

TRAJECTORIES OF ADOLESCENT INTERNALIZING AND  
EXTERNALIZING PROBLEMS: PARENTING BEHAVIORS AS  
PREDICTORS OF CHANGE

By

Annalise L. Caron

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Approved:

Professor Bahr Weiss

Professor David Cole

Professor Bruce Compas

Professor Tom Smith

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## CHAPTER I

### INTRODUCTION

Despite a developmental shift in focus away from parents towards peers during adolescence, familial factors such as parenting skills or other parenting behaviors actually become more important as risk and preventive factors for the development of psychopathology during adolescence, particularly in regards to externalizing problems such as aggression and delinquency (Stouthamer-Loeber, Loeber, Wei, Farrington, & Wikstrom, 2002). Although longitudinal studies have shed some light on potential causal pathways linking parenting variables to changes in adolescent psychopathology, most of these studies have focused on prediction of *group*-level psychopathology or differences across two points, and have not had sufficient time points to adequately assess changes *within individuals* over time (Willett, Singer, & Martin, 1998). Thus, although we have some knowledge of how parenting behaviors relate to adolescent psychopathology in general, we have relatively little knowledge how these processes between parents and adolescents develop and change over time.

The overall goal of the present study was to identify parenting mechanisms related to the intra-individual development and maintenance of adolescent internalizing and externalizing problems, using statistical analyses for the analysis of intraindividual change (Raudenbush & Bryk, 2002). That is, the primary purpose of the present study was to examine trajectories of adolescent internalizing and externalizing problems over time, and identify parenting behavior predictors of individual differences in these

trajectories of psychopathology. Secondary goals included (a) examining parenting behavior moderators of these relations, (b) examining possible curvilinear effects of parental behavior control on these relations, (c) directly comparing the specificity of these relations to less severe externalizing versus more severe violent behavior, and finally (d) testing competing models of parenting processes with growth in adolescent psychopathology domains as predictors of parenting behavior trajectories.

### Theoretical and Empirical Links between Parenting and Adolescent Adjustment

Forty years of parenting research has at least produced a consensus on the importance of three dimensions of parenting behavior: (a) behavior control, (b) psychological control, and (c) warmth; (Barber, Olsen & Shagle, 1994; Galambos, Barker & Almeida, 2003; Maccoby & Martin, 1983; Schaefer, 1965). Behavior control refers to parental knowledge of and attempts to regulate adolescents behavior through monitoring, discipline, and limit setting, whereas psychological control refers to strategies to control the adolescent through psychologically intrusive means such as love withdrawal, guilt induction, and constraining verbal expression (e.g., Barber, 1996; 2002). Warmth refers to parental behaviors that are supportive, attentive, and accepting (Bogels & Melick, 2005; Holden & Miller, 1999; Rothbaum & Weisz, 1994; Steinberg & Silk, 2002).

Theoretically as well as empirically, the two types of parental control have contrasting relations with psychopathology, with behavior control supporting positive development, and psychological control serving as a risk factor for healthy development (Steinberg, 1990). Maladaptive (i.e., low) levels of behavioral control (e.g., a lack of monitoring) typically have been conceptualized and found to be related to externalizing

problems (Barber, 1996; Barber, et. al., 1994; Barber & Olsen, 1997; Caron, Weiss, Harris, & Catron, 2005; Galambos, et al., 2003; Gray & Steinberg, 1999; Griffen, Scheier, Botvin, Diaz, & Miller, 2000; Laird, Pettit, Bates, & Dodge, 2003; Linver & Silverberg, 1995; Pettit, Laird, Dodge, Bates & Criss, 2001; Sampson & Laub, 1994) whereas maladaptive (i.e., high) levels of psychological control (e.g., manipulation of youths' thoughts and feelings through verbal constraint) have been conceptualized and found to be related to internalizing problems (Barber, et al., 1994; Bogels & Melick, 2004; Caron et al., 2005; Conger, Conger, & Scaramella, 1997; Garber, Robinson, and Valentiner, 1997; Gray & Steinberg, 1999; Pettit et al., 2001; Soenens, Vansteenkiste, Luyten, Duriez, & Goossens, 2005). Recent studies (Barber & Harmon, 2002; Barber, Olsen & Shagle, 1994; Pettit, et al, 2001), however, suggest that both types of parental control, but in particular psychological control, are related to both types of psychopathology (Barber, 1996; Barber & Harmon, 2002; Barber & Olsen, 1997; Conger, et al., 1997; Stone, Buehler, & Barber, 2002). A recent meta-analysis of both types of parental control during adolescence confirmed these findings, with behavior control negatively relating to externalizing problems (but not internalizing problems), whereas psychological control related to both problem domains though more strongly to internalizing problems (Caron, Weiss, & Harris, 2005).

There are several mechanisms through which these relations might occur. Decreases in parental supervision during adolescence increase adolescents' opportunities to engage in delinquent activities and thus, low levels of behavior control (e.g., monitoring of adolescent's whereabouts and activities) may have a direct effect on externalizing behaviors by not allowing or setting limits on adolescents' ability to engage

in aggressive or delinquent behavior (see e.g., Kim, Hetherington, Reiss, 1999). Parental behavior control also may have indirect effects, such as through its impact on adolescents' self control (Finkenauer, Engels, & Baumeister, 2005), and association with deviant peers (Kim et al., 1999; Mason, Cauce, Gonzales, & Hiraga, 1996, Scaramella, Conger, Spooth, & Simons, 2002; Snyder, Dishion & Patterson, 1986). Depending on how behavior control is defined and measured (Kerr & Stattin, 2000; 2003a), behavior control sometimes may tap aspects of the parent-adolescent relationship relating to the development of positive emotional autonomy (e.g., parental use of moderate levels of behavioral control may reflect healthy levels of adolescent communication and attachment to parents) that, according to social control theory, are related to lower levels of externalizing problems as well (see e.g., Hirschi, 1969).

It also is possible that causal effects run in the opposite direction. For instance, high levels of externalizing behaviors in adolescents may result in increases in parents' attempts to control their adolescents' behavior or conversely, might result in decreases in parental control attempts due to increased parental tolerance and / or hopelessness regarding the externalizing behavior (Bell & Chapman, 1986; Stice & Barrera, 1995). The latter possibility (which suggests a negative correlation) is more consistent with research findings in this area (e.g., Colder, Lochman, & Wells, 1997; Kerr & Stattin, 2003a, 2003b; Stice & Barrera, 1995) than the former, which suggests a positive correlation.

By their nature, psychologically controlling strategies such as guilt induction, love withdrawal, constraining verbal expression, and invalidating feelings intrude on adolescent self-direction and psychological sense of self (Barber, Bean & Erikson, 2002),

which may foster internalizing problems; the resultant anger at the use of these parental strategies may as well foster externalizing problems. For instance, psychological control that involves violating adolescent independent thought and decision making (i.e., cognitive autonomy) may relate to internalizing problems, by communicating to the adolescent that s/he is lacking in positive attributes, thus diminishing the adolescent's self-esteem (Garber & Flynn, 2001; Garber, Robinson, & Valentiner, 1997) and generating a depressive attributional style (Garber & Flynn, 2001); it might also foster depression through its impact on adolescents' self-perceived competence (see e.g., Conger, et al., 1997; Jacquez, Cole, & Searle, 2004), self control (Finkenauer, et al., 2005), or facilitation of maladaptive perfectionism in the adolescent (Soenens, et al., 2005). Further, psychological control may cause externalizing problems by serving as a model for hostile social information processing, which has been found to mediate the relation between maternal control strategies and aggression (Gomez, Gomez, DeMello, & Tallent, 2001). In addition, psychological control also may be related to externalizing problems via parental modeling of interpersonal strategies similar to relational aggression (Nelson & Crick, 2002).

Similar to the two types of parental control, parental warmth or support has been found to relate to both internalizing and externalizing problems. Low levels of warmth have been conceptualized and found to be related to both internalizing and externalizing problems (e.g., Gray & Steinberg, 1999). Forehand & Nousiainen (1993) found parental acceptance to be a predictor of adolescent adjustment, beyond psychological or behavior control. In a meta-analytic review, Rothbaum and Weisz (1994) found that across the parenting and child /adolescent externalizing problem literature parental warmth -- as

defined by both indices of synchrony (e.g., responsiveness, sensitivity) and approval (e.g., praise, encouragement) -- were significantly negatively related to externalizing problems. Parental warmth has been suggested to improve self-confidence, well-being, and self-worth, which in turn may foster positive adjustment (Gray & Steinberg, 1999; Liu, 2003). Parental warmth also may be linked to fewer adolescent internalizing and externalizing problems due to its leading to increased familial attachment that in turn provides a sense of security (i.e., decreasing likelihood of internalizing problems) as well as internalization of parental values (i.e., decreasing likelihood of engaging in unsanctioned externalizing behaviors; Hirschi, 1969). From an “adolescent effects” perspective, parents may withdraw warm and supportive behavior in response to adolescent delinquent behavior as a result of parental disapproval (Kerr & Stattin, 2003a). However, recent studies suggest that warmth may have stronger “parental effects” than other parenting dimensions, so effects likely are bi-directional (Kerr & Stattin, 2003a, 2003b).

Taken together, these findings indicate that all three dimensions of parenting behavior are related to adolescent psychopathology. However, the majority of these studies are cross-sectional (e.g., Soenens, et al., 2005). Of the longitudinal studies that have controlled for initial levels of adolescent psychopathology in predicting changes attributable to parent behaviors, the majority have examined changes with only two points of data collection (Barber, 1996; Brody & Ge, 2001; Herman et al., 1997; Mason, et al., 1996; Pettit, et al., 2001; Kerr & Stattin, 2003a, 2003b; Stice & Barrera, 1995), although there are exceptions (Galambos, et al., 2003; Laird, Pettit, Bates, & Dodge, 2003; Simons et al., 2002). As O’Connor (2002) points out, repeated measurements of

parent behaviors reliably associated with repeated measurements of adolescent psychopathology over time would provide much stronger evidence for parenting effects. Further, the majority of the longitudinal findings mentioned have been naturalistic studies, and in such studies of normal-risk populations, there is typically only modest change in individual differences in either parenting behaviors or adolescent psychopathology over time (O'Connor, Deater-Deckard, Fulker, Rutter, & Plomin, 1998).

The present study examined within-individual change over time in parenting and adolescent psychopathology, using statistical methods that allow for examination of and prediction of individual differences in change. Participants were taken from an outcome study of Multisystemic Therapy (MST; Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 1998), an intervention that specifically focuses on changing parenting behaviors as a mechanism for decreasing adolescent externalizing psychopathology. Unlike naturalistic studies of normal-risk populations that have minimal change in individual differences in both parenting behaviors and adolescent psychopathology over time (O'Connor et al., 1998), the present treatment sample has the potential to increase variability adolescent psychopathology over time, with its dual goals to both enhance parenting skills and decrease adolescent externalizing problems. Although treatment group status (i.e., treatment versus control group participant), was included as a control variable in this study, previous research has not confirmed that the effects of MST are due to changes in parenting, although one study has indicated parental monitoring (i.e., an aspect of parental behavior control) partially mediates the treatment effect (Huey,

Henggeler, Brondino, & Pickrel, 2000). Thus, it is possible that treatment is mediated through other aspects of the MST program.

### Multisystemic Therapy

Multi-systemic therapy (MST: Henggeler, et al., 1998) is based on general systems (e.g., Plas, 1992) and social ecology theory (Bronfenbrenner, 1979). Systems theory emphasizes that multiple systems influence individual development and behavior, whereas social ecology theory organizes these systems into multiple embedded contexts within which the individual reciprocally interacts. Given this conceptual background, MST requires the therapist (on behalf of the family) and the family (on their own behalf) to intervene within multiple contexts including the individual, family, peer, school, and neighborhood to facilitate positive change; however, at least in the sample used in the present study, the large majority of therapeutic attention often was directed towards increasing parents' repertoire of parenting skills. MST has been shown to be associated with decreases in criminal activity (Henggeler, Clingempeel, Brondino, & Pickrel, 2002), antisocial behavior and drug use (Henggeler, et al., 1991; Henggeler, Melton, & Smith, 1992), arrests (Henggeler, et al., 1991;1992) and re-arrests (Borduin, et al., 1995), out of home placement, increased school attendance (Brown et al., 1999), increased family cohesion (Henggeler et al., 1992), as well as increased cost effectiveness as compared to treatment as usual (Schoenwald et al., 1996).

MST was developed for use with juvenile offenders, specifically targeting those who were violent or chronic offenders (Henggeler, et al., 1992; Henggeler, Melton, Smith, Schoenwald, & Hanley, 1993). It is an intensive, short-term (i.e., 3-6 months),



home based program, wherein therapists carry small caseloads (i.e., 4-6 families) and often make multiple visits to each family per week. Although MST therapists operate in multiple contexts of the adolescent's life (e.g., school, neighborhood) with services being delivered from a family preservation model, with multiple family members being considered the "identified client" (Henggeler, et al., 1992; 1993; 1998), the primary focus is usually on the family system, in particular on the parent(s) or guardian(s). This family treatment focus is evident in "*The Nine Principles of Multisystemic Therapy*" (Appendix A; Henggeler, et al., 1998), four of which focus on "family members," with one principle specifically targeting parents. That is, "Interventions should be designed to promote treatment generalization and long-term maintenance of therapeutic change by empowering *caregivers* to address family members' needs across multiple systemic contexts (Henggeler, et al., 1998, p.23)."

A number of intervention studies have show that altering parental behaviors within the context of an intervention is associated with changes in child and adolescent adjustment, particularly with regard to externalizing problems (Degarmo, Patterson, & Forgatch, 2004; Forgatch & Degarmo, 1999; Huey, Henggeler, Brondino, & Pickrel, 2000; Patterson, Degarmo, & Forgatch, 2004; Scott, Splender, Doolan, Jacobs, & Aspland, 2001; Stoolmiller, Duncan, Bank, & Patterson, 1993; Vitaro, Brendgen, & Tremblay, 2001). Typical MST interventions focus largely on enhancing family relations (e.g., improved parent-child and marital interactions) and family cohesiveness, improving parental discipline strategies, increasing parental monitoring, and increasing positive home- school communication and collaboration (Burns, Schoenwald, Burchard, Faw, & Santos, 2000). The one study to date that directly examined mechanisms of change in

Multisystemic Therapy found that changes in family cohesion, functioning, and parental monitoring partially mediated the relation between therapist adherence to MST and decreases in adolescent delinquency (Huey, et al., 2000), however this study was limited by only two time points of measurement, and therefore more specific questions regarding when symptom change occurs and individual differences in treatment response were not addressed.

#### The Present Study: Studying Trajectories of Internalizing and Externalizing Problems

The following specific questions will be addressed in the present study: (a) do initial parenting behaviors predict individual differences in the trajectories of adolescent internalizing and externalizing (i.e., *launch models*; Skinner, Zimmer-Genbeck, & Connell, 1998) as well as initial levels of these problems; and (b) do changes in parent behaviors across time covary with changes in adolescent adjustment over time, above and beyond initial levels of parenting behaviors (i.e., *contemporary across time models*). In addition to these questions, the present study also will examine: (a) parent behavior moderators that impact on the magnitude of the general relation between parent behaviors and adolescent internalizing and externalizing trajectories; (b) curvilinear effects of parenting behaviors in predicting adolescent adjustment; (c) the specificity of these relations to minor versus more severe externalizing problems; and (d) reciprocal (i.e., adolescent effects) models where initial level and growth in adolescent adjustment predict parent behaviors over time. Specific research questions related to these topic areas are described in the following sections, along with a table of hypotheses at the conclusion of this introductory section.

There are two general approaches that might be used to assess the effects of initial status and change in adolescent internalizing and externalizing problems, and to relate individual differences in these parameters to parenting behavior predictors: (a) a traditional HLM approach (also called linear mixed models, multilevel models, or random coefficients models), and (b) a latent growth curve modeling (Willet & Sayer 1994; also called latent curve analysis or structural equations approach). Although both procedures have strengths, hierarchical linear modeling was chosen because of its flexibility in handling variable spacing of time points across persons, which latent growth curve analyses are unable to handle (Raudenbush, 2001). Thus, a linear mixed effects models approach (also conceptualized as hierarchical linear modeling; Raudenbush & Bryk, 2002) was used to assess both within-individual change in symptoms as well as assess three areas of parenting (i.e., behavior control, psychological control, and warmth) as potential predictors of individual differences in adolescents' trajectories of internalizing and externalizing problems.

#### Parenting Behaviors as Moderators

Sources of risk and protection (or “differential vulnerability,” when considered in conjunction with prior exposure to risk factors) (a) may lie in the individual, the family, or the environment, (b) may be temporary or enduring, and (c) may act in additive or interactive fashion. Most often the search for moderators in the relation between parenting behaviors and adolescent psychopathology has focused on static demographic characteristics such as gender and race/ethnicity (e.g., Finklestein, Donenberg, & Martinovich, 2001), but recent investigations have also begun to examine how different

parenting behaviors moderate the effects of one another (e.g., Gray & Steinberg, 1999). Little of the research examining interactions among parenting behaviors in the prediction of adolescent adjustment has been longitudinal (for exception, Galambos, et al., 2003; Pettit & Laird, 2002), providing no information regarding temporal precedence or the causal direction of such processes. The present study will use analysis of within individual change over time to begin to address this limitation of prior work, specifically examining how parenting behaviors may moderate each other in the prediction of adolescent psychopathology domains.

The effects of parenting behaviors have sometimes been shown to depend on the level of other parenting behaviors (Forehand & Nousinian, 1993; Galambos et al., 2003; Gray & Steinberg, 1999; Pettit & Laird, 2002), although many studies have failed to find such interactions, even cross-sectionally (Barber, et al., 1994; Garber, et al., 1997; Herman, et al., 1997; Stice, Barrera, & Chassin, 1993). For example, in some studies psychological control has predicted externalizing problems conditional on low parental involvement or warmth (Caron, et al., 2005; Pettit & Laird, 2002), although others have failed to find this interactive relation with externalizing problems (Gray & Steinberg, 1999). This relation also has been found with internalizing problems (Caron et al., 2005; Gray & Steinberg, 1999). From a parent effects perspective, a compensatory process could be occurring where high warmth compensates or buffers against the negative effects of high psychological control such that adolescents fail to interpret the psychological control as oppressive, but instead a sign of love and concern when administered in the context of a warm adolescent-parent relationship. Alternatively from a child effects perspective, externalizing behaviors could invoke high levels of resulting

parental psychological control only if the parent-child relationship is not grounded in a warmth or closeness (see for example, Allen et al., 2002). For example, a parent might feel more threatened by adolescent externalizing behavior or more frustrated by adolescent internalizing behaviors, resulting in greater use of psychological control if they do not have a warm and supportive relationship. Thus, whether or not a parent-adolescent relationship is grounded in warmth may alter the meaning and consequences of parenting behaviors for adolescents, and likewise alter parental interpretations of adolescent psychopathology.

Parental behavioral and psychological control have also been shown to interact, with psychological control more strongly associated with child externalizing and internalizing problems when parents also use high levels of behavior control (Galambos, et al., 2003). This combination of high behavior control (typically conceptualized as a positive socialization strategy) with high psychological control (conceptualized as an intrusive parenting strategy) may be reflect of an approach to parenting that is too controlling -- an overmanagement of children's behavior -- that results in a child feeling smothered, causing internalizing problems (via decreasing self-esteem or sense of personal agency) or frustration and anger, causing externalizing problems (via its impact on hostile social information processing: Gomez, Gomez, DeMello, & Tallent, 2001). As Galambos and colleagues point out, when describing such an interaction predicting externalizing problems, child effects processes may be occurring where parents react to a misbehaving or difficult child by resorting to all available means of control, reflecting development of a coercive process. Longitudinal studies suggest parents may decrease positive behavior control strategies in response to increasing child deviance (e.g., Kerr &

Stattin, 2003a) while at the same time increase use of more negative types of control with increasing child deviance (Scaramella et al., 2002; Stice & Barrera, 1995).

The present study will examine two-way interactions among the three parenting domains of warmth, behavior control, and psychological control in predicting adolescent internalizing and externalizing problems over time. Based on the aforementioned results, it was hypothesized that the maladaptive effects of psychological control in relation to adolescent adjustment would be conditional on low levels of warmth and high levels of behavior control (i.e., psychological control x warmth and psychological control x behavior control), when predicting from initial levels of parenting behavior and contemporaneously across time. Because previous results have been inconsistent, all other analyses would be considered exploratory and specific hypotheses are not offered.

#### Parental Behavior Control: A Curvilinear Relation?

Although typically researchers have thought of too little behavior control as a risk to healthy development (Steinberg, 1990), it is also possible that excessive levels of behavior control also may be maladaptive, fostering rebelliousness or other externalizing problems in adolescents who feel smothered while seeking developmentally appropriate autonomy from their parents (Stice, Barrera, & Chassin, 1993). Further, excessive behavioral control also could result in low self esteem and concomitant internalizing problems, if such restrictive control were to decrease the adolescent's sense of personal control, agency, or competence (e.g., Seligman, 1991; Cole, Martin & Powers, 1997). Results of analyses evaluating the possibility of non-linear effects have been mixed. Curvilinear effects have been found in some studies (Gonzales et al., 1996; Mason et al.,

1996; Stice et al, 1993; Weintraub & Gold, 1991) but not in others (Galambos et al., 2003; Jacobson & Crockett, 2000).

Part of the reason for these inconsistent results may be sampling effects. Because parental control variables can only be analyzed and interpreted relative to the sample range of parental control, naturalistic studies that assess only the lower range of parental control (i.e., the adaptive range, where most parents in normative samples likely fall), there may have been sufficient range to capture only a linear aspect of the relation with adolescent psychopathology. Since the adolescents in the present study were selected for moderate to high behavioral problems, it is likely that a broader range of parenting behaviors was sampled, allowing enough variation to assess quadratic effects in this study. To examine whether there may be an optimal level of behavior control in relation to adolescent internalizing and externalizing problems -- that is, to examine whether both “too much” and “too little” behavior control relates to higher levels of psychopathology - - quadratic effects of behavior control in predicting initial levels and the rate of change in adolescent internalizing and externalizing problems was examined across both model types. Specifically, these analyses addressed the following questions: (a) Is the relation between initial levels behavior control and the slope of adolescent internalizing and externalizing problems nonlinear (i.e., Launch models), and (b) Does behavior control have a quadratic component when predicting within subject correlations across time with adolescent internalizing and externalizing problems, controlling for nonlinear initial levels of behavior control (i.e., Contemporaneous Across Time models).

### Specificity of Relations to Minor versus Severe Externalizing Problems

As Loeber and Hay (1997) have pointed out, the causes of minor aggression only partially overlap with causes of more serious forms of violence. Many studies of research on parental influence on child and adolescent externalizing problems have focused on relatively minor forms of deviance and thus have failed to capture the more severe violent and antisocial youth behavior. And in the instances when severe behavior has been assessed, it generally has been included as part of a larger broadband syndrome of externalizing problems and therefore specificity of effects has not evaluated. Because causal and developmental pathways may differ as a function of the seriousness of the type of externalizing problem, it is important to conduct separate analyses based on severity of symptoms, in order to elucidate the potentially different parenting processes involved in the development of or resistance to problems of differing severity.

Further, given that escalation of oppositional and rule-violating behaviors into full-fledged violence tends to occur in adolescence (Lerner, Villarruel, & Castellino, 1999; Loeber & Hay, 1997), identification of factors associated with acceleration or deceleration of these different behaviors is particularly important during this time period. However, grouping externalizing behaviors into “minor” versus “serious” categories is not a straightforward matter, as there are a number of factors upon which the “severity” of different externalizing problems might vary: (a) persistence (Stouthamer-Loeber, et al., 2002), (b) chronicity (Dodge & Pettit, 2003), (c) likelihood of treatment referral (Weisz & Weiss, 1991), (d) the overt versus covert nature of the problems (Tolan, Gorman-Smith, & Loeber, 2000; Loeber, et al., 1999), and (e) violent versus nonviolent offenses (Capaldi & Patterson, 1996; Arseneault, et al., 2000). Further, the



developmental course of externalizing problems changes over time, with violent behaviors increasing with age from the pre-adolescent to the adolescent years (Farrington, 1986; Loeber & Hay, 1997).

In the present study, categorization of severity was based on prior work (Lipsey & Derzon, 1998) that defined serious behaviors as those that emphasize actual physical aggression or serious threat of such aggression as the criterion for violence, and offenses of comparable seriousness for other delinquent behaviors. Delinquent “offenses of comparable seriousness” were operationalized as those that potentially could result in being arrested. See Appendix B for the break down of externalizing symptoms by severity level. Due to the lack of prior work examining severity of externalizing behavior in this manner, analyses are considered exploratory and specific hypotheses are not made.

#### Reciprocal Relations / Direction of Effects

Although there is agreement that in general that the relation between parenting behaviors and adolescent psychopathology is causally bidirectional, there is not yet consensus on the relative importance of parent effects (i.e., parent behavior causing child psychopathology) versus child effects, or in this case ‘adolescent effects’ models (e.g., Brody, 2003; Capaldi, 2003; Galambos et al., 2003; Harris, 1995; 1998; Kerr & Stattin, 2003a, 2003b; Vandell, 2000). The present study focuses largely on ‘parent effects’ models (i.e., initial parenting predicting changes in adolescent psychopathology). However, ‘adolescent effects’ models where initial levels of adolescent psychopathology predict changes in parenting over time are also possible, and have been found in the literature. For example, externalizing behaviors have been found to be linked to

reductions in parental warmth and control over time whereas in the same dataset parent effects were not found (Kerr & Stattin, 2003; Stice & Barrera, 1995).

Laird and colleagues (2003), on the other hand, found evidence for reciprocal effects, wherein parenting behaviors longitudinally predicted and were predicted by adolescent delinquent behavior (e.g., low levels of parental warmth may be a consequence of the aversive nature of adolescent externalizing behavior; Patterson, 1982; 1997; Russell, 1997). Furthermore, from an ‘adolescent effects’ perspective, low levels of parental control have been shown result from: (a) increased parental tolerance or hopelessness of the externalizing behavior (Bell & Chapman, 1986; Colder, Lochman, & Wells, 1997; Stice & Barrera, 1995), (b) youths’ hiding of externalizing behaviors (e.g., delinquency) resulting in a lack of parental knowledge of the child behaviors that warrant control, (c) parental anxiety over child’s behavior resulting in parental avoidance, and (d) parents being intimidated by adolescents who externalize in delinquent, aggressive, or otherwise violent ways (Kerr & Stattin, 2003a). Longitudinal findings support an adolescent effects perspective, wherein active parental behavior control attempts are more a reaction to earlier externalizing behavior (e.g., delinquency) than vice versa, and that changes in youth’s behavior in the family context (e.g., being secretive) mediates this relation between delinquency and parental control attempts (i.e., intimidated or worried parents decrease control attempts; Kerr & Stattin, 2003a). Consequently, we also tested ‘adolescent effects’ models in the present study for the Launch models.

## Research Hypotheses

Predictive Role of Parenting Behaviors on Adolescent Psychopathology:

1. *Launch Models*: Parenting at T1 will predict variance in adolescent psychopathology intercept (e.g., EXT at T1) and slope (e.g., trajectory of EXT) parameters. Specifically, initial levels of parental:

- a) Warmth will be moderately negatively related to both intercept and slope of both adolescent internalizing and externalizing problems.
- b) Psychological control will be moderately positively related to the intercept and slope of adolescent internalizing problems, and have a small negative relation with the intercept of adolescent externalizing problems. Psychological control is hypothesized to not significantly predict the slope of externalizing problems.
- c) Behavior control will be moderately negatively related to the intercept and slope of adolescent externalizing problems, and will not predict the intercept or slope of adolescent internalizing problems.

2. *Contemporaneous Across Time Models*: Parenting behavior will be correlated with adolescent psychopathology domains contemporaneously, such that within-subject fluctuations in levels of parenting behavior will be concurrently correlated with within-subject levels of adolescent psychopathology, controlling for initial levels of parenting behavior at level 1. Although prior studies have not directly tested these questions, based on the cross-sectional and short-term longitudinal studies available, the following hypotheses were made. Specifically, within-subject levels across time of parental:

- a) Warmth is hypothesized to be negatively related to adolescent internalizing and externalizing problems.

b) Psychological control is hypothesized to be positively related the adolescent internalizing, but not externalizing problems.

c) Behavior control is hypothesized to be negatively related to adolescent externalizing, but not internalizing problems.

### Moderating Effects

3. Parenting Behaviors as Moderators: Moderating effects of parenting behaviors on other parenting behaviors are hypothesized for Launch Models and when predicting Contemporaneously Across Time:

a) Psychological control and behavior control will interact in the prediction of initial levels and contemporaneous levels of both adolescent internalizing and externalizing problems. Specifically, psychological control will more strongly predict adolescent internalizing and externalizing when levels of behavior control are high.

b) Psychological control and warmth will interact in the prediction of intercept and contemporaneous levels of both adolescent internalizing and externalizing problems. Specifically, psychological control will more strongly predict adolescent internalizing and externalizing problems when levels of warmth are low.

### Curvilinear Effects with Behavior Control

Due to previous mixed results, examination of the quadratic effects of behavior control in the prediction of the intercept and slopes of adolescent psychopathology, particularly externalizing problems, was considered exploratory. Both model types will be examined: a) launch models, and b) contemporaneous across time models.

### Specificity of Relations to Severity of Externalizing Problems

Due to the lack of research directly comparing the effects of parenting behaviors on externalizing problems of different severities, these analyses were considered exploratory.

### Reciprocal Relations with Parenting Behaviors Predicting Adolescent Psychopathology

1. Launch Models: Adolescent psychopathology at T1 would predict variance in parenting behavior intercepts (e.g., behavior control at T1) and slope (e.g., trajectory of behavior control) parameters. Specifically, initial levels of adolescent:

- a) Externalizing problems would be moderately negatively related to initial levels of parental warmth and behavior control, and positively related to initial levels of parental psychological control. Prediction of the parenting behavior slopes was considered exploratory.
- b) Internalizing problems were hypothesized to not be significantly related to initial levels or slopes of parenting behaviors over time.

## CHAPTER II

### METHOD

#### Participants

Participants were 160 families with an adolescent between the ages of 12 and 17 (mean age = 14.55) enrolled in a self-contained behavior classroom of Nashville, Tennessee Public Schools who enrolled in the randomized controlled MST intervention study (Weiss, Han, Harris, Catron, Caron, & Ngo, 2005). Students in these self-contained classrooms had moderate to severe behavior problems, with over 75% of participants having a record of juvenile court involvement at baseline. All students within the age range who were enrolled in these self-contained behavior classrooms (MIP; Moderate Intervention Program classes) were potential study participants. A total of 306 families contacted, 24% were ineligible because the adolescent was outside the age range and 23% declined to participate; of the 166 who agreed to participation in the project, 5 voluntarily withdrew and 1 family never began treatment. Of the 160 adolescents comprising the initial sample, 16% were female, 60% were ethnic/racial minorities (59% African American), and 56% lived with one caregiver. Eighty-three percent of the sample lived with at least one biological parent (8% grandparent; 3% aunt/uncle, 5% adoptive or foster parent, 2% other relative) and the mean caregiver education level was having completed “some college.”

## Procedure

All adolescents included in study were randomly selected for involvement in the larger study from public school district Moderate Intervention Program (MIP) classrooms. MIP classrooms are self-contained classrooms for students who are unable to be educated in regular education classrooms because of behavior problems. All adolescents enrolled in MIP classes between seventh and eleventh grade were eligible for inclusion. MIP teachers initially contacted families and obtained Consent to Contact from interested families. Those families that agreed to be contacted by the research group were called by project staff who described the study and explained that if enrolled their family had a 50% chance of receiving the MST intervention. The caller obtained Informed Consent from all interested families. Each family was informed if they were enrolled in MST or control group condition after the end of the baseline interview. The interviewer was blind to treatment status until a sealed envelope was opened at the end of the baseline assessment. Research staff randomly determined placement in the treatment or control group by the flip of a coin. Of the initial 160 families, 78 were randomly placed in the treatment group, and 82 were randomly placed in the control group.

All participating families completed in-home interviews at baseline, three months, six months, and eighteen months post baseline. Questionnaires were read aloud by bachelor and masters level interviewers to both parents and adolescents. Parents (i.e., or primary caregivers) and adolescents were interviewed separately in different rooms to ensure confidentiality. For those participants who had two parental informants complete the interview, data from the parent who was determined to be the “primary” caretaker was used for the purposes of this study (9% male caregivers). Adolescents received \$15

at each assessment, and payments to parents ranged from \$20 to \$100 depending on the number of questionnaires and the length of the interview.

### Measures

The following measures were used in the present study.

Demographic Questionnaire. A demographic questionnaire assessing child and parent age, gender, race, parental marital status, parental education level, and family structure was completed by both the adolescent and parent.

Child Report of Parenting Behavior Inventory. Schulderman and Schulderman's 1970 CRPBI-30 was used to assess the mother-adolescent relationship. This was a shortened version of Schaefer's (1965) original 108-item inventory that Schulderman revised in 1970. Although the revised edition was shorter, factor analysis has found it to be reliable with the original version. This measure examined three subscales: a) psychological autonomy versus *psychological control*, b) *firm control* versus lax control, and c) *acceptance* versus rejection. Interviewers read descriptions of parenting behaviors to the adolescents and they were asked to indicate whether each description as "like," "somewhat like," or "not like" their parent. The psychological control subscale indexed such indirect parenting strategies as guilt, anxiety-provocation, and love withdrawal. The firm control scale indexed aspects of parental behavior control such as encouraging compliance through enforcement of rules and punishment, and the acceptance subscale assessed relationship quality measured by warmth and support in the parent-adolescent relationship through expressions of love, affection, positive involvement, and a lack of rejection or hostility. Test-retest reliability for the three scales has been found to be



above  $r = .79$  (Schaefer, 1965; Schulderman & Schulderman, 1970). Internal consistency as measured by Chronbach alphas for the CRPBI have been reported to be over .90 (e.g., Allen, personal communication, 1999; Galambos, et al., 2003).

*Child Behavior Checklist.* Parent-reported child psychopathology data was collected using the Child Behavior Checklist (CBCL; Achenbach, 1991). The CBCL is a widely used, 118-item parent-report measure of child psychopathology. Parents responded on a three-point scale as to how much each item described their child. The CBCL produced two broadband scales: a) internalizing problems (e.g., depressive and anxious symptoms) and b) externalizing problems (e.g., aggression, delinquency) that were used as indices of psychopathology. CBCL scales average a one-week test-retest reliability of .89 and a correlation of .81 with the Quay and Peterson (1983) Revised Behavior Problem Checklist (Achenbach, 1991). Besides the broadband domains of internalizing and externalizing problems, low and high severity of externalizing problems were analyzed as outcome variables. See Appendix B for symptom severity breakdown.

### Analyses

A number of the hypotheses in the current study were tested using linear mixed effects models, also referred to as hierarchical linear models (Bryk & Raudenbush, 1992; Raudenbush & Bryk, 2002), multilevel models (Snijders & Bosker, 1999) and random coefficients models (Longford, 1993). Trajectories of parenting behaviors and adolescent psychopathology domains were estimated over four time points (baseline, approximately 3 months, approximately 6 months, approximately 18 months). This method allows for the simultaneous estimation of both: a) a within-person structure of regression intercepts

and slopes (i.e. adolescent psychopathology domains across time), and b) a between-person structure where the within-person intercepts and slopes are regressed on person-level predictor variables (i.e., parenting behavior predictors). A linear mixed model approach to examining individual change was chosen as opposed to latent growth curve modeling (Willet & Sayer 1994) due to the ability of linear mixed modeling to handle variable spacing of time points across persons which typically is not estimable in latent growth curve analyses with structural equation modeling (Raudenbush, 2001). All analyses were conducted using an unstructured covariance matrix.

Before discussing the specific models examined, a comment with regard to the metric of the parenting and psychopathology variables studied herein is warranted. Following the recommendations of Willet, Singer, and Martin (1998), neither the parenting behavior dimensions nor the psychopathology outcome variables were standardized but were left in their original metric. Although standardization to a mean of 0 and standard deviation of 1.0 is intuitively appealing, Willet and colleagues point out that doing so can negatively affect the results and create misleading or erroneous findings. First of all, both the CRPBI and CBCL have arbitrary metrics, unlike interval scales such as, for example, inches or dollars. Thus, standardizing them does not necessarily improve their interpretability. Although some researchers have suggested that standardization helps in determining the “relative importance” of predictors (e.g., behavior control, psychological control, and warmth) within a study, this is not the case especially for predictors that are not measured on the same scale (e.g., gender, treatment status, behavior control, in this study; see Bring, 1994). Further the notion that standardization helps to compare findings across studies has been shown not to be true, in

fact decreasing comparability across studies. That is, if the standard deviation of the predictors varies across samples, different standardized coefficients will emerge across studies (see Willet et al., 1998 for illustration). The negative effects of standardization are multiplied in longitudinal studies, when standardizing within waves can decrease variation, resulting in trajectories that do not resemble the raw data trajectories. Further, the risk of nonrandom attrition over multiple waves of data, with fewer participants in later waves can cause means and standard deviations to be nonequivalent, thereby making predictors noncomparable across waves (see Willet et al, 1998 for discussion).

### Models

Although within-subject and between-subject parameter estimates for the linear mixed models were simultaneously estimated, to illustrate this multi-level approach the analysis can be broken down into a within-person structure (Level 1) and a between-persons structure (Level 2). Our exemplar equations will use externalizing problems (EXT) as the outcome variable at Level 1, although similar models were fit for all outcome variables (i.e., internalizing problems, subcategories of high and low severity of externalizing problems, and parenting behaviors in reciprocal models). In the following equations, ‘i’ denotes the time point, and ‘j’ denotes the particular person.

First, a within-person equation was estimated that assessed the individual trajectory of adolescent externalizing problems across the four time points. This equation includes an intercept, slope, and residual error term ‘r’ for each individual:

$$\text{Level 1: } \text{EXT}_{ij} = \pi_{0j} + \pi_{1j}(\text{Time}_{ij}) + r_{ij}$$

with EXT referring to adolescent externalizing problems of ADOLESCENT<sub>j</sub> at Time<sub>i</sub>,  $\pi_{0j}$  to the intercept or initial EXT score for subject j, TIME referring to the length of time (in months) since the baseline assessment for subject j,  $\pi_{1j}$  to the slope of EXT for subject<sub>j</sub>, and  $r_{ij}$  to a random residual error term associated with each individual time point for each subject. In order to estimate the average effects for the full sample, a between-person structure also was estimated, with the intercepts and slopes of the Level 1 model acting as the outcome variables for the Level 2 between-person structure equations:

$$\text{Level 2: } \pi_{0j} = \beta_{00} + \beta_{01}(\text{TX}) + \beta_{02}(\text{Baseline Age}) + u_{0j} \quad (2)$$

$$\pi_{1j} = \beta_{10} + \beta_{11}(\text{TX}) + \beta_{12}(\text{Baseline Age}) + u_{1j} \quad (3)$$

where the dependent variables  $\pi_{0j}$  and  $\pi_{1j}$  represent the intercept (i.e., of ADOLESCENT<sub>j</sub>'s initial EXT score or intercept) and slope (i.e., of ADOLESCENT<sub>j</sub>'s EXT trajectory) that are a function of a sample intercept ( $\beta_{00}$ ), a control for treatment status ( $\beta_{01}$ ), a control for the developmental effect for age at baseline ( $\beta_{02}$ ), and random error ( $u_{0j}$ ) [equation (2)], and mean slope for the sample ( $\beta_{10}$ ), a control for the effects of treatment status on slope ( $\beta_{11}$ ), a control for the developmental effect of starting age on slope ( $\beta_{12}$ ), plus random error ( $u_{1j}$ ) [equation (3)] respectively. The 'u' coefficients are random effects that allow for variation around the predicted intercepts and slopes from the fixed effect, across subject estimates.

Based on prior work that suggests that growth trajectories of internalizing and externalizing problems sometime may be quadratic (Garber, Keiley, & Martin, 2002; Laird et al., 2003), the above linear mixed model also was also estimated with a squared estimate of TIME in the Level 1 equation, i.e.:

$$\text{Level 1: } \text{EXT}_{ij} = \pi_{0j} + \pi_{1j}(\text{Time}_{ij}) + \pi_{2j}(\text{Time}_{ij}^2) + r_{ij} \quad (4)$$

Because the  $\pi_{2j}$  parameter was significant in both baseline models predicting internalizing and externalizing problems, quadratic models were estimated across both outcome variables throughout analyses. Significant variation was found to exist in the intercept and slope(s), indicating that adolescents varied in regards to both initial levels as well as in changes in internalizing and externalizing problems over time. Therefore, additional analyses were conducted to determine the extent that this variability was related to parenting behavior domains – both initial levels of parenting domains (at Level 2) and within-individual changes in parenting behaviors (at Level 1) above and beyond initial levels of parenting. This analytic structure served as the base for all analyses. Because the total effect of a particular type of parenting behavior is a function of the entire repertoire of behaviors used by the parent (Darling & Steinberg, 1993), and because these behaviors tend to be correlated, unique effects of parenting behaviors were examined in this study by including all three types of parenting simultaneously in all equations.

First, “launch models” were assessed with the predictor variables initial levels of parenting behaviors reported at baseline (Level 2), predicting growth in the adolescent psychopathology trajectories over time. Then, to assess whether changes in parenting levels within individuals over time (Level 1) predicted change in psychopathology levels above and beyond initial levels of parenting, “contemporaneous across time” models were added to the “launch models.” This nesting allowed examination of both the contribution of initial levels of parenting behaviors and whether fluctuations or changes in parenting behaviors over time (measured as deviations from initial parenting levels) contributed to the prediction of internalizing and externalizing trajectories. The parenting behavior dimensions at level 1 in the Contemporaneous Across Time Model are centered

such that initial parenting level was centered at 0. Thus, the Contemporaneous Across Time model was tested both the contribution of initial level of parenting behaviors (i.e., Launch models nested within these models) in the prediction of the outcome trajectories over time (Level 2, “Launch Model”) as well as whether fluctuations or changes in parenting over time (measured as deviations from initial parenting level) contributed above and beyond initial levels to the prediction of the internalizing and externalizing trajectories (Level 1).

Additional analyses were conducted from these base models, examining two-way parenting behavior moderators, curvilinear effects of behavior control, specificity to severity of externalizing, and reciprocal effects launch models with initial levels of adolescent psychopathology predicting level and growth in parenting behavior over time. Details of each analysis structure are provided in the Results section.

As an additional test of the hypotheses herein, all Launch and Contemporaneous Across Time models were run as separate models with one parenting behavior per model. These extra analyses determined which the relations between the parenting behaviors and adolescent internalizing and externalizing problems were affected by inclusion of all three parenting behaviors simultaneously. Although coefficients differed slightly, overall results with regard to which parenting behaviors significantly predicted levels or slopes of trajectories did not differ as a function of whether the parenting behaviors were entered individually or simultaneously. For succinctness, results for only the simultaneous models are presented.

## Missing Data

A proportion of the data from the fourth time point had not been collected at the time of analyses. That is, because individuals entered the study at different time points over the course of 3 and ½ years, collection of the final data point (approximately 18 months since initial baseline assessment) varied by person. Because different reporters were used for parenting (adolescents) and psychopathology (parents), and reporters were often interviewed separately at different times, data was considered “missing” if either one of the reporters did not give data at a particular time point. The mean number of missing data points was .79, and the mode was 0 missing data points.

As mentioned previously, linear mixed modeling is able to handle missing data, as well as variable spacing of time points across persons. When data are incomplete, linear mixed models yield unbiased estimates of parameters when the data are missing completely at random [MCAR] or missing at random [MAR]. Because the fourth time point was disproportionately missing across individuals, but not systemically as a function of the outcome variables, our incomplete data meets the MAR criteria. However, even without meeting MCAR or MAR criteria, linear mixed effects analyses minimize biases when compared with other approaches (Verbeke & Molenbergs, 2000).

To further assess whether any bias occurred, all “launch” and “contemporaneous across time” analyses were re-conducted with a random-effects modeling approach that explicitly incorporates “missingness” as a predictor. First, a dummy variable was created that represented the number of missing data points for each individual. This missingness variable was included as an additional predictor in the linear mixed models examined. Both main effects and interaction terms involving the missingness variable were included

to assess whether participants with varying numbers of missing data points differed at baseline (main effect for missingness variable) and in the pattern of change over time (missingness x time interaction). None of the parameters associated with missingness were significant, suggesting that degree of missing data did not affect initial levels of psychopathology nor change in psychopathology over time.



## CHAPTER III

### RESULTS

Data were first analyzed for normality and the presence of outliers, using univariate and graphical approaches. Analysis of skewness and kurtosis of all variables indicated that no transformations were necessary. Means, standard deviations, and correlations among all of the parenting variables across all four time points are presented in Table 1. As is typical of within-informant correlations across time, adolescent reported parenting behaviors were generally moderately correlated with themselves across time (warmth:  $r=.49-.68$ ; psychological control:  $r=.31-.62$ ; behavior control:  $r=.25-.65$ ). Only one parenting behavior did not correlate with itself across all four time points; Psychological control at T1 was not correlated with itself at T4 ( $r=.11$ ).

Means, standard deviations, and correlations among the psychopathology domains across time are presented in Table 2. On average, parents reported higher levels of externalizing than internalizing problems, but both psychopathology domains were elevated in this clinical sample with the average for internalizing falling at the 84<sup>th</sup> percentile (mean T score= 63.16) and externalizing at the 92<sup>nd</sup> percentile (mean T score = 67.76). Stabilities for internalizing problems were generally moderately high across the four time points ( $r=.62-.84$ ). Externalizing problems also showed stability across time ( $r=.53-.79$ ). As is typical of within-informant correlations (Achenbach, McConaughy, & Howell, 1987), moderate correlations were also found between the internalizing and externalizing psychopathology domains within time point ( $.45 \leq r \leq .55$ ), with smaller

Table 1

Descriptive Statistics (M, SD) and Pearson Correlations Among Parenting Behaviors across all Time Points.

	M	SD	W1	W2	W3	W4	PC1	PC2	PC3	PC4	BC1	BC2	BC3	BC4
Warmth T1	23.75	5.12	1.0											
Warmth T2	23.79	5.41	.61***	1.0										
Warmth T3	23.78	5.61	.54***	.68***	1.0									
Warmth T4	23.25	5.22	.49***	.65***	.65***	1.0								
Psych Cont T1	20.55	4.01	.04	.01	.03	-.09	1.0							
Psych Cont T2	20.86	4.55	.00	.14	.11	-.05	.61***	1.0						
Psych Cont T3	20.11	4.48	.03	.18	.07	-.05	.41***	.62***	1.0					
Psych Cont T4	20.45	4.03	.03	.13	.14	.01	.11	.31**	.40***	1.0				
Beh Cont T1	21.51	3.43	-.12	.08	.04	-.07	.25**	.24**	.13	-.05	1.0			
Beh Cont T2	21.67	3.48	.01	.06	.09	-.03	.15 <sup>+</sup>	.18*	.11	-.01	.56***	1.0		
Beh Cont T3	21.62	3.69	-.14	.03	-.28**	-.07	.07	.14	.17 <sup>+</sup>	.02	.49***	.65***	1.0	
Beh Cont T4	20.63	3.34	.17	.14	.04	-.07	.23*	.10	.17	.19 <sup>+</sup>	.43***	.25*	.39***	1.0

*Note.* W1=warmth, baseline. W2=warmth, 2<sup>nd</sup> time point, etc. PC=psychological control. BC=behavior control  
<sup>\*</sup>*p* < .05. <sup>\*\*</sup>*p* < .01; <sup>\*\*\*</sup>*p* < .001.

Table 2

Descriptive Statistics (M, SD) and Pearson Correlations among Psychopathology Domains across Time Points.

	M	<i>SD</i>	I1	I2	I3	I4	E1	E2	E3	E4
Internalizing T1	15.01	8.45	1.0							
Internalizing T2	12.31	9.01	.78***	1.0						
Internalizing T3	11.02	8.28	.73***	.84***	1.0					
Internalizing T4	10.89	7.97	.62***	.78***	.73***	1.0				
Externalizing T1	24.72	10.23	.45***	.31***	.39***	.29**	1.0			
Externalizing T2	20.18	11.03	.39***	.50***	.51***	.49***	.72***	1.0		
Externalizing T3	18.50	10.94	.27**	.37***	.55***	.45***	.68***	.79***	1.0	
Externalizing T4	18.02	10.37	.28**	.32**	.32**	.55***	.53***	.59***	.61***	1.0

*Note.* I1 = Internalizing problems, baseline. I2=Internalizing problems, 2<sup>nd</sup> time point, etc. E=Externalizing problems.  
 \* $p < .05$ . \*\* $p < .01$ ; \*\*\* $p < .001$ .

correlations across time ( $.27 \leq r \leq .39$ ). Finally, Table 3 presents the within time point bivariate correlations between parenting behaviors and psychopathology domains. Only three correlations were significant at the bivariate level: a) T1 behavior control and internalizing ( $r = -.23$ ), b) T1 psychological control and externalizing ( $r = .24$ ), and c) T4 warmth and externalizing ( $r = -.27$ ).

The initial mixed effects analyses explored a set of three models for externalizing problems and internalizing problems, respectively (Tables 4 and 5). In these models, the time variable (i.e., within-individual number of months between assessments) and the baseline age variable was centered with a mean of 0. Model 1 (“Time” model) examined the average within-person rate of change in externalizing problems and internalizing problems across time, including a quadratic term. Model 2 (“Launch” model) tested the extent to which between-person differences in intercept levels of externalizing and internalizing problems and the average rate of change in these problems were related to initial levels of parenting behaviors. In Model 3 (“Contemporaneous Across Time”), within-individual changes (across time) in parenting behaviors were added as predictors of corresponding changes (across time) in externalizing and internalizing problems, above and beyond (controlling for) initial levels of parenting behaviors. These within-individual fluctuations in parenting behaviors were computed such that each individual’s initial parenting behavior level was recentered at 0 (i.e., scores as deviations from initial parenting levels) to avoid confounding of the Launch and Contemporaneous Across Time models.

The results for externalizing problems are presented in Table 4. **Model 1:** In the Time model there was a significant effect of Time and Time<sup>2</sup>. Beginning at the first

assessment, adolescents' externalizing problems decreased across time, with this rate of decrease itself decreasing across time, until about 15 months post-treatment, when the rate of decrease become approximately zero, with insufficient data points to indicate whether the trajectory continued flat or begun to increase. See Figure 1.

Table 3

Pearson Correlations among Parenting and Psychopathology Domains within Time Points.

	Warmth	Psych Control	Firm Control
Time 1			
Internalizing T1	-.08	.12	-.23**
Externalizing T1	-.06	.24**	-.11
Time 2			
Internalizing T2	-.10	-.06	-.04
Externalizing T2	-.17 <sup>+</sup>	.14	-.05
Time 3			
Internalizing T3	-.01	-.12	-.08
Externalizing T3	-.13	.11	.05
Time 4			
Internalizing T4	-.19 <sup>+</sup>	.16	-.09
Externalizing T4	-.27*	.18	-.03

*Note.* <sup>+</sup> $p < .10$  \* $p < .05$ . \*\* $p < .01$ .

Table 4

Effects of Initial Parenting Behaviors on Levels and Change in Externalizing Problems, and Across-Time Parenting Behaviors on Within-Individual change in Externalizing Problems (continued on next page).

	Time	Launch	C.A. Time
	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
<u>LEVEL 1</u>			
Ext at Initial	18.41(1.17)***	26.20(6.87)***	26.80(7.04)***
Time	-.76(.09)***	-1.13(.47)*	-.89(.47) <sup>+</sup>
Time <sup>2</sup>	.05(.01)***	.05 (.01)***	.06(.01)***
Within-Sub Warmth			-.27(.09)***
Within-Sub Psych Cont			.08(.10)
Within-Sub Beh Cont			.25(.13) <sup>+</sup>
<u>LEVEL 2</u>			
TX (control versus Tx)	.65(1.7)	1.02(1.68)	.92(1.65)
Baseline Age	-.24(.53)	-.40(.54)	-.36(.56)
Initial Level of Warmth		-.35(.15)*	-.37(.15)*
Initial Level of Psych Cont		.49(.19)*	.46(.20)*
Initial Level of Beh Cont		-.45(.21)*	-.45(.21)*
<u>CROSS LEVEL</u>			
Time x TX	.35(.12)**	.35(.13)**	.28(.12)*
Time <sup>2</sup> x TX	-.02(.01)	-.02(.01) <sup>+</sup>	-.02(.01) <sup>+</sup>

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Table 4, continued.	Time	Launch	C.A. Time
	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Time x Baseline Age	-.01(.03)	-.01(.04)	-.01(.04)
Time x Initial Warmth		.003(.01)	-.001(.01)
Time x Initial Psych Cont		-.008(.01)	-.01(.01)
Time x Initial Beh Cont		.02(.02)	.01(.01)

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*Note.* <sup>+</sup> $p < .10$  \* $p < .05$ . \*\* $p < .01$  \*\*\* $p < .001$

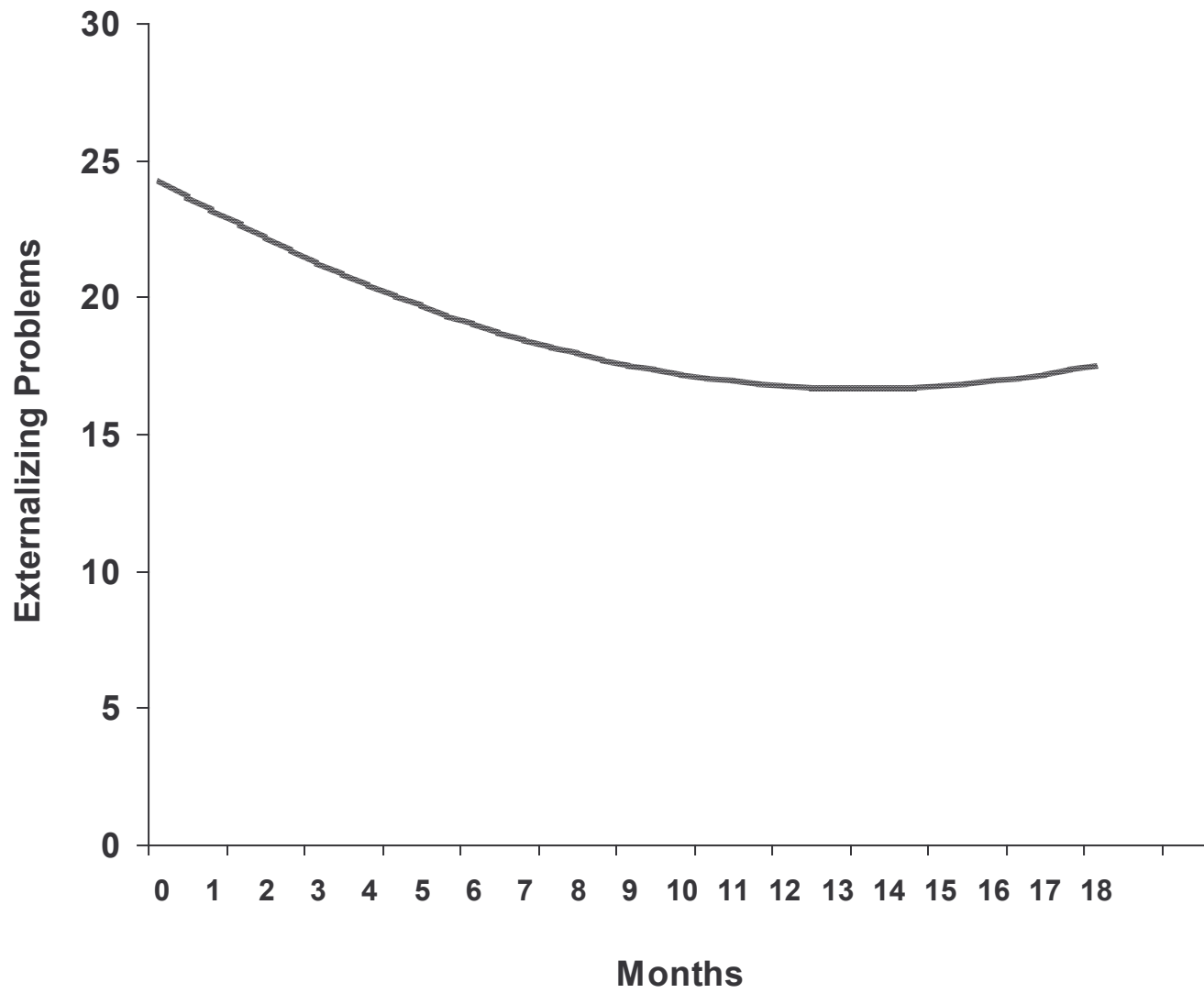


Figure 1: Trajectory of mean Externalizing Problems over Time.



**Model 2:** In examining between-person predictors in the Launch model, all three of the parenting behaviors were related to the within-person intercept (i.e., level of externalizing problems). Specifically, higher levels of parental Warmth and Behavior Control were related to lower levels of adolescent externalizing problems, whereas lower levels of psychological control related to fewer externalizing problems. However, none of the parenting behaviors were related to the rate of change in adolescent externalizing problems over time, i.e., they did not interact with Time. **Model 3:** The Contemporaneous Across Time models indicated that within-individual fluctuations in parental warmth were correlated with within-individual fluctuations in levels of adolescent externalizing problems, above and beyond initial levels of parental warmth. The other two parenting behavior dimensions were not contemporaneously related to either internalizing or externalizing problems.

Of course, no assumptions can be made regarding directions of effects or causality in these analyses. A somewhat different picture emerged with adolescent internalizing problems (See Table 5). There were significant effects of Time and Time<sup>2</sup>, with adolescents' internalizing problems decreasing across the four time points, with the rate of decrease decreasing across time (See Figure 2). Unlike with externalizing problems, the between-person control variable of baseline age was significant for internalizing problems, indicating that older baseline age was related to higher levels of internalizing problems overall, although it did not predict rate of change in internalizing problems (i.e., did not interact with Time).

The Launch Model (Model 2, Table 5) indicated that parents' baseline level of behavioral control was significantly negatively associated with initial level of

Table 5

Effects of Initial Parenting Behaviors on Levels and Change in Internalizing Problems, and Across-Time Parenting Behaviors on Within-Individual change in Internalizing Problems (continued on next page).

	Time	Launch	C.A. Time
	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
<u>LEVEL 1</u>			
INT at Initial	11.69(.90)***	22.77(5.65)***	22.94(5.68)***
Time	-.44(.06)***	-.60(.33) <sup>+</sup>	-.53(.37)
Time <sup>2</sup>	.03(.01)***	.03(.01)***	.03(.01)***
Within-Sub Warmth			-.13(.07) <sup>+</sup>
Within-Sub Psych Cont			.01(.08)
Within Sub Beh Cont			.01(.09)
<u>LEVEL 2</u>			
TX (control versus Tx)	-.64(1.29)	-.49(1.31)	-.57(1.36)
Baseline Age	1.15(.44)**	1.07(.45)*	1.07(.45)*
Initial Level of Warmth		-.16(.12)	-.18(.12)
Initial Level of Psych Cont		.24(.16)	.23(.16)
Initial Level of Beh Cont		-.56(.17)**	-.56(.17)**
<u>CROSS LEVEL</u>			
Time x TX	.12(.09)	.11(.09)	-.11(.10)
Time <sup>2</sup> x TX	-.00(.01)	-.00(.01)	.00(.01)

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Table 5, continued.	Time	Launch	C.A. Time
	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Time x Baseline Age	-.004(.02)	-.01(.03)	-.00(.03)
Time x Initial Warmth		.00(.01)	-.00(.01)
Time x Initial Psych Cont		-.01(.01)	-.01(.01)
Time x Initial Beh Cont		.02(.01)	.02(.01)

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*Note.* <sup>+</sup> $p < .10$  \* $p < .05$ . \*\* $p < .01$  \*\*\* $p < .001$

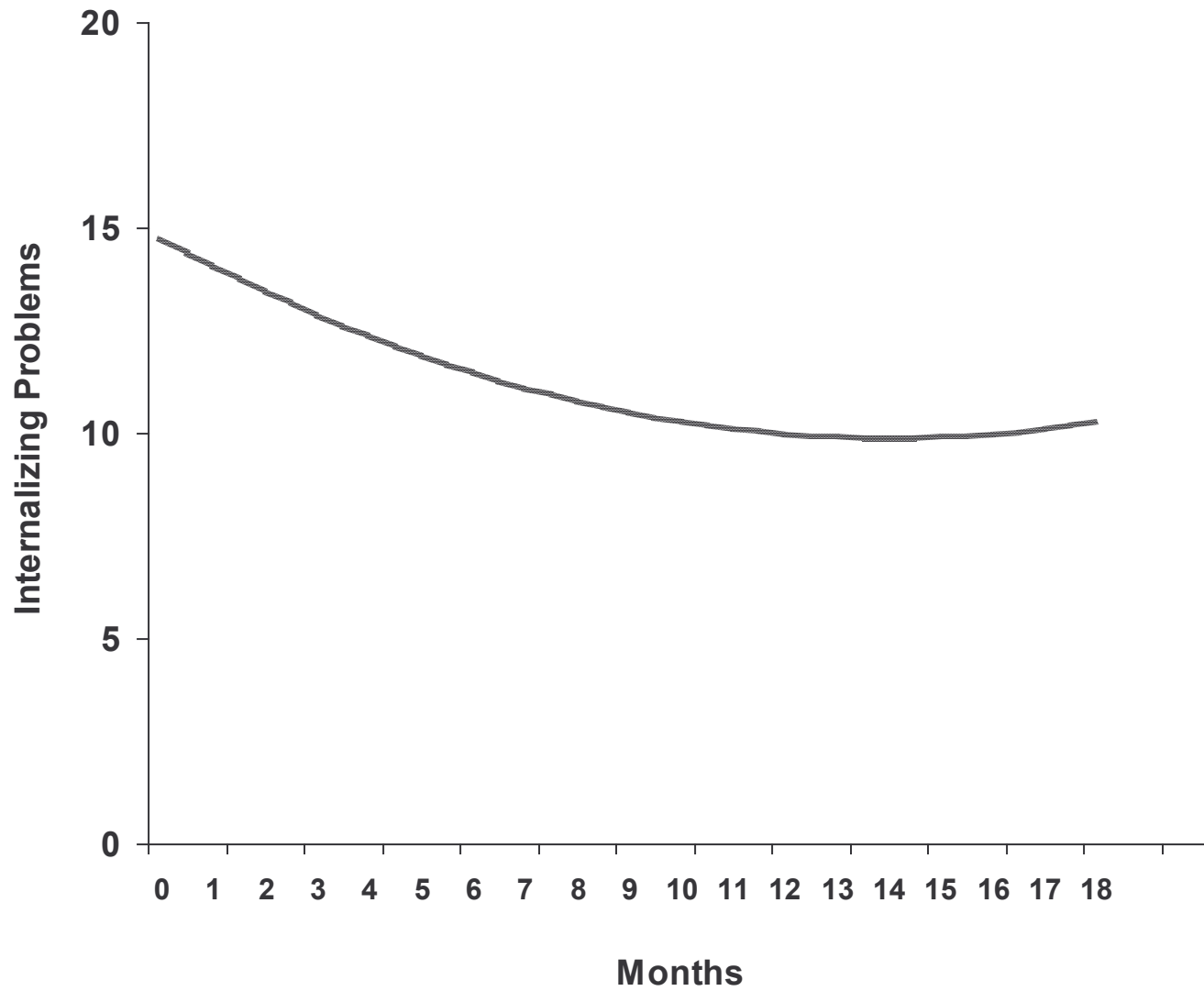


Figure 2: Trajectory of mean Internalizing Problems over Time.

adolescents' internalizing problems (although it did not predict rate of change in internalizing problems); i.e., adolescents whose parents used more behavioral control had lower levels of internalizing problems. Baseline levels of none of the parenting behaviors were related to the rate of change in internalizing problems across time. Examination of within-individual fluctuations in parenting behaviors in the Contemporaneous Across Time model (Model 3; Table 5) also did not produce significant results, although a trend suggested that within-individual decreases in levels of parental warmth may relate to increases in adolescent internalizing problems.

For both internalizing and externalizing outcome variables, all Launch and Contemporaneous Across Time analyses were re-run without the treatment variable in analyses to assess whether controlling for treatment group status affected the results with regard to parenting behaviors. Although the parameters shifted slightly, there was no change in which parenting behaviors were significant.

Table 6 and Table 7 present results of the parenting behavior interaction analyses. In these analyses, the launch level parent behaviors were centered at 0 to create the multiplicative interaction terms. For both adolescent externalizing and internalizing problems, parenting behavior interactions were added to the Launch and Contemporaneous Across Time models (Tables 4 and 5). For clarity, the coefficients from Launch and Contemporaneous Across Time models in Tables 4 and 5 are not represented in Tables 6 and 7. In the Launch Models, three two-way parenting behavior interactions were added at Level 2 to predict level of psychopathology, as well as three cross-level parenting behavior interactions by Time. Additionally, three within-

individual two-way parenting behavior interactions with time are included at Level 1 in the Contemporaneous Across Time models.

Interestingly, although none of the main effects for parenting behaviors were related to rate of change in adolescent externalizing problems over time (see Table 4), there was a significant interaction between warmth and psychological control on the rate of change in externalizing problems (i.e., Warmth x Psychological Control x Time; Table 6). See Figures 3, Figure 4, and Figure 5. There were no other two-way parenting behavior interactions in the prediction of either level or rate of change in adolescent externalizing problems. With internalizing problems, there was a significant interaction at Level 1 in the Contemporaneous Across Time models between Parental Warmth and Behavior Control. This interaction indicated that the extent to which internalizing problems and parental warmth covaried within subjects across time differed as a function of the level of parental behavior control (and vice versa, in regards to parental behavior control and parental warmth). That is, the extent to which a subject's level of internalizing problems at a particular time point was predictable from that subject's level of parental warmth at the same time point varied as a function of the subject's level of behavioral control. (See Figure 6.)

To test the curvilinear effects of behavior control on initial levels and trajectories of externalizing and internalizing problems, the behavior control variable was squared and added to both the Launch and Contemporaneous Across Time Models. (See Table 8 for curvilinear effects of behavior control. See Tables 4 and 5 for base coefficients of these models.) In the Launch models, the squared behavior control variable was added at Level 2, as well as a cross-level interaction between behavior control squared and Time.

Table 6

Linear Mixed Modeling Results of the Effects of Parenting Behaviors as Moderators in the Prediction of Adolescent Externalizing Problems.

	Launch	C.A. Time
	Coefficient (SE)	Coefficient (SE)
	<u>LEVEL 1</u>	<u>LEVEL 1</u>
WIS W x WIS PC		.01(.02)
WIS W x WIS BC		-.04(.03) <sup>+</sup>
WIS PC x WIS BC		-.04(.03) <sup>+</sup>
	<u>LEVEL 2</u>	<u>LEVEL 2</u>
W x PC	-.007(.04)	-.01(.04)
W x BC	-.03(.04)	-.02(.04)
PC x BC	-.09(.05) <sup>+</sup>	-.08(.05)
	<u>CROSS LEVEL</u>	<u>CROSS LEVEL</u>
W x PC x Time	-.01(.00)*	-.01(.00)
W x BC x Time	.00(.00)	.00(.00)
PC x BC x Time	-.00(.00)	-.00(.00)

Note: See Table 4 for base model coefficients not presented above.

<sup>+</sup> $p < .10$  \* $p < .05$ .

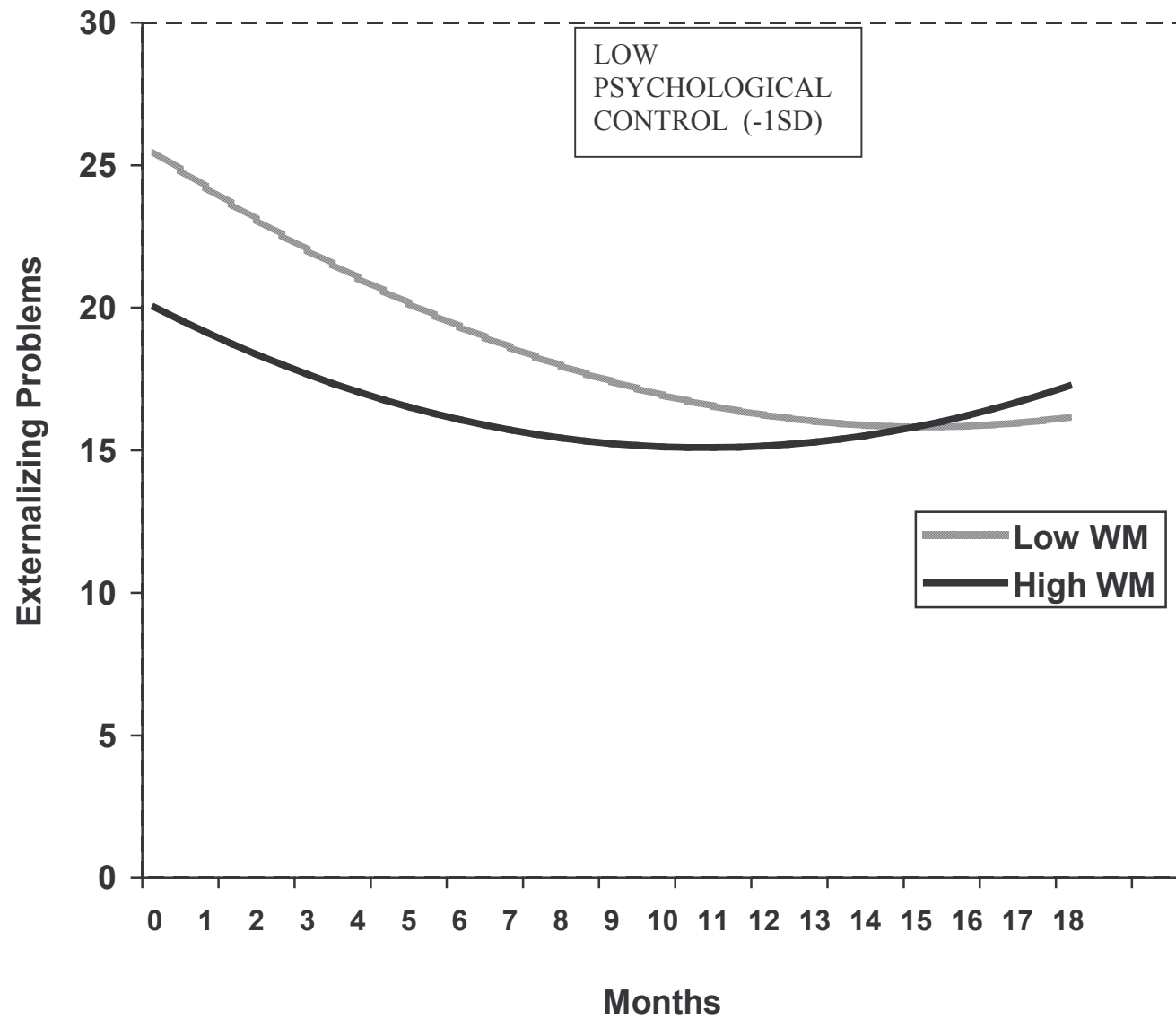


Figure 3: Parental Warmth X Time at Low Levels of Psychological Control in the prediction of Externalizing Problems.



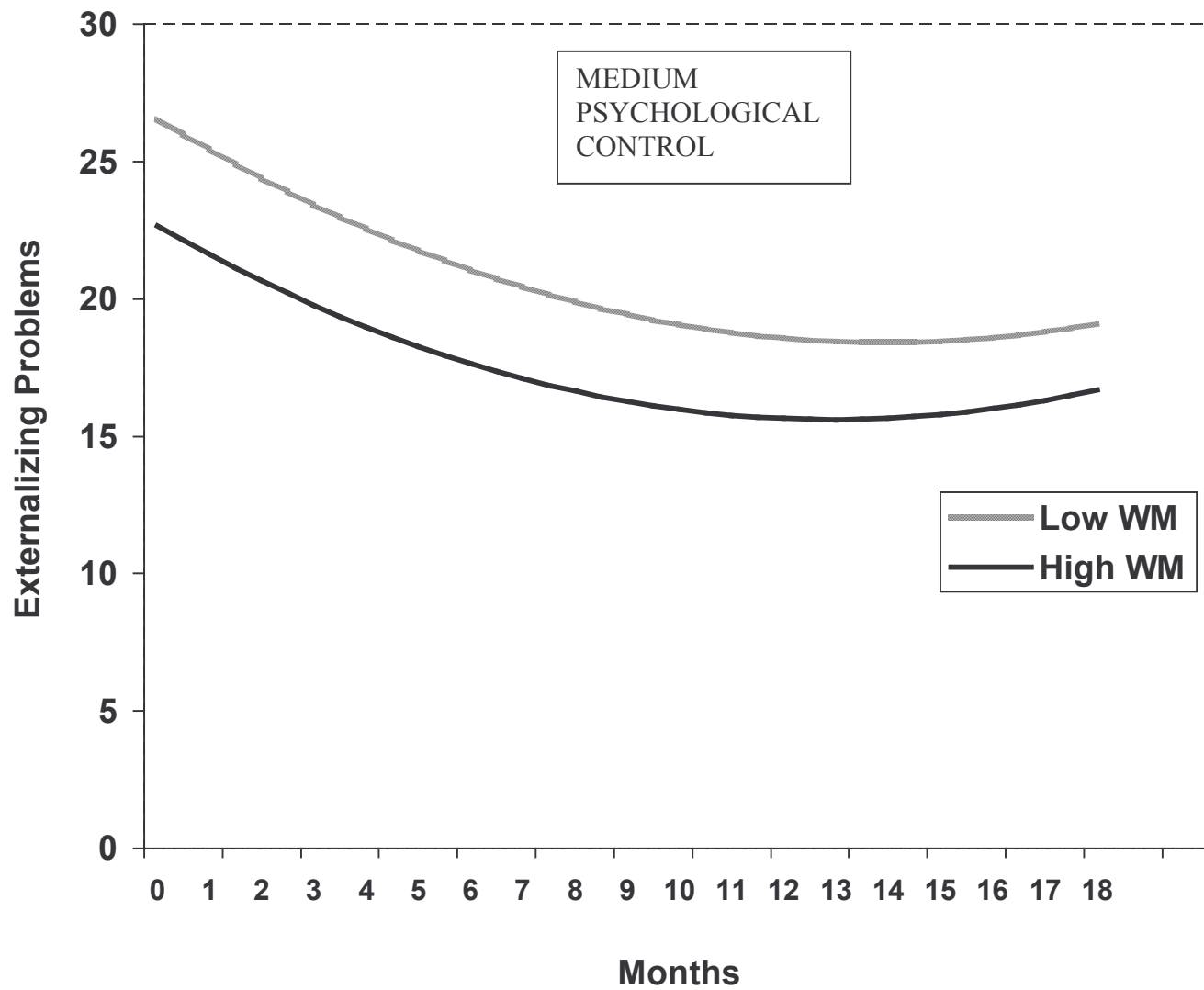


Figure 4: Parental Warmth X Time at Medium Levels of Psychological Control in the prediction of Externalizing Problems.

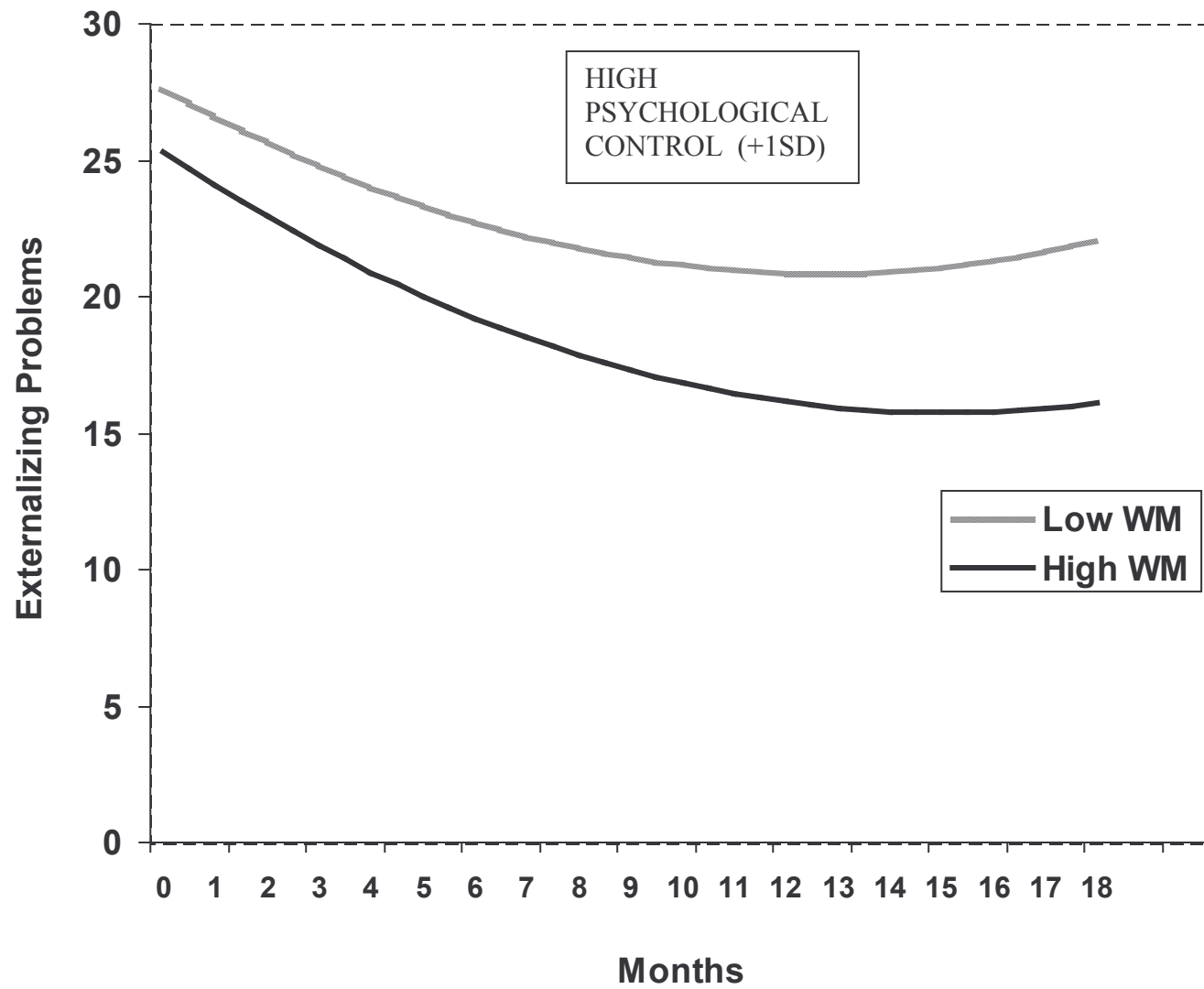


Figure 5: Parental Warmth X Time at High Levels of Psychological Control in the prediction of Externalizing Problems.

Table 7

Effects of Parenting Behaviors as Moderators in the Prediction of Adolescent Internalizing Problems.

	Launch	C.A. Time
	Coefficient (SE)	Coefficient (SE)
	<u>LEVEL 1</u>	<u>LEVEL 1</u>
WIS W x WIS PC		.01(.01)
WIS W x WIS BC		-.04(.02)*
WIS PC x WIS BC		-.03(.02)
	<u>LEVEL 2</u>	<u>LEVEL 2</u>
W x PC	.04(.03)	.03(.04)
W x BC	-.04(.03)	-.03(.03)
PC x BC	-.04(.04)	-.03(.04)
	<u>CROSS LEVEL</u>	<u>CROSS LEVEL</u>
W x PC x Time	-.00(.00)	-.00(.00)
W x BC x Time	.00(.00)	.00(.00)
PC x BC x Time	-.00(.00)	-.00(.00)

Note: See Table 5 for base coefficients not presented above.

<sup>+</sup> $p < .10$  \* $p < .05$ . \*\* $p < .01$  \*\*\* $p < .001$

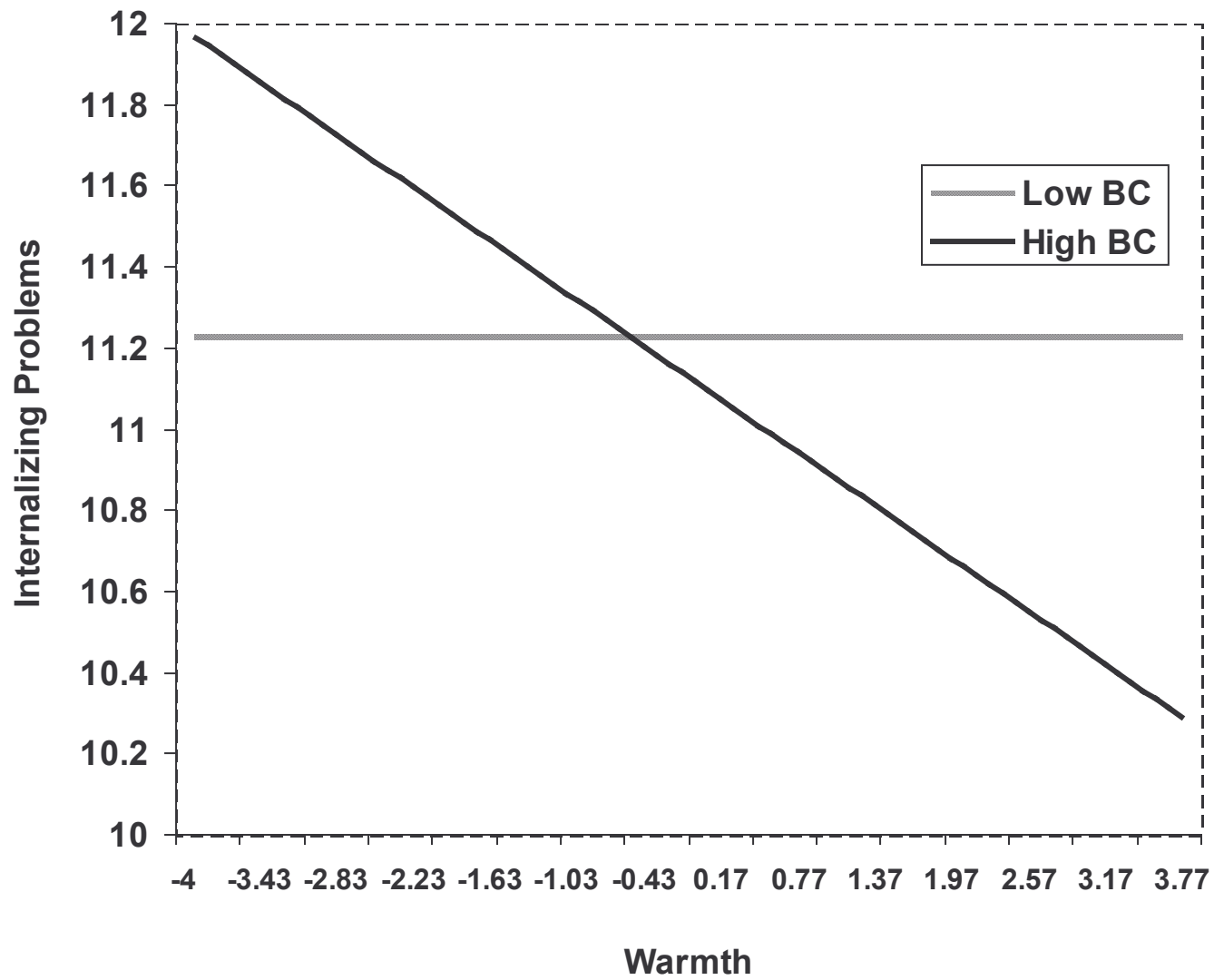


Figure 6: Within-individual interaction between Behavior Control and Warmth in Predicting Internalizing Problems

This quadratic term was not significant in predicting levels of either externalizing or internalizing problems, however a significant interaction with Time occurred for internalizing problems. (See Figure 7.) Within-individual quadratic effects of behavior control were not found in the Contemporaneous Across Time models.

In order to assess whether the three parenting behaviors relate differently to minor versus more severe forms of externalizing problems, a profile analysis approach (Tabachnick & Fidell, 1996) was used to assess for differential effects. This tests the interaction between an independent variable (in this case, the parenting behaviors), and the profile effect (in this case, a contrast between standardized minor forms of externalizing behavior, MINOR EXT, and standardized more severe forms of externalizing behaviors, SEVERE EXT). This repeated measures test assessed the extent to which the relation between the independent variables (parenting behaviors) differed significantly for the two different dependent variables (severity of EXT) of which the contrast was comprised (see Weiss et al., 1998). This analysis is analogous to using equality constraints on two parameter estimates in a path or structural equation model. None of the parenting behaviors were related to the contrast of interest (i.e., difference between MINOR and SEVERE EXT), indicating that there was neither differential magnitude of relations nor differential direction of relations between the parenting behaviors and severity of externalizing problems (Table 9). See Appendix B for the symptoms that constitute the conceptually derived minor and severe externalizing syndromes.

Finally, a set of *reciprocal* Launch models were tested to examine whether initial levels and rate of change in adolescent psychopathology were related to each of the

Table 8

Linear Mixed Modeling Results of the Curvilinear Effects of Behavior Control in the Prediction of Adolescent Externalizing Problems.

	<u>Launch</u>		<u>C.A. Time</u>	
	<u>EXT</u>	<u>INT</u>	<u>EXT</u>	<u>INT</u>
<u>Level 1</u>				
WIS BC x WIS BC			-.008(.02)	-.014(.01)
<u>Level 2</u>				
BC x BC	-.03(.04)	.003(.04)	-.04(.05)	.005(.04)
<u>Cross Level Int</u>				
BC x BC x Time	-.002(.003)	-.004(.002)*	-.004(.003)	-.004(.002) <sup>+</sup>

Note: See Table 4 for base model coefficients not presented above. <sup>+</sup> $p < .10$  \* $p < .05$ .

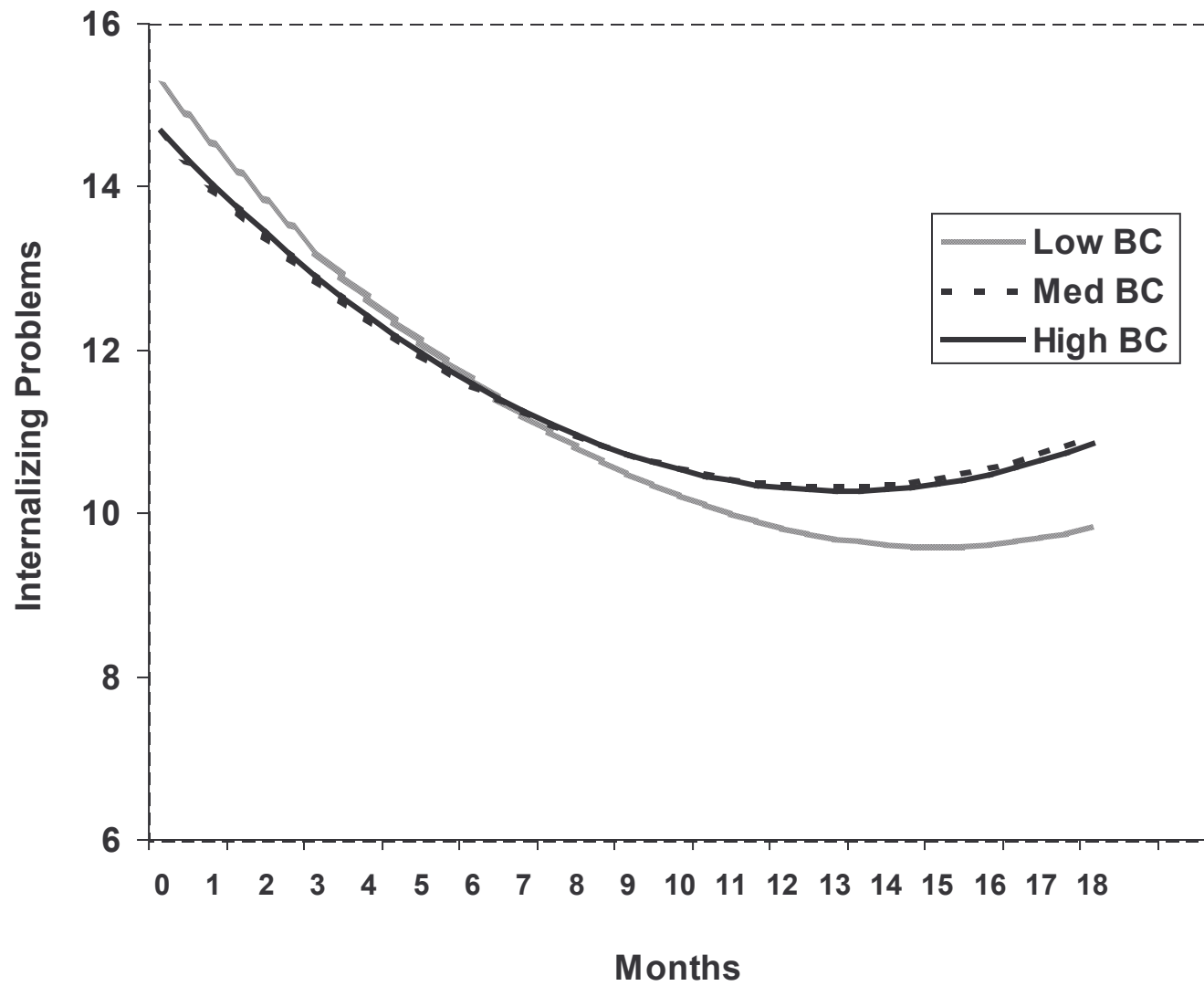


Figure 7: Quadratic Effects of Behavior Control in the Prediction of the Slope of Internalizing Problems

Table 9

Linear Mixed Modeling Results of the Effects of Initial Parenting Behaviors on Levels and Change in Minor versus Severe Externalizing Problems, and Across-Time Parenting Behaviors on Within-Individual change in Minor versus Severe Externalizing Problems (continued on next page).

	Launch	C.A. Time
	Coefficient (SE)	Coefficient (SE)
<u>LEVEL 1</u>		
Severity of Ext Intercept	1.04(.53) <sup>+</sup>	1.21(.53)*
Time	-.03(.05)	.005(.05)
Time <sup>2</sup>	-.002(.001) <sup>+</sup>	-.002(.001)*
Within-Sub Warmth		.01(.01)
Within-Sub Psych Cont		-.02(.01) <sup>+</sup>
Within Sub Beh Cont		-.004(.01)
<u>LEVEL 2</u>		
TX (control versus Tx)	.05(.13)	.004(.13)
Baseline Age	.11(.04)*	.10(.04)*
Initial Level of Warmth	-.02(.01) <sup>+</sup>	-.02(.01)
Initial Level of Psych Cont	-.008(.01)	-.02(.01)
Initial Level of Beh Cont	-.01(.02)	-.01(.02)
<u>CROSS LEVEL INTERACTIONS</u> (next page)		



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Table 9, continued.	Launch	C.A. Time
	Coefficient (SE)	Coefficient (SE)
Time x TX	.001(.003)	-.001(.003)
Time <sup>2</sup> x TX	.01(.01)	.004(.01)
Time x Baseline Age	-.002(.001)	-.001(.002)
Time x Initial Warmth	.001(.001)	.001(.001)
Time x Initial Psych Cont	.001(.001)	-.002(.001)
Time x Initial Beh Cont	.001(.001)	.001(.001)

---

*Note.* <sup>+</sup> $p < .10$  \* $p < .05$ .

parenting behaviors over time (Tables 10-12). In these “Launch” analyses, to assess the unique effects of each individual parenting behavior (e.g., warmth), the other two parenting behaviors (e.g., psychological control and behavior control) were included as predictor variables in analyses. These Launch models tested the extent to which between-person differences in initial levels of parental warmth, psychological control, and behavior control and the average rate of change in these parenting behaviors were related to initial levels of adolescent internalizing and externalizing problems.

The results for Warmth are presented in Table 10. The between person control variables of treatment group status and baseline age did not predict either level or rate of change in externalizing or internalizing problems. Further, as expected, the two parenting control behavior (i.e., behavior and psychological control) were significantly related to level of parental warmth. Psychological control interacted with time, with subjects with higher initial levels of psychological control having a slower rate of change in parental warmth over time. The effects of most conceptual interest, however, were the adolescent psychopathology effects. A model examining between person initial levels of adolescent externalizing problems, predicted initial level of parental warmth, but did not predict rate of change in parental warmth (i.e., did not interact with Time). A similar model that examined adolescent internalizing problems as a predictor, found internalizing problems predicted neither level or rate of change in parental warmth.

The results for Psychological control are presented in Table 11. In these analyses, after treatment group status, baseline age, and the other two parenting behaviors were controlled, initial level of adolescent externalizing problems predicted initial level of parental psychological control, but failed to predict rate of change in parental

Table 10

“Launch” Reciprocal Linear Mixed Effects Models with Adolescent Psychopathology Domains predicting Parental Warmth.

	Ext Predictor	Int Predictor
	Coefficient (SE)	Coefficient (SE)
<u>LEVEL 1</u>		
Intercept	29.65(1.88) <sup>***</sup>	27.83(1.81) <sup>***</sup>
Time	.21(.21)	.18(.21)
<u>LEVEL 2</u>		
TX (control versus Tx)	-.55(.72)	-.39(.73)
Baseline Age	-.47(.27) <sup>+</sup>	-.39(.27)
Initial Level of Psych Cont	.12(.05) <sup>*</sup>	.11(.05) <sup>*</sup>
Initial Level of Beh Cont	-.28(.06) <sup>***</sup>	-.27(.06) <sup>***</sup>
Initial Level of EXT or INT	-.09(.04) <sup>***</sup>	-.03(.04)
<u>CROSS LEVEL INTERACTIONS</u>		
Time x TX	-.01(.05)	-.02(.05)
Time x Baseline Age	.03(.02) <sup>+</sup>	.03(.02)
Time x Psych Cont	-.01(.01) <sup>*</sup>	-.01(.01) <sup>*</sup>
Time x Beh Cont	.002(.008)	.003(.008)
Time x Initial EXT or INT	.00(.00)	-.003(.003)

Note. <sup>+</sup> $p < .10$  <sup>\*</sup> $p < .05$ . <sup>\*\*</sup> $p < .01$  <sup>\*\*\*</sup> $p < .001$

psychological control over time. That is, higher initial levels of externalizing problems were related to higher levels of parental psychological control, but were not related to the rate of change in psychological control over time. Results suggest a similar pattern with adolescent internalizing problems, although these results are only a trend in this study (Table 11).

Interestingly, in separate models predicting Behavior control, initial levels of both adolescent internalizing and externalizing problems predicted level of parental behavior control (Table 12). Similar to all previous models predicting parenting behavior, there were no significant interactions of adolescent internalizing or externalizing with Time, indicating that initial level of adolescent psychopathology did not affect the rate of change in behavior control.

Table 11

“Launch” Reciprocal Linear Mixed Effects Models with Adolescent Psychopathology Domains predicting Parental Psychological Control.

	Externalizing	Internalizing
	Coefficient (SE)	Coefficient (SE)
<u>LEVEL 1</u>		
Intercept	12.32(1.85) <sup>***</sup>	13.70(1.76) <sup>***</sup>
Time	.28(.24)	.08(.23)
<u>LEVEL 2</u>		
TX (control versus Tx)	-.33(.52)	-.48(.53)
Baseline Age	-.11(.19)	-.20(.20)
Initial Level of Warmth	.10(.04) <sup>*</sup>	.09(.04) <sup>*</sup>
Initial Level of Beh Cont	.19(.05) <sup>***</sup>	.18(.05) <sup>***</sup>
Initial Level of EXT or INT	.08(.03) <sup>**</sup>	.06(.03) <sup>+</sup>
<u>CROSS LEVEL INTERACTIONS</u>		
Time x TX	-.03(.05)	-.03(.05)
Time x Baseline Age	.004(.02)	.006(.02)
Time x Warmth	-.01(.01)	-.004(.005)
Time x Beh Cont	-.004(.008)	-.002(.008)
Time x Initial EXT or INT	-.003(.003)	-.003(.003)

Note. <sup>\*</sup> $p < .05$ . <sup>\*\*</sup> $p < .01$  <sup>\*\*\*</sup> $p < .001$

Table 12

“Launch” Reciprocal Linear Mixed Effects Models with Adolescent Psychopathology Domains predicting Parental Behavior Control.

	Externalizing	Internalizing
	Coefficient (SE)	Coefficient (SE)
<u>LEVEL 1</u>		
Intercept	23.57(1.19) <sup>***</sup>	23.24(1.10) <sup>***</sup>
Time	-.13(.14)	-.14(.13)
<u>LEVEL 2</u>		
TX (control versus Tx)	-.27(.46)	-.24(.45)
Baseline Age	-.30(.17) <sup>+</sup>	-.19(.17)
Initial Level of Warmth	-.13(.03) <sup>***</sup>	-.12(.03) <sup>***</sup>
Initial Level of Psych Cont	.12(.03) <sup>***</sup>	.12(.03) <sup>***</sup>
Initial Level of EXT or INT	-.06(.02) <sup>**</sup>	-.08(.03) <sup>**</sup>
<u>CROSS LEVEL INTERACTIONS</u>		
Time x TX	.008(.03)	.01(.03)
Time x Baseline Age	-.02(.02) <sup>+</sup>	-.02(.01) <sup>+</sup>
Time x Warmth	.002(.003)	.002(.003)
Time x Psych Cont	.001(.005)	.002(.005)
Time x Initial EXT or INT	-.0001(.002)	-.000(.00)

Note. <sup>+</sup> $p < .10$  \* $p < .05$ . \*\* $p < .01$  \*\*\* $p < .001$

## CHAPTER IV

### DISCUSSION

The goal of this study was to identify parenting behavior predictors of individual differences in trajectories of adolescent internalizing and externalizing problems over time. In particular, this study examined the effects of parental warmth, behavior control, and psychological control on adolescents' initial levels and trajectories of change in psychopathology over an 18-month period. Secondary analyses examined: (a) parenting behaviors as moderators of each other in these relations, (b) curvilinear effects of parental behavior control on these relations, (c) the specificity of the relations of these three parenting dimensions to less versus more severe externalizing behavior, and (d) tested reciprocal models with growth in adolescent psychopathology domains as predictors of parenting behavior domains over time. Findings regarding each of these areas are discussed in turn below. Then, the implications of these results regarding the overall role of parenting behavior in relation to the development, maintenance, and possible diminution of adolescent psychopathology are discussed.

#### Parenting Predictors of Adolescent Psychopathology

Before discussing substantive findings, it is important to note the structure and findings from the baseline models. First, trajectories of psychopathology domains were modeled including baseline age and treatment group status to control for the effects of age on initial level and growth in psychopathology and of receiving treatment on growth

in psychopathology over time. These models represented the baseline for all additional analyses. There was a significant negative effect of time for both internalizing and externalizing problems (i.e., a linear decreasing component to the trajectories over time), and there also was a significant quadratic effect indicating that the rate of decrease in internalizing and externalizing problems itself decreased across time. Further, there was an effect of baseline age on levels of internalizing problems such that older age was associated with higher initial levels of internalizing, but not externalizing problems. This finding is consistent with previous studies indicating that internalizing problems such as depression increase in mid to late adolescence (e.g., Ge et al., 1994; Garber et al., 2002; Hankin et al., 1998). Finally, reflecting the success of randomization to Group (control vs. treatment), the effect of treatment on initial levels of either psychopathology domain was non-significant. There was a significant interaction between Group and Time for externalizing problems, which is consistent with previous findings (Henggeler, et al., 1991; 1992; 2002) indicating that receiving the MST is associated with decreases in adolescent externalizing problems (but not internalizing problems) relative to the control group.

#### Launch Models: Predicting Psychopathology from Initial Levels of Parenting

Building from these baseline models, substantive questions focused on parenting behavior as predictors of adolescent internalizing and externalizing problems over time. When examining the influence of the three dimensions of parenting on initial levels of psychopathology, initial levels of parental warmth were related to initial levels but not to growth (i.e., initial levels of parental warmth did not interact with time) of both



internalizing and externalizing problems. Baseline levels of both parental behavior and psychological control were related to levels of externalizing, but not internalizing problems. Neither types of control were related to change over time in internalizing or externalizing problems.

Consistent with hypotheses, parental warmth was negatively related to initial levels of both adolescent internalizing and externalizing problems. Previous studies have provided evidence that parenting low in reinforcement and warmth are related to internalizing (Burbach & Borduin, 1986; Cole & Rehm, 1986; Randolph & Dykman, 1998), externalizing problems (Pettit, et. al., 1993), and comorbid problems (Broidy et al., 2003; Ge, Best, Conger, & Simons, 1996; Kim et al., 2003). High warmth may work to simultaneously decrease both internalizing and externalizing problems by facilitating a general positive sense of well being in the adolescent (e.g., Gray & Steinberg, 1999) increasing self-esteem and reducing adolescent responsiveness to peer bullying or negative peer pressure. Low levels of warmth may cause of child internalizing problems (Cole & Rehm, 1986) via its reinforcement value or through its effects on cognitions such as self-esteem (e.g., Garber & Flynn, 2001). However, with externalizing problems, adolescent effects may be responsible for the relations, with low parental warmth a consequence of the aversive nature of externalizing child behavior (Patterson, 1997).

Although initial levels of parental warmth related to level of both internalizing and externalizing psychopathology domains, initial level of parental warmth did not interact with time to predict trajectories of adolescent psychopathology. There may be both substantive and statistical reasons for this lack of finding. Substantively, by the time that children reach mid to late adolescence, the parenting behavior dimensions measured

in this study may reflect a more “trait” like construct. That is, parenting dimensions measured at this stage of development are likely the result of cumulative reciprocal influences between the parent and adolescent that have developed over the course of many years, and therefore parenting skills or strategies that may relate to change in psychopathology may not be captured in broad parenting dimensions such as “parental warmth.” A key principal of “reciprocity” theory of parent-child relationships is that parent-child influences take many years to develop (Maccoby, 1992), and therefore the findings here may reflect capture deeply engrained patterns of parenting that have been developed over years. Thus, the effects of the parenting behaviors on child psychopathology at later points in development such as adolescence may be due to a more stabilized process where the parenting dimension affected changes earlier in development (i.e., relate to level), but not later (i.e., not relating to slope). Further discussion of the lack of prediction of growth is offered after discussing the findings regarding behavior and psychological control.

Results with regard to the parental control variables varied by psychopathology outcomes in a manner different from that that had been hypothesized. Specifically, initial levels of behavior control related to levels of both internalizing and externalizing problems and unexpectedly, psychological control related to externalizing problems but not internalizing problems. Given the widely documented relation between behavior control and externalizing problems (Barber, 1996; Barber, et. al., 1994; Barber & Olsen, 1997; Galambos, Barker, & Almeida, 2003; Gray & Steinberg, 1999; Griffen, Scheier, Botvin, Diaz, & Miller, 2000; Linver & Silverberg, 1995; Pettit, Laird, Dodge, Bates & Criss, 2001; Sampson & Laub, 1994), it is not surprising that higher levels of behavior

control were related to lower initial levels of this adolescent psychopathology domain. However, behavior control had not been hypothesized to predict internalizing problems (either the intercept or slope), and conversely psychological control was hypothesized to predict internalizing problems (both intercept and slope) as well as externalizing problems (intercept only). In this study, however, psychological control related to externalizing, but not internalizing problems.

Because behavior control is largely concerned with management and supervision of behavior with the goal of positive socialization (i.e., not of internal emotion states), whereas psychological control techniques (e.g., guilt induction, love withdrawal, constraining of verbal expression, invalidating feelings) are presumed to facilitate child dependence and affective reactions by manipulating, constraining and intruding upon an adolescent's self-direction and psychological sense of self (Pettit, et al., 2001; Barber, Bean, & Erikson, 2002), these two constructs have typically been theorized and found to predict differentially across psychopathology domains with behavior control relating to externalizing problems and psychological control relating to both internalizing and externalizing problems, with stronger relations with internalizing problems (for review, see Caron, Weiss, & Harris, 2005).

Sample characteristics may partly be responsible for the unexpected findings in this study (i.e., for behavior control relating to initial levels of both internalizing and externalizing problems, and psychological control relating to initial levels of externalizing, but not internalizing problems). Although there was significant variability, the mean level of impairment in this sample was high, with initial levels of both internalizing and externalizing problems reaching clinically significant levels. Thus,

the mechanisms for the development and change in psychopathology in this sample may be different than in less severe samples. For example, psychologically controlling parenting behaviors are typically considered to relate to internalizing problems by acting on proximal variables to internal affective states by reducing self-esteem (Garber & Flynn, 2001; Garber, Robinson, & Valentiner, 1997), generating a depressive attributional style (Garber & Flynn, 2001), or possibly by impacting adolescents' self-perceived competence (see e.g., Jacquez, Cole, & Searle, 2004) in community samples. Similarly, psychological control was hypothesized to cause externalizing problems by serving as a model for hostile social information processing (Gomez, Gomez, DeMello, & Tallent, 2001) or as a model of interpersonal strategies that are similar to relational aggression (Nelson & Crick, 2002). It may be that in more severely impaired samples like ours, such processes are not primary or even relevant at this stage in the development and maintenance of psychopathology.

There are a number of additional reasons why the majority of our hypotheses were not confirmed. Our sample consisted of adolescents that were currently experiencing high levels of externalizing problems, as well as co-occurring internalizing problems. This can be valuable because in community samples, most participants will have relatively low problem levels and therefore the distribution of child psychopathology will be significantly skewed (Hartman et al., 1999). However, a wealth of previous work has shown that adolescents with high levels of externalizing problems such as antisocial behavior, conduct disorder, and attention-deficit hyperactivity behaviors (i.e., like those in our sample) often have neuropsychological and neurocognitive impairments (Henry & Moffit, 1997; Moffit, 1990; Morgan & Lilienfeld,

2000; Raine, et al., 2005). It may be that when examining severe clinical samples such as this one, parenting variables that are important in community samples because of the impact they have on adolescent cognitions and attributional style have less potency in the development and maintenance of internalizing (and externalizing problems) in samples of children known to have neurocognitive impairments. Instead, internalizing problems in these more severe samples may result more from other processes such as failure in academic and social contexts secondary to externalizing problems, resulting in both negative reactions from others (e.g. parents, peers, police) and larger social consequences (e.g., criminal arrest) that increase children's vulnerability to internalizing symptoms such as depression (see e.g., Capaldi & Stoolmiller, 1999; Fergusson, et al., 2003; Patterson & Stoolmiller, 1991). Thus, instead of psychological control being of primary relevance, higher levels of behavior control may be important for lower internalizing problems by decreasing opportunities for adolescents to experience these negative social and societal effects resulting from troubling externalizing problems.

Unlike psychological control that is theorized to operate primarily through cognitive and relational domains (see Barber, et al., 2002), behavior control operates at least partly by controlling or setting limits directly on the adolescent's behavior (e.g., Scaramella et al. 2002). Low levels of behavior control could relate to higher initial levels of child externalizing problems due to a history of increased opportunities to act out without appropriate guidelines for behavior regulation, increased opportunity to engage with deviant peers (Kim et al., 1999; Mason et al., 1996, Scaramella, et al., 2002; Snyder, et al., 1986).

Some have questioned the validity of these parent-effects models of behavior control (Kerr & Stattin, 2000; 2003a, 2003b; Stattin & Kerr, 2000), and have found greater empirical support for child effects (e.g., Kerr & Stattin, 2003). From this perspective, high levels of externalizing problems in children may result in decreases in behavior control attempts, as parental tolerance or hopelessness increases (Bell & Chapman, 1986; Colder, Lochman, & Wells, 1997; Stice & Barrera, 1995). Kerr and Stattin (2003) suggest other possible pathways for these connections, such as (a) youths increasingly hiding externalizing behaviors (e.g., delinquency), resulting in a lack of parental knowledge of the child behaviors that warrant control, (b) parental anxiety over child's behavior resulting in parental avoidance, and (c) the possibility that parents become intimidated by children's externalizing behavior and therefore decrease control attempts. Longitudinal findings provide some support for such a child-effects perspective, suggesting active parental behavior control attempts may be more of a reaction to earlier externalizing behavior (e.g., delinquency) than vice versa. Finally, other possible explanations for the behavior control and externalizing relation are that parental behavior control sets off cognitive processes such as biased social information processing towards hostility (Gomez et al., 2001), or that third variables such as poor attachment to family which is marked by low behavior control (Hirchi, 1969) is partly responsible for the relation.

Most of these theories, however, would suggest a process that occurs over time. The Launch models that predict trajectories (such as those found to be non-significant in the present study) test whether baseline levels of parenting set a developmental process in motion that affects the trajectory of increasing or decreasing symptoms over time. What

is the most striking with regard to all three parenting dimensions examined, however, is that none of the initial levels of parenting dimensions predicted individual differences in change in the adolescent psychopathology domains over time. This is consistent with a recent study by Galambos and colleagues (2003) who found of six possible tests, only one test of the same parenting behaviors measured in this study (i.e., behavior control) predicted individual differences in trajectories of either adolescent internalizing or externalizing problems (i.e., externalizing problems).

There are a number of different possibilities as to why the psychopathology trajectories may not have been predicted by initial levels of warmth, behavior control, or psychological control. First, it may be that a static and global measure of parenting examined herein does not reflect an important factor in influencing the trajectory of adolescent psychopathology. By adolescence, other factors such as association with deviant peers (e.g, Brendgen, Vitaro, & Bukowski, 2000), involvement in the criminal justice system (e.g., Maughan, Pickles, Rowe, Costello, & Angold, 2000), or histories of more severe forms of parenting behavior such as physical or sexual abuse (e.g., Widom, 1989; 1998) may be more important in setting the course of an individual's trajectory of externalizing problems in samples with elevated levels of psychopathology. Further, risk factors such as parenting variables are fairly stable over time, and therefore examining them in middle adolescence may make their immediate effect less evident than it would be with a younger sample, since older children have been exposed to them cumulatively over a longer period of time (Loeber, et al., 2000).

Secondly, the CRPBI is a global measure of parenting dimensions that assesses broad aspects of warmth, psychological control, and behavior control. Questions such as

“I am very strict with my child” or “I would like to be able to tell my child what to do all the time” reflect generalities of parent behaviors, not specifics. In contrast, self-report measures of actual parental management behaviors (e.g., Kim, et al., 2003) or Barber’s (1996) Psychological Control Scale-Observer Rating scale that was specifically designed to capture the properties of psychological control through *observational methods* may relate more specifically to trajectories of psychopathology over time because they assess subtleties in the constructs that at this age are better at differentiating between-person differences in actual parental behavior.

Another measurement issue has to do with the manner in which the parenting behaviors were studied, as unique separate parenting dimensions. It is not clear whether parenting behaviors are best examined as categorical parenting styles (e.g., authoritative parenting, authoritarian parenting; Baumrind, 1991) based on simultaneous consideration of multiple dimensions, or as independent, continuous dimensions (e.g., psychological control; behavior control; Barber, 1996) as in this study. Underlying the use of parenting style typologies (as opposed to separate dimensions of parenting) are several assumptions about the nature of parenting behaviors, including (a) the belief that parenting behaviors are themselves correlated (e.g., parents who are warm tend to use positive behavior control strategies), and (b) the belief that the effects of one type of parenting behavior vis-à-vis child outcomes are dependent on the presence or absence of other parenting behaviors (i.e., there are interactive effects among parenting behaviors in regards to their relations to adolescent psychopathology). Although interactive effects were also examined in this study (discussed in a later section), previous work that has found parenting behaviors to predict trajectories of growth in psychopathology over time



considered multiple different parenting dimensions together in latent constructs. For example, in an examination of growth rates of internalizing and externalizing problems during adolescence, Scaramella and colleagues (1999) found that a latent parenting variable that was high in warmth, child management skill, and low in hostility exhibited both a compensatory and buffering effect (i.e. affecting levels and growth trajectories) on age related increases in externalizing problems, and a compensatory effect on levels of internalizing problems. Thus, it may be that the effects of the parenting behaviors studies herein do not act independently as they were analyzed, and results could be different if all three parenting behaviors were considered jointly, either categorically or as latent constructs.

Third, the lack of prediction of trajectories of psychopathology may reflect the timing of assessments of psychopathology in this study. The outcome variables of internalizing and externalizing problems were measured at baseline, three months, six months, and eighteen months. The prediction of individual differences of the same variables can vary greatly as a function of the time interval for data collection (for discussion, see Cole et al., 2002). Although we modeled time very specifically at the individual level, with each person's time intervals modeled separately, it may be that a shorter time period between assessments would have captured nuances of the relation between initial levels of parenting and growth in psychopathology that were lost or "washed out" by the length of time between assessments.

Fourth, for both practical reasons<sup>1</sup> and to decrease shared method variance (see Campbell & Fiske, 1959), parenting dimensions in this study were measured by child report and psychopathology was measured by parent report. It has been argued that

children's views of parenting are more important than parental self reports, because the meaning the child or adolescent ascribes to parental behavior likely is more important than the actual parental behaviors themselves (Boyce, et al., 1998). Presumably, it is adolescents' perceptions of parental behavior rather than the actual parental behaviors that shape the adolescents' reactions, as an affective response to the perceptions of aversive or supportive parenting, through modeling of the perceived parental behavior, etc. However, different effects are possible, given the moderate to low or non-significant correlations found between mother and adolescent reports of parenting behaviors (Bogels & Melick, 2004; Gonzales, Cauce, & Mason, 1996; Sessa, et al., 2001; Smetana et al., 2002). Using parental reports of their own parenting may have produced different results.

For instance, the magnitude of relations might vary as a function of the informant of adolescent psychopathology, since adolescents may be more knowledgeable informants of their own psychological states (Rowe & Kandel, 1997). There is some evidence that parents underreport or may be unaware of the development of psychopathology in their children's, particularly internalizing psychopathology, as compared with child self-reports (Cole et al., 2002; Garber et al., 2002; Weissman, et al., 1987). This could have served to attenuate the relations found in this study, or possibly change the shape of the trajectories. Although typically parents are considered better reporters of externalizing problems (Loeber, Green, & Lahey, 1990; Rowe & Kandel, 1997), by adolescence children may have greater knowledge of their externalizing psychopathology since they are aware of their behaviors across contexts (e.g., with peers, teachers) as opposed to parents who are only exposed to a subset of their total behavioral

repertoire (Stice & Barrera, 1995). Thus, our choice to use parent reports of psychopathology may have decreased the accuracy of the measurement of the construct, thereby attenuating the relations of psychopathology domains and parenting dimensions.

Further, regardless of whether parents underreported their children's psychopathology, given their likely history of difficult interactions with their adolescents and their resultant ingrained perceptions, noticing and capturing small changes of their youth's symptoms may be difficult and affected the trajectories studied herein. Cole and colleagues (2002) found that parent reports of child and adolescent depressive symptoms remained relatively constant over a period of six years, even though the variability of depressive symptoms varied systematically over development. Thus, our use of parent reports of psychopathology may have lowered the reported rate of change in psychopathology, thereby decreasing our ability to predict change in trajectories. Using different reporters of the constructs could have provided different results, as growth analyses of problem behaviors do vary by informant (see, e.g., Keiley et al, 2000).

Finally, the age of the participants in this study may have reduced our ability to predict individual differences in the rate of internalizing and externalizing problem development. The mean age of participants in this study was a little less than 15 years of age. Cole and colleagues (2002) recently found that individual differences in growth of some internalizing problems (i.e., depressive symptoms) were more variable earlier in development (i.e., age 10-12) than later in adolescence (i.e., age 14-16), when individual differences in depressive symptoms appear to have further stabilized. Thus, because the psychopathology outcome variables are fairly stable at this point in development, the parenting variables may not be predictive of change at this stage of development.

### Contemporaneous-Across Time Models: Within-Individual Changes in Parenting and Adolescent psychopathology over Time

Another goal of this study was to determine where within-individual changes in parenting behaviors were correlated with within-individual changes in adolescent psychopathology, above and beyond baseline levels of parenting behaviors. This is an important line of inquiry, because variables (e.g., in this study, baseline levels of parenting) that are associated with initiation of adjustment problems are not always the same as the variables that contribute to the amelioration or worsening of psychopathology (Sroufe, 1997; Steinberg & Avenevoli, 2000). To conduct this analysis as a nested model, within-person changes in parenting at Level 1 were centered on baseline levels of parenting so as to examine the effects of fluctuations in parenting behaviors above and beyond the baseline levels of parenting behaviors controlled at Level 2.

Warmth was the only parenting behavior dimension for variations across time were significantly correlate with variation of across time in adolescent psychopathology, specifically externalizing problems. That is, controlling for initial relations between warmth and externalizing, variations in warmth over time negatively covaried with variations in levels of externalizing problems. Parental contingent reinforcement and support (i.e., warmth) typically have been conceptualized as a parent-effect positively related to depressive symptoms (e.g., Burbach & Borduin, 1986; Cole & Rehm, 1986; Garber et al., 1997). In contrast, the relation between parental warmth and externalizing problems may likely be an adolescent driven effect, where decreases in aversive behaviors such as aggression and delinquency result in increases in parents' tendency to be warm and supportive of their adolescent.

What is particularly interesting to consider, however, is that although these contemporaneous relations with externalizing problems exist above the effect of initial level of parental warmth (i.e., Contemporaneous Across Time Models), initial levels of parental warmth did not predict the slope of adolescent externalizing problems (i.e., Launch models). From a parent-effects perspective, this finding calls into question a solely deterministic view of the effects of early parenting on later development. Instead, at least with regard to parental warmth, changes in these parent behaviors may affect the exacerbation or diminution of problem behaviors even during adolescence. Such findings have implications for the development of interventions for adolescent externalizing problems. From a child-effects perspective, these findings suggest that parents are susceptible to changing their show of warmth in response to behaviors associated with adolescent externalizing problems. This, too, has translational implications for clinicians working with parents of externalizing adolescents. Not only do they need to focus on teaching parents ways to respond to adolescent's externalizing behaviors, but also to be aware of how the adolescent's behavior can affect parents own affect and warmth in relation to their child.

#### Parenting Behaviors as Moderators in the Prediction of Psychopathology

We next examined whether the effects of the three parenting dimensions on adolescent internalizing and externalizing problems varied as a function of the level of other parenting dimensions. However, none of the parenting behavior dimensions interacted in predicting initial levels of adolescent internalizing or externalizing problems. Previous studies in this area have been mixed, with some studies failing to

find interactions among parenting behavior dimensions (e.g., Barber, et al., 1994; Garber, et al., 1997; Herman et al., 1997; Stice, Barrera, & Chassin, 1993) whereas others have found some evidence for interactive relations (Caron, et al., 2005; Galambos et al., 2003; Gray & Steinberg, 1999; Pettit & Laird, 2002). However, the manner in which parenting behaviors interact to predict psychopathology has varied across studies, and only one previous study has examined parenting behavior interactions as predictors of trajectories of adolescent internalizing and externalizing problems (Galambos et al., 2003). Our failure to find significant interactions among parenting behaviors in the prediction of initial level of psychopathology adds more evidence to it is appropriate to disaggregate parenting styles (e.g., authoritative, permissive; Baumrind, 1991) into their component dimensions when examining parent-child processes (Barber & Olsen, 1997; Herman et al., 1997). This conclusion is limited, however, as we did find one instance of a parenting behavior dimension interacting in a launch model to predict the slope of externalizing problems over time, and a case of parenting dimensions interacting in the contemporaneous across time model to predict internalizing problems.

The interaction in the Launch Model was a three-way interaction between psychological control, warmth, and time in the prediction of externalizing problems. More specifically, at high levels of parental psychological control, adolescents with parents displaying high and low levels of warmth start at close to the same level of externalizing problems, but the adolescents of parents displaying low levels of warmth (as compared to those with parents displaying high levels of warmth) end up with higher levels of externalizing problems at 18 months. Thus, at high levels of psychological control, parental warmth appears to have a buffering or compensatory effect with regard

to the effect of psychological control, perhaps via its effects on the adolescent's interpretation of the parents' behavior. From an adolescents' effects perspective, externalizing behaviors could invoke relatively higher levels of parental psychological control when the parent-adolescent relationship is not grounded in warmth or closeness, again perhaps because of a buffering effect of the closeness of the relationship on the parents' interpretations of the child's behavior.

In contrast, at low levels of parent psychological control the opposite effect occurs. Specifically, high levels of parental warmth are associated with an increasing linear trajectory at 18 months, as opposed to an essentially flat linear trajectory for adolescents with parents displaying low levels of parental warmth, perhaps the combination of low psychological control and low warmth reflecting a permissive parenting process (Baumrind, 1992; Maccoby & Martin, 1983). This overall pattern of findings is consistent with Pettit and Laird's (2002) study which found that higher parental use of psychological control when children were age 13 was associated with more delinquent behavior at age 14 (when parental involvement was low), but was associated with less delinquent behavior when parental involvement was high.

There was only one within-subject interaction found in the contemporaneous across time models. Specifically, warmth and behavior control interacted in the prediction of adolescent internalizing problems. This interaction indicates that the extent to which internalizing problems and parental warmth covaried within subjects across time differed as a function of the level of parental behavior control (and vice versa, in regards to parental behavior control and parental warmth). That is, the extent to which an adolescent's level of internalizing problems at a particular time point was predictable

from that his or her level of parental warmth at the same time point varied as a function of this subject's level of behavioral control. At low levels of behavior control, warmth was not related to an individual's level of internalizing problems. However, when an individual's behavior control was high (relative to that individual's initial level of behavior control), higher levels of parental warmth predicted lower levels of internalizing problems.

#### Curvilinear effects of Parental Behavior Control

Although typically researchers have conceptualized increased levels of behavior control as positive for healthy adolescent development (Steinberg, 1990), some authors have proposed that moderate rather than maximal levels of parental behavior control are optimal for development (Rollins & Thomas, 1979). Such theories suggest that excessive as well (as low levels of behavior control) may be maladaptive, fostering rebelliousness in adolescents that feel smothered when seeking developmentally appropriate levels of autonomy from parents (Stice et al. 1993). Typically, the potential negative effects of excessive behavior control have been considered with regard to externalizing behaviors such as reactive aggression, but have not been considered with regard to internalizing problems.

Similar to the lack of significant two-way interactions among the three parenting behavior dimensions, significant quadratic effects for behavior control were not found in relation to the *intercept* of either internalizing or externalizing problems. However, non-linear effects of behavior control were found to predict the *slope* of the trajectories of adolescent internalizing, but not externalizing problems. This finding was unexpected, as



previous work in this area has found quadratic effects for externalizing problems (Gonzales, et al., 1996; Mason et al., 1996; Stice et al., 1993; Weintraub & Gold, 1991). The lack of findings with adolescent externalizing problems in this study may relate to sample selection. For adolescents with clinically elevated levels of externalizing problems, many of whom have already been involved with the criminal justice system (Maughan, et al., 2000), it may be that their behavior mandates higher levels of behavior control than would be appropriate for less delinquent populations. Thus, ‘moderate levels’ of parental behavior control that are appropriate for less severely impaired populations may not be sufficient to effectively manage our more severely impaired sample’s behavior.

The finding of a significant nonlinear effect of initial levels of behavior control on the slope of adolescent internalizing problems was surprising. Moderate levels of behavior control were associated with an accelerating slope at 18 months (similar to high behavior control) and possibly the worst long-term outcome, i.e., highest levels of internalizing problems after 18 months, if the trajectory were to continue at the rate predicted at 18 months. Why moderate levels of behavior control might predict a trajectory of worse outcome with regard to internalizing problems is unclear, and future replication of this finding is needed before interpretation of the effect would be justified.

#### Specificity of Relations By Severity of Adolescent Externalizing Problems

For some but not all youth, during adolescence oppositional behavior escalates into full-fledged violence (Lerner et al., 1999). This suggests that the causal and developmental pathways may differ as a function of the seriousness of the externalizing

behaviors, and consequently there has been growing interest in determining whether the correlates and predictors of severe vs. less severe externalizing problems differ. Consequently, in the present study specificity analyses were conducted to determine whether parenting behavior dimensions related differentially to more versus less severe externalizing problems. Towards this end, a profile analysis approach (Tabachnick & Fidell, 1996; Timm, 2002) was used to determine whether the relation between the three parenting dimensions and less severe externalizing problems differed from those for more severe externalizing problems. None of these differential effects were significant, indicating that the relations with parental behavior control, psychological control, and warmth did not differ as a function of the severity of externalizing problems, at least based on the manner that we defined “severity” (see Lipsey & Derzon, 1998). Given that the causes of more “minor” forms of aggression may not be the same as for more serious forms of violence (Loeber & Hay, 1997), and recent interest in trajectory theories of antisocial and criminal development that posit different risk factors for chronic versus adolescent-limited offending (e.g., Fergusson, Horwood, & Nagin, 2000; Moffit, 1993; Nagin, Farrington, & Moffit, 1995; Sampson & Laub, 1993), these findings were unexpected. However, they were consistent with a recent study by Fergusson & Horwood (2002) who found a common set of etiological factors associated with property offending (i.e., presumably less severe) and violent offending (i.e., presumably more severe).

Theories developed by Moffit (1993) and Patterson and colleagues (1989; 1997; 1998) suggest differential pathways to different severities of externalizing problems. Specifically, Moffit (1993) proposed two general subpopulations of externalizers. One

group reflects a “child-onset” population who exhibit neurocognitive deficits and difficult temperament from childhood, and such deficits serve to interact with the family environment such as to reinforce externalizing behaviors, setting a “life-course” trajectory of externalizing problems. A second, presumably less “severe” subpopulation is made up of “adolescent-limited” offenders who engage in externalizing behaviors only during adolescence, largely due to the influence of delinquent peers.

Patterson (1996) has developed a somewhat different account of the development of early versus late onset delinquency. Specifically, those who exhibit early onset delinquency that leads to more severe and pervasive problems, are presumed to be shaped largely by family interaction patterns starting in early childhood. Parents’ capitulation to children oppositional behavior is hypothesized to serve as a negative reinforcer for the oppositional behavior, ultimately teaching the child that oppositional, aggressive behavior will be reinforced, thus increasing the likelihood the child’s negative behavior will re-occur. This pattern develops over time starting in toddlerhood, with increasingly poor parental monitoring, poor discipline, and impaired family problem solving that leads to the development of even more severe forms of externalizing problems during later childhood and adolescence. Later onset externalizers are presumed to have fewer of the familial and parenting risk factors early in life. Instead, their problems develop later, after they have developed more normative social skills and peer relationships. Although they are influenced by parent-adolescent conflict and deviant peers during adolescence, their problems are less severe and their better developed social skills allow them to get jobs and start families, which ultimately limits their antisocial, externalizing behaviors (Patterson & Bank, 1989).

It may be that the majority of the adolescents in our study fall into Moffit's (1993) "life course persistent" group. Differences in the relations of parenting behavior dimensions to less versus more severe problems may not have been found because our sample may have been restricted to adolescents likely to have had longstanding externalizing problems and dysfunctional parenting systems. Thus, the less severe externalizing problems may reflect a stage in the adolescents' life course beyond which they have moved, to more severe problems. On the other hand, our results may reflect a reality that parenting risk factors related to more or less severe externalizing problems are the same, as Fergusson and Horwood (2002) found for measures of family functioning. Further, in a secondary analysis examining property versus violent offending, Fergusson and Horwood (2002) found that risk factors for both types of offending showed an identical pattern of results. Thus, these results coupled with those of our study suggest that the parenting behaviors studied herein may relate in similar ways to externalizing problems regardless of level of severity.

The question of severity of externalizing problems is particularly important, given the substantial societal impact and consequences that result from severe externalizing problems (Knapp, 2001). Should particular risk factors be identified that are specific to very severe externalizing problems, these would be important first targets for intervention in highly disturbed populations. These types of analyses that compare correlates and predictors of more vs. less severe forms of specific types of psychopathology also may be useful in regards to other psychopathology domains, such as internalizing problems (e.g., depressive symptoms). Some of the parenting behaviors shown to be related to depressive symptoms such as poor communication, an unsupportive emotional

relationship, and poor monitoring (Hartos & Power, 2000; Vazsonyi, Hibbert, & Snider, 2003) have also been found to relate to more severe behaviors such as adolescent suicidality as well (Evans, Hawton, & Rodham, 2004). If certain of these parenting behaviors were found to be risk factors that differentiated between depressive symptoms alone versus suicidal ideation and possible escalation to full scale suicide attempts, this would have significant implications for suicide prevention programs and public health. Future studies should consider conducting specificity analyses for multiple risk factors and correlates for both internalizing and externalizing problems.

#### Reciprocal Models: Adolescent Psychopathology predicting Parenting Dimensions

An alternative model to initial levels of parenting set a growth trajectory of adolescent internalizing and externalizing problems (i.e., Launch models) is involves the converse, with initial levels of adolescent psychopathology domains predicting the trajectories of parenting behaviors over time. To examine this possibility that such “child effects models” would provide the best fit for the data, we tested these reciprocal models as well. Similar to the results of the Launch models wherein parenting behavior dimensions served as predictors of adolescent psychopathology, neither adolescent internalizing nor externalizing problems predicted the trajectories of parenting behaviors over time. Thus, the intercepts of parenting behaviors and adolescent psychopathology were correlated with each other, but the slope of the parenting behaviors over time was not related to initial psychopathology levels. One possible explanation for these findings is that risk factors often become stable over time (Loeber et al., 2000; Sameroff, Bartko, Baldwin, Baldwin, & Seifer, 1998), and therefore the magnitude of the relation between

possible risk factors such as parenting behaviors and an outcome may depend on when in a child or adolescents' life that they are measured.

Individual differences in child behavior and temperament, however, have consistently been found to be important contributors to parental behavior (e.g., Lengua & Kovacs, 2005). Presumably, the aversive nature of adolescent externalizing problems can cause parents to react to behaviorally difficult adolescents by resorting to all available means of control, reflecting development of a coercive process (Galambos, et al., 2003; Patterson, 1982; 1997). Although some longitudinal studies suggest parents ultimately decrease positive strategies (e.g., appropriate behavior control) in response to increasing child deviance (e.g., Kerr & Stattin, 2003), use of more negative types of control has been shown to continue to increase with increasing child and adolescent behavior problems (Scaramella et al., 2002; Stice & Barrera, 1995).

Why were such adolescent-driven processes not evident in the reciprocal models analyzed in this study? There may be several reasons. First, because we were interested in the adolescent psychopathology broadly speaking (i.e., externalizing problems and internalizing problems), we did not assess specific temperamental variables considered important in child effects models such as emotional reactivity, fearfulness, irritability, behavioral inhibition, negative emotionality, and novelty seeking (Barnow, Lucht, & Freyberger, 2005; Calkins, Smith, Gill, & Johnson, 1998; Eisenberg et al., 2005; Lengua & Kovacs, 2005; Rothbart & Bates, 1998; Scaramella & Conger, 2003). Thus, our broadband psychopathology indices may either not have captured, or washed out, the items that tap important temperamental variables which have been shown to predict parenting behaviors. Further, we did not assess adolescent behavior in interaction tasks

(e.g., see Scaramella & Conger, 2003), which may have been more likely to capture parenting behavior responses to difficult adolescent temperamental variables. It will be useful for future studies to assess temperamental variables shown to relate specifically to adolescent internalizing (e.g., shyness, fear), externalizing (e.g., effortful control, behavioral inhibition, irritability; impulsivity), and psychopathology in general (e.g., frustration), and use growth analyses to determine whether the temperamental variables predict parenting behavior trajectories over time (see Eisenberg et al., 2005; Oldehinkel, Hartman, De-Winter, Veenstra, & Ormel, 2004).

Using longitudinal regression analyses, Lengua & Kovacs (2005) found bidirectional relations between temperament and parenting of 8-11 year old boys, with child fearfulness and positive emotionality predicting higher levels of maternal warmth and acceptance, whereas child irritability predicted greater inconsistent discipline, controlling for initial levels of both temperament and parenting. However, these authors also found that both parenting behavior and child temperament variables demonstrated unique effects in predicting child internalizing and externalizing problems.

### Strengths and Limitations

A number of strengths and limitations are necessary to consider in order to appropriately interpret the results of this study. One strength is that this work simultaneously examined multiple parenting behaviors, using hierarchical linear models that allow for the prediction of individual differences over time, and exploring complex relations such as specificity analyses, parenting behavior moderators, and reciprocal designs. However, certain methodological limitations limit the generalizability and

implications of our findings. First, only adolescents whose parents were interested in participating in an MST treatment study were involved in this investigation, and our results therefore may not be generalizable to samples that have not had this selection factor. Selecting participants from Moderate Intervention Program classrooms increased the likelihood that participants had elevated psychopathology scores. Although this selection process avoided selection problems inherent with clinic-referred samples (Angold & Rutter, 1992), it is possible that our selection process results in a restricted range of psychopathology. However, the baseline t-scores ranged from 34 to 81 for internalizing problems, and 50 to 85 for externalizing problems, indicating that there was large variability in baseline levels of psychopathology, at least based on parent-report. Further, examination of individual differences allows examination of parameters of change for each individual, decreasing traditional difficulties in predicting change over time with relatively stable constructs such as parenting and psychopathology. Still, it is not certain that the results are generalizable to community samples of adolescents with nonclinical levels of psychopathology. However, Fergusson & Horwood (2002) recently showed that the familial predictors of externalizing problem trajectories are the same, regardless of whether the externalizing problems were high/chronic or low risk behaviors.

As noted previously, parenting behavior dimensions were measured by adolescent report and adolescent internalizing and externalizing problems were measured by parent report. Given the moderate to low correlations found between mother and adolescent reports of parenting (Gonzales, Cauce, & Mason, 1996; Sessa, et al., 2001; Smetana et al., 2002), and the fact that the levels of psychopathology reported and modeled in growth trajectories vary by informant (Garber et al., 2002; Keiley et al, 2000), our results



may specific to the informants used. Further, using latent variable modeling with multiple indicators of each variable could decrease measurement error that may have resulted in underestimation of the coefficients in this study (see Loehlin, 1998).

Second, the decision to focus on the two main broadband psychopathology domains of adolescent internalizing and externalizing problems rather than narrowband domains such as depressive or aggressive symptoms, or formal diagnostic categories (e.g., Major Depressive Disorder, Conduct Disorder) may have influenced the results. For example, findings specific to a narrowband psychopathology domain (e.g., anxious symptoms) could have been washed out by using the broader internalizing outcome variable that includes anxious, depressed, withdrawn, and somatization symptoms. Although continuous measures of psychopathology tend to more effectively capture subtle fluctuations in symptoms, studies of categorical disorders allow for examination of predictors of onsets, recurrences, and remissions of DSM-IV diagnoses by using statistical techniques like survival analysis. Such information cannot be captured by continuous measures like those used in this study.

Third, the relation between internalizing and externalizing problems in our sample was fairly high. It is possible that the magnitude of this relation was a function of our sample selection procedure, which in turn might suggest limits to the generalizability of our results. However, in a sample of over 1,400 non-referred preadolescents, Cole and Carpentieri (1990) found a correlation of .73 between depression and conduct disorder factors, which suggests that the strong relation between internalizing and externalizing problems that we found in our selected sample probably was not a function of our selection process.

Fourth, as mentioned previously, the timing of assessments may have affected the shape of the growth trajectories. Both psychopathology and parenting behaviors were measured at baseline, approximately three months, six months, and eighteen months. The prediction of individual differences of the same variables can vary greatly as a function of the time interval over which the data were collected (see Cole et al., 2002). It may be that a shorter time period between assessments might have captured different aspects of the relation between initial levels of parenting and growth in psychopathology that were lost or “washed out” by the length of time between assessments. Given the likely proximal effects of parenting behaviors on adolescents’ emotional states, closer timed assessments may have been more sensitive for addressing the questions examined in this study.

Fifth, our results were likely affected by the present study was part of a larger treatment outcome study. Although the effects of treatment were controlled in all analyses, Multi-systemic therapy acts largely through its ability to change maladaptive parenting behavior patterns (Huey, et al., 2000). Thus, there was a risk that the effects of changes parenting behavior on adolescent internalizing and externalizing problems could have been captured in the treatment status control variable, thereby decreasing the observed relations between the parenting behavior dimensions and intercepts and slopes of these two psychopathology domains. However, we tested for this effect by removing the treatment status variable from analyses, and there was little difference in the results.

Sixth, although we controlled for the main effect of gender in our analyses, we did not examine gender or ethnicity as possible moderators of the relations among parenting behavior dimensions and adolescent psychopathology domains. Although gender may

moderate relations, it is unlikely that we would have found those effects as the present sample was 84% male. Some (e.g., Deater-Deckard et al., 1996) but not all studies have found that effects of certain parenting behaviors vary as a function of ethnicity, and thus failing to carry out similar analyses may be a limitation to the study. Similarly, our relatively large age span including both middle and high school students may have affected the shape of the trajectories studied herein. Although we controlled for age effects on level of psychopathology as well as on rate of change in both internalizing and externalizing problems, we only found one significant effect with increasing age relating to increased levels of internalizing problems.

Finally, although the longitudinal nature of the launch models had the potential to provide evidence of temporal precedence, direction of causality between parenting behavior dimensions and adolescent internalizing and externalizing problems cannot be determined for either the launch or contemporaneous across time models. This study neither rules out nonspuriousness (see Kenny, 1979) which is a criterion for a variable to be considered a causal factor, nor conducts an experimental manipulation with regard to the parenting behaviors themselves. It may be that (a) parenting dimension causes or perpetuates child psychopathology (e.g., Ge et. al., 1996), (b) child psychopathology elicits certain parenting behavior dimensions (e.g., Bell, 1968), and / or (c) unassessed third variables (e.g., heredity, e.g., Deater-Deckard & Plomin, 1999) are responsible for child psychopathology as well as parenting behavior dimensions.

## Conclusion

The present study assessed the role of parenting behaviors in the exacerbation or diminution of adolescent internalizing and externalizing problems over time. Although fewer relations were found than hypothesized, adolescent psychopathology domains were predicted by parenting behaviors in different ways across the outcome variables, both as unique predictors and in conjunction with each other in the parenting moderator models. In general, initial levels of the parenting behavior dimensions related to levels of both psychopathology domains, but did not interact with time, suggesting initial levels of parenting did not set a course for psychopathology development over the time points and ages measured in this study. There were a few exceptions, however, with initial levels of parental warmth and psychological control interacting in predicting the trajectory of adolescent externalizing problems, and curvilinear effects of initial levels of behavior control predicting adolescent internalizing problems. These results, coupled with the contemporaneous across time findings of changes in parental warmth varying with externalizing problems, suggest that there is continued need to consider a broad range of possible ways that parenting may affect the development of childhood and adolescent psychopathology. The question is not whether parenting matters, but how.

Future research would benefit from consideration of more specific adolescent outcomes such as narrowband psychopathology domains. For example, externalizing problems include disparate facets such as oppositionality, impulsivity, overactivity, aggression (i.e., verbal and physical), and both covert and overt antisocial conduct problems. Each of these problems occurs in familial contexts that may be varied and

differentially affected by particular parenting behaviors (or vice versa, with these different behavior problems inciting varying parental responses). Further, although this study did simultaneously consider multiple parenting behavior dimensions in the models, co-occurring psychopathology domains were not considered jointly in the models. Given the high co-occurrence of internalizing and externalizing problems, consideration of these within the same models becomes essential for elucidation of causal pathways between parenting behaviors and adolescent outcomes.

Overall, this study is consistent with a developmental psychopathology approach to examining child and adolescent development. From this perspective, the interlocking nature of relations within the family are considered a particularly important influence in shaping individual psychopathological outcomes. As a result, adolescent development cannot be considered or fully understood without joint consideration of historical and simultaneous behaviors of other important people in their lives. Future work in this area would benefit from joint consideration of peers, siblings, teachers, and other important individuals that affect growth, development, and mental health of adolescents.

#### Footnote

<sup>1</sup> Based on the recommendations of my dissertation committee (9/24/03), to decrease the number of models analyzed in this study, it was decided that both parenting and psychopathology dimensions would be examined from one reporter only. This change was documented in the “Dissertation Update memo” sent to all committee members on 10/15/04, and approved by all members.

## APPENDIX A

### The Nine Principles of Multisystemic Therapy

(Heneggeler, et al., 1998)

1. The primary purpose of assessment is to understand the fit between the identified problems and their broader systemic context.
2. Therapeutic contacts emphasize the positive and use systematic strengths as levers for change.
3. Interventions are designed to promote responsible behavior and decrease irresponsible behavior among family members.
4. Interventions are present-focused and action-oriented, targeting specific and well defined- problems.
5. Interventions target sequences of behavior within and between multiple systems that maintain the identified problems.
6. Interventions are developmentally appropriate and fit the developmental needs of youth.
7. Interventions are designed to require daily or weekly effort by family members.
8. Intervention efficacy is evaluated continuously from multiple perspectives with providers assuming accountability for overcoming barriers to successful outcomes.
9. Interventions are designed to promote treatment generalization and long-term maintenance of therapeutic change by empowering caregivers to address family members' needs across multiple systemic contexts.

## APPENDIX B

### Severity Groupings of Externalizing Behaviors

#### More Severe

Gets in many fights  
Physically attacks people  
Runs away from home  
others  
Sets fires  
Steals outside the home  
Truancy, skips school  
Uses alcohol or drugs  
Vandalizes property  
Destroys things belonging to others

#### Less Severe

Argues a lot  
Bragging, boasting  
Cruelty, bullying, and meanness to  
others  
Demands a lot of attention  
Disobedient at home  
Disobedient at school  
Shows off  
Teases a lot  
Has a hot temper  
Swearing or obscene language  
Lying / Cheating



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