmte in het gezin bleek negatief samen te hangen met externaliserend en internaliserend probleemgedrag van adolescenten. Er werd al eerder aangetoond dat het netwerk van affectieve gezinsrelaties een negatieve invloed heeft op probleemgedrag van adolescenten. Onze resultaten wijzen erop dat een netwerk van hoog of laag affectieve gezinsrelaties kan resulteren in een gedeeld gezinsklimaat met een hoge of lage affectieve kwaliteit, die

onafhankelijk van de affectieve kwaliteit van specifieke gezinsrelaties, negatief is gerelateerd aan externaliserend en internaliserend probleemgedrag van adolescenten.

De warmte in het gezin bleek niet sterker gerelateerd aan het externaliserend en internaliserend probleemgedrag van adolescenten dan individuele kenmerken van gezinsleden. Eerder onderzoek, waarin werd aangetoond dat cumulatieve affectieve gezinsrelaties sterker correleren met probleemgedrag van adolescenten dan individuele kenmerken van gezinsleden, werd hiermee niet bevestigd. Het zou kunnen zijn dat het relatieve belang van kenmerken van het gezin als groep afhankelijk is van de specifieke affectieve kwaliteit van het gezinsklimaat dat wordt gemeten. De tegenstrijdige resultaten kunnen ook zijn ontstaan omdat in vorig onderzoek niet getest is of kenmerken van het gezin als groep daadwerkelijk sterker gerelateerd zijn aan het probleemgedrag van adolescenten dan individuele kenmerken van gezinsleden.

De bevindingen tonen de bruikbaarheid van SRM analyse aan bij het bestuderen van de samenhang tussen de warmte in het gezin en probleemgedrag van adolescenten. De toepassing van SRM analyse maakte het mogelijk om aan te tonen dat de warmte in het gezin als groep, onafhankelijk van kenmerken van gezinsleden en gezinsrelaties, gerelateerd is aan zowel het externaliserend als het internaliserend probleemgedrag van adolescenten.

Beoordelingen van Gezinsleden over elkaars Probleemgedrag

In de derde studie (Hoofdstuk 4) werd SRM analyse toegepast om te onderzoeken of de beoordelingen van gezinsleden over elkaars probleemgedrag de beoogde kenmerken meten van de gezinsleden die worden beoordeeld op hun probleemgedrag (partnerfactoren). Ook werd met SRM analyse onderzocht of de beoordelingen van gezinsleden over elkaars probleemgedrag mede worden bepaald door kenmerken van de gezinsleden die rapporteren over probleemgedrag (waarnemerfactoren) en kenmerken van het gezin als groep (gezinsfactor). Dit werd onderzocht op twee meetmomenten, met een tussenperiode van ongeveer tien maanden.

In het algemeen bleken de beoordelingen van gezinsleden over elkaars externaliserend en internaliserend probleemgedrag de beoogde kenmerken van de gezinsleden te meten die worden beoordeeld op hun probleemgedrag. Alleen de partnerfactor van vaders (eerste

meetmoment) en de partnerfactor van moeders (tweede meetmoment) verklaarde geen significant deel van de variantie in de beoordelingen van gezinsleden over elkaars internaliserend probleemgedrag. Dit wijst erop dat in sommige situaties, verschillen in beoordelingen van internaliserend probleemgedrag niet verklaard kunnen worden door kenmerken van de persoon die werd beoordeeld. Het zou kunnen zijn dat het internaliserend probleemgedrag van vaders en moeders niet altijd zichtbaar is voor alle gezinsleden omdat ouders hun emotionele problemen niet tonen aan hun kinderen. De beoordelingen van gezinsleden over elkaars externaliserend en internaliserend probleemgedrag bleken niet alleen de beoogde kenmerken van de gezinsleden te meten die worden beoordeeld op hun probleemgedrag, maar werden ook bepaald door kenmerken van de gezinsleden die rapporteren over probleemgedrag en door de kenmerken van het gezin als groep.

Kenmerken van de gezinsleden die rapporteren over probleemgedrag (d.w.z. waarnemerfactoren) bleken een groter deel van de variantie in de beoordelingen van gezinsleden over elkaars externaliserend en internaliserend probleemgedrag te kunnen verklaren dan de beoogde kenmerken van de gezinsleden die worden beoordeeld op hun probleemgedrag (d.w.z. partnerfactoren). Daarnaast, verklaarden partnerfactoren geen groter deel van de variantie in beoordelingen van externaliserend probleemgedrag dan in beoordelingen van internaliserend probleemgedrag. Er bleken dus geen verschillen te zijn in de eensgezindheid van gezinsleden over hoe zij elkaars externaliserend en internaliserend probleemgedrag beoordelen.

De bevindingen van deze studie tonen aan dat het gebruik van beoordelingen van gezinsleden om probleemgedrag te meten mogelijk niet valide is, omdat deze beoordelingen mede bepaald worden door waarnemer- en gezinsfactoren. Beoordelingen van gezinsleden over probleemgedrag worden vaak gebruikt door onderzoekers, diagnosten, en behandelaars. Omdat niet valide beoordelingen van probleemgedrag negatieve gevolgen kunnen hebben voor het onderzoek naar, en de diagnose en behandeling van probleemgedrag, is het van belang om in deze beoordelingen de kenmerken van de personen die worden beoordeeld op hun probleemgedrag te kunnen scheiden van de mogelijk verstorende waarnemer- en gezinsfactoren. Met behulp van SRM analyse kunnen,

ook in individuele gevallen, de verstorende bronnen van variantie worden verwijderd uit de maat van het probleemgedrag van een persoon.

De Rol van de Kwaliteit van de Ouder-Adolescent Relatie

In de vierde studie (Hoofdstuk 5) werden twee modellen getest die de beïnvloedende rol van de kwaliteit van de ouder-adolescent relatie in de samenhang tussen persoonlijkheid en probleemgedrag van adolescenten weergeven. In het mediatiemodel, werd verondersteld dat de effecten van de persoonlijkheid op het probleemgedrag van adolescenten lopen via de ouder-adolescent relatie. In het moderator model, werd verwacht dat de ouder-adolescent relatie als een externe conditie functioneert, die de samenhang tussen de persoonlijkheid en het probleemgedrag van adolescenten beïnvloedt.

Ondersteuning werd gevonden voor beide modellen in enigszins verschillende patronen, afhankelijk van de relatie (vader-adolescent relatie, moeder-adolescent relatie), persoonlijkheidstrek (extraversie, vriendelijkheid, emotionele stabiliteit, nauwgezetheid, openheid voor nieuwe ervaringen), en soort probleemgedrag (externaliserend probleemgedrag, internaliserend probleemgedrag). Met betrekking tot het mediatiemodel, bleek de kwaliteit van de vader/moeder-adolescent relatie de effecten van vriendelijkheid, emotionele stabiliteit, en nauwgezetheid op externaliserend probleemgedrag van adolescenten te mediëren. Vriendelijkheid, emotionele stabiliteit, en nauwgezetheid kunnen gezien worden als persoonlijkheidstrekken die resulteren in een positieve ouder-adolescent relatie. Die positieve ouder-adolescent relatie kan minder externaliserend probleemgedrag tot gevolg hebben. Het mediatiemodel werd niet ondersteund voor internaliserend probleemgedrag. Er werd alleen een rechtsreeks verband gevonden tussen persoonlijkheid en internaliserend probleemgedrag van adolescenten. Het kan zijn dat internaliserend probleemgedrag minder wordt opgemerkt door ouders dan externaliserend probleemgedrag, waardoor ouders minder snel interveniëren en, als uitvloeisel daarvan, minder snel mediëren tussen de persoonlijkheid van adolescenten en hun internaliserend probleemgedrag.

Met betrekking tot het moderator model, bleek de ouder-adolescent relatie de samenhang tussen emotionele stabiliteit en nauwgezetheid (alleen in vader-adolescent relatie) en externaliserend probleemgedrag van adolescenten te modereren. Bij een lage

kwaliteit van de ouder-adolescent relatie bleken adolescenten met een lage emotionele stabiliteit of nauwgezetheid meer gevoelig te zijn voor het ontwikkelen van externaliserend probleemgedrag dan bij een hoge kwaliteit van de ouder-adolescent relatie. Het feit dat alleen de vader-adolescent relatie de samenhang tussen nauwgezetheid en externaliserend probleemgedrag modereert kan verklaard worden doordat vaders nauwgezetheid meer waarderen dan moeders vanwege het belang ervan voor schoolprestaties. Het moderator model werd ook ondersteund voor internaliserend probleemgedrag. Bij een lage kwaliteit van de ouder-adolescent relatie bleken adolescenten die minder vriendelijk, nauwgezet, en emotioneel stabiel zijn meer gevoelig te zijn voor het ontwikkelen van internaliserend probleemgedrag dan bij een hoge kwaliteit van de ouder-adolescent relatie. Hoewel niet alle modererende effecten aangetoond werden voor beide ouder-adolescent relaties (vader-adolescent relatie, moeder-adolescent relatie), tonen deze bevindingen aan dat de gecombineerde bijdragen van de kwaliteit van de ouder-adolescent relatie en persoonlijkheid van adolescenten een effect uit kunnen oefenen op het internaliserend probleemgedrag van adolescenten.

Algemeen Afsluitende Opmerkingen

Een belangrijk kenmerk van dit proefschrift was dat meerdere informanten binnen het gezin de warmte in het gezin en elkaars probleemgedrag beoordeelden. Dit resulteerde in een beter begrip van wat feitelijk wordt gemeten in beoordelingen van waargenomen warmte en probleemgedrag binnen de gezinscontext (Hoofdstuk 2 en 4). Effecten op verschillende niveaus van complexiteit bleken met elkaar te zijn vermengd in deze beoordelingen. De beoordelingen van gezinsleden over de warmte in het gezin gaven niet alleen de warmte op het beoogde groepsniveau weer, maar werden ook beïnvloed door kenmerken van de gezinsleden die rapporteren over warmte op het individuele niveau. De beoordelingen van gezinsleden over elkaars probleemgedrag representeerden niet alleen de beoogde kenmerken van de gezinsleden die worden beoordeeld op hun probleemgedrag op het individuele niveau, maar werden ook beïnvloed door kenmerken van de gezinsleden die rapporteren over probleemgedrag op het individuele niveau, en door kenmerken van het gezin op het groepsniveau. Deze bevindingen tonen aan dat het niet altijd duidelijk is of

theoretische voorspellingen en interventies, die vaak gebaseerd zijn op deze beoordelingen, zich (alleen) richten op het beoogde niveau van complexiteit.

In Hoofdstuk 3 werd aangetoond dat SRM analyse kan worden gebruikt om theoretische voorspellingen te doen op een beoogd niveau van complexiteit, zonder de verstorende invloeden van andere niveaus. De toepassing van SRM analyse maakte het mogelijk bewijs te leveren dat de warmte in het gezin als groep gerelateerd is aan probleemgedrag van adolescenten, onafhankelijk van kenmerken van gezinsleden op het individuele niveau en kenmerken van gezinsrelaties op het dyadische niveau. Voor onderzoekers hoeven niet alleen de effecten op beoogde niveaus van complexiteit interessant te zijn. Als effecten op onbedoelde niveaus van complexiteit worden gemeten kunnen deze waardevolle extra diagnostische informatie opleveren. Waarnemereffecten kunnen bijvoorbeeld informatie verschaffen over de unieke ervaring van een gezinslid ten aanzien van het gezin of andere gezinsleden. Deze informatie kan van essentieel belang zijn voor het begrijpen van gezinsproblemen.

SRM analyse kan in de praktijk worden toegepast om bijvoorbeeld het functioneren van individuele gezinnen te onderzoeken. Een belangrijk voordeel van het gebruik van SRM analyse als toegepast klinisch gezinsinstrument is de mate van specificiteit die kan worden verkregen over het gezinsfunctioneren. Vergeleken met andere zelfrapportage instrumenten kan SRM gezinsanalyse een meer gedetailleerde analyse geven van het psychosociale innerlijk van een gezin, door het vaststellen van problemen op verschillende niveaus van complexiteit binnen het gezin. Dit resulteert in een veel grotere specificiteit ten aanzien van de oorzaken van verstoringen en conflicten. Dit maakt het bij uitstek een geschikt gezinsinstrument om klinische interventies te begeleiden en klinische uitkomsten te evalueren.

In geen van de SRM studies beschreven in dit proefschrift werden hypotheses geformuleerd met betrekking tot relatiefactoren. Omdat er niet twee indicatoren beschikbaar waren om elke relatiefactor te identificeren, maakte de systematische variantie die werd veroorzaakt door de relatiefactoren deel uit van de restvariantie. Dientengevolge kon er in de SRM studies geen informatie worden verschaft over het dyadische niveau van complexiteit binnen gezinnen. In Hoofdstuk 5 werd een andere benadering gebruikt om de kwaliteit van de ouder-adolescent relatie op het dyadische niveau te meten. De kwaliteit van

de ouder-adolescent relatie bleek een belangrijke rol te spelen als mediërende en modererende variabele in het verklaren van de samenhang tussen de persoonlijkheidstrekken en het probleemgedrag van adolescenten. Deze bevinding laat zien dat relaties met ouders een belangrijk onderdeel zijn van de dagelijkse sociale omgeving van adolescenten.

Er moet worden opgemerkt dat de generaliseerbaarheid van de bevindingen beperkt is tot relatief goed functionerende intacte gezinnen met adolescente kinderen. Resultaten kunnen verschillen voor minder goed functionerende gezinnen, gezinnen met een andere samenstelling, en gezinnen met jongere kinderen. Daarnaast was de steekproef relatief klein, gezien de complexiteit van de getoetste modellen. Een grotere steekproef is nodig om de relatieve bijdragen van het mediatiemodel en het moderator model in het verklaren van de samenhang tussen persoonlijkheid en probleemgedrag van adolescenten, en de kwaliteit van de ouder-adolescent relatie, te testen. Alhoewel gesuggereerd wordt dat een steekproef van 50 gezinnen voldoende is voor SRM analyse, zouden de bevindingen van de SRM studies sterker en meer sensitief zijn als een grotere steekproef dan 69 gezinnen zou zijn onderzocht. In twee studies (Hoofdstuk 2 en 3) werden SRM factoren gebruikt om latente variabelen te voorspellen. Voor een latente variabele benadering wordt een steekproef van 69 gezinnen als relatief klein beschouwd. Het gebruik van kleine steekproeven kan resulteren in negatieve varianties, correlaties boven de 1.0, en het niet vinden van een passend model dat de data representeert. In onze studies zijn we deze problemen niet tegengekomen. Daarnaast blijken in het algemeen onze onderzoeksbevindingen aan te sluiten bij de bevindingen van eerder onderzoek.

Vanwege de relatief kleine steekproef en de complexiteit van de getoetste modellen, was het niet mogelijk om longitudinale analyses uit te voeren. Dientengevolge kunnen de gevonden samenhangen niet causaal worden verklaard. Ook kunnen derde variabelen de gevonden samenhangen verklaren. Het gezin is een open systeem en de percepties en het gedrag van gezinsleden naar elkaar toe worden vaak beïnvloed door krachten van buiten de kern van gezinsrelaties zoals de relaties van adolescenten met hun leeftijdsgenoten. Verder blijkt uit onderzoek op het gebied van gedragsgenetica dat we de mogelijkheid niet kunnen uitsluiten dat de gevonden samenhangen verklaard kunnen worden door genetische factoren.

In sommige gevallen wijken de bevindingen van de SRM studies af van eerdere resultaten die door andere onderzoekers zijn gevonden. Een mogelijke verklaring voor deze tegenstrijdige bevindingen is dat in SRM analyse factoren onafhankelijk van factoren op andere niveaus geschat worden, terwijl in eerdere studies niet werd gecontroleerd voor factoren op andere niveaus. In tegenstelling tot eerdere bevindingen werd bijvoorbeeld geen samenhang gevonden tussen de neiging om warmte te ervaren van gezinsleden en het probleemgedrag van het oudere adolescente kind, en tussen de neiging van ouders om door gezinsleden als warm te worden ervaren en het probleemgedrag van adolescenten (Hoofdstuk 3). Eerder onderzoek kan samenhangen hebben gerapporteerd die niet gevonden zouden zijn als voor de effecten op het dyadische en groepsniveau (d.w.z. warmte in specifieke gezinsrelaties en in het gezin als groep) zou zijn gecontroleerd.

In dit proefschrift is getracht een structurele analyse te geven van gezinnen met adolescenten door verschillende niveaus van complexiteit te onderzoeken. Er werd aangetoond dat SRM analyse gebruikt kan worden om effecten op verschillende niveaus van complexiteit te onderscheiden in beoordelingen van gezinsleden over de warmte in het gezin en elkaars probleemgedrag. Toekomstig onderzoek kan zich richten op het ontwikkelen van alternatieve manieren om deze effecten te onderscheiden in beoordelingen van gezinsleden. Daarnaast kan SRM analyse toegepast worden om verschillende niveaus van complexiteit te onderscheiden in beoordelingen van gezinsleden met betrekking tot andere concepten dan warmte in het gezin en probleemgedrag van gezinsleden. Toekomstige studies waarin relatievariantie onafhankelijk van restvariantie wordt geschat kunnen meer licht werpen op de mate waarin beoordelingen van gezinsleden worden bepaald door de specifieke aanpassingen die bepaalde gezinsleden maken ten opzichte van andere gezinsleden. Tot slot, kan SRM analyse worden toegepast voor het onderzoeken van het functioneren van individuele gezinnen en gezinsleden. Om SRM analyse van een onderzoeksinstrument te kunnen vertalen naar een toegepast, klinisch gezinsinstrument, is het noodzakelijk dat toekomstig onderzoek zich richt op het ontwikkelen van normscores voor specifieke gezinssamenstellingen en leeftijdsgroepen.

Alhoewel SRM analyse informatie verschafte over waarnemer-, partner-, en gezinsvariantie in beoordelingen van gezinsleden werd niet duidelijk welke gezinsprocessen deze variantie veroorzaken of kunnen verklaren. Alle gezinsleden bleken

het bijvoorbeeld eens te zijn over het probleemgedrag van het jongere adolescente kind (partnervariantie jongere adolescente kind) in Hoofdstuk 4. In sommige gezinnen zijn gezinsleden het er dus over eens dat het jongere adolescente kind veel probleemgedrag vertoont, terwijl in andere gezinnen gezinsleden het er over eens zijn dat het jongere adolescente kind weinig probleemgedrag vertoont. Helaas weten we niet welke processen tot deze percepties leiden bij de gezinsleden van het jongere adolescente kind.

Om een beter inzicht te krijgen in de gezinsprocessen die voorafgaan aan deze percepties kan toekomstig onderzoek zich richten op het combineren van SRM analyse met een dynamische gezinssysteembenadering. Dynamische systeemtheoretici suggereren dat ontwikkelingsuitkomsten verklaard kunnen worden door een proces dat zelforganisatie wordt genoemd. Zelforganisatie refereert naar het spontaan ontstaan van coherente vormen van een hogere orde door middel van recursieve interacties tussen meer eenvoudige componenten. Structurele kenmerken die door SRM analyse worden blootgelegd zouden kunnen worden verklaard als een resultaat van het proces van zelforganisatie dat wordt verondersteld door dynamische systeemtheoretici. Dit kan worden toegelicht door het relateren van een specifieke dynamische systeemmethode, de state space grid, aan een specifiek type reciprociteit correlatie, de relatie reciprociteit correlatie, die wordt gemeten met SRM analyse.

Met de state space grid methode kan het gedragstraject van een dyade (d.w.z. de opeenvolging van gedragingen) worden weergegeven, zoals het voortgang vindt in werkelijkheid, op een grid die alle mogelijke gedragscombinaties representeert. Er kunnen bijvoorbeeld vier categorieën van gedrag worden weergegeven zoals vijandig, negatief, neutraal, en positief gedrag. Het gedrag van de ouder is weergegeven op de X-as en het gedrag van het kind is weergegeven op de y-as. Elke seconde kan het gedrag van ouder en kind worden weergegeven. Elke cel op de grid representeert een bepaalde dyadische staat (bv. ouder vijandig; kind vijandig). Met SRM analyse worden relatie reciprociteit correlaties gespecificeerd door het correleren van twee relatiefactoren (bv. ouder-kind met kind-ouder). Bijvoorbeeld, ouders die hun kinderen waarnemen als vijandig (d.w.z. relatiefactor ouder-kind in percepties van vijandigheid) kunnen ook als vijandig waargenomen worden door hun kinderen (d.w.z. relatiefactor kind-ouder in percepties van vijandigheid).

De microsociale interacties tussen ouder en kind die zijn weergegeven in de state space grid zouden de ontwikkelingsuitkomst van een relatie reciprociteit correlatie kunnen verklaren. Op den duur kunnen interacties tussen ouder en kind bijvoorbeeld clusteren in een bepaalde cel van de state space grid, zoals de cel die het vijandige gedrag van de ouder en het vijandige gedrag van het kind representeert. De ouder en het kind kunnen een bepaalde manier van interacteren hebben ontwikkeld die wordt gekenmerkt door een wederzijds vijandig patroon. Dit kan verklaren waarom de perceptie van de ouder van de vijandigheid van het kind en de perceptie van het kind van de vijandigheid van de ouder gecorreleerd zijn.

Toekomstig onderzoek zou ook kunnen profiteren van het gebruik van observatiemethoden, die erg geschikt zijn voor het bestuderen van complexe interactieve gezinsprocessen. Andere aanbevelingen voor toekomstig onderzoek zijn het meten van andere uitkomstvariabelen dan warmte en probleemgedrag (zowel negatieve als positieve uitkomsten) en het bestuderen van grotere en meer heterogene steekproeven.

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Curriculum Vitae

Willeke Manders was born on June 24th, 1974, in Eindhoven, The Netherlands. She graduated from high-school in 1993. In 1999 she received her MA degree in Industrial and Organizational Psychology / Communication and Education at the University of Tilburg. From 2000 to 2001, she worked as a staff member at a Center for Child Care in Eindhoven. During this period she also studied Pedagogical and Educational Sciences at the Radboud University Nijmegen. In 2001 she started her Ph.D. study at the Radboud University Nijmegen. The main focus of her Ph.D project was on the association between family characteristics and adolescent problem behavior, using the social relations model as an analytic tool. Since August 2006, she is employed as an instructor at the Center for Child and Family Studies of Leiden University.