Family Systems in the Context of Child Risk: An Observational Analysis

by

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ABSTRACT

Family plays an important yet understudied role in the development of
psychopathology during childhood, particularly for children at developmental
risk. Indeed, much of the research on families has actually concentrated more on
risk processes in individual family members or within-family subsystems. In
general, important and complex associations have been found among family-
related constructs such as marital conflict, parent-child relationships, parental
depression, and parenting stress, which have in turn been found to contribute to
the emergence of children's behavioral problems. Research has begun to emerge
that certain family system constructs, such as cohesion, organization, and control
may influence children's development, but this research has been limited by a
focus on parent-reports of family functioning, rather than utilizing observational
methods. With notable exceptions, there is almost no observational research
examining families of children at developmental risk.

This study examined the longitudinal relations among family risk and family
system constructs, as well as how family systems constructs mediated the
relations between family risk and child outcome. Further, the study examined how
developmental risk moderated these relations. The sample followed 242 families
of children with and without developmental risk across the transition-to-school
period. Family risk factors were assessed at 5 years, using parental reports of
symptomatology, parenting stress, and marital adjustment, and observational
assessments of the parent-child relationship. Family system constructs (cohesion,
warmth, conflict, organization, control) were measured at age 6 using structured

observations of the entire family playing a board game. Child behavior problems and social competence were assessed at age 7.

Results indicated that families of children with developmental delays did not differ from families of typically developing children on the majority of family system attributes. Cohesion and organization mediated the relations between specific family risk factors and social competence for all families. For families of typically developing children only, higher levels of control were associated with more behavior problems and less social competence. These findings underscore the importance of family-level assessment in understanding the development of psychopathology. Important family effects on children's social competence were found, although the pathways among family risk and family systems attributes are complex.

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Overview

Family plays an important yet understudied role in the development of psychopathology during childhood. Indeed, much of the purported research on families has actually concentrated more on risk processes in individual family members or within-family subsystems such as dyadic relationships (Cowan & Cowan, 2006). In general, important and complex associations have been found among specific family-*related* constructs such as marital conflict, poor parent-child relationships, parental depression, and parenting stress, which have in turn been found to contribute to the emergence of children's behavioral problems (Cummings, Davies, & Campbell, 2000). Still, little research has examined the impact of the *whole* family system on the emergence of psychopathology during childhood (Cox & Paley, 1997; Minuchin, 1985), and the way in which family system functioning may mediate the relations between these risk factors and child psychopathology. Family theory as well as emerging research indicates that certain family system constructs, such as cohesion, conflict, and control, influence children's development (Burt, Cohen, & Bjorck, 1988; Halpern, 2004), and parents may behave differently within the family system than they do in more well studied dyadic contexts (Lindsey & Caldera, 2006). As such, studies of whole family interaction are likely to add critically to our understanding of the mechanisms by which psychopathology develops in children.

Family research has most often focused on typically developing children and parents (Kerig, 2001). Yet, when children are at risk, a variety of additional stressors are present within the family system (Crnic, Friedrich, & Greenberg,

1983). One example of a child risk factor is the presence of early developmental risk in the child. Early developmental risk is of particular importance because such children are three to four times more likely to develop a comorbid behavior problem (Baker, Blacher, Crnic, & Edelbrock, 2002). However, with notable exception (Mink, Nihira, & Meyers, 1983), little research has addressed the characteristics or unique features of the family systems of these children. Whether the same family processes have equivalent effects across families with and without children at early developmental compromise is an important area of inquiry with implications for general risk theory.

Despite the apparent salience of system level constructs to families of risk and non-risk children, research has lagged significantly. One of the major limitations of whole family system research to date has been a rather exclusive focus on self-report methodologies that seek an individual's assessment of whole family functioning (Moos & Moos, 1981). Although such report has value, it is arguably less a systemic assessment than an individual's psychological appraisal susceptible to traditional biases inherent in such methods. Observational methodologies brought to bear on system constructs would add invaluably to the methodological rigor in the area. Available dyadic and triadic subsystem observations improve the method, but a clear need remains for observational approaches that address whole family system constructs.

Utilizing a longitudinal model, the current study will test a model for the development of psychopathology and social competence during the transition to school age in which family processes play a central role. The research will

provide a more comprehensive understanding of observed systemic family interactions and key predictors in families of children with either high or low developmental risk. A multi-modal measurement approach (inclusive of structured and naturalistic home observations, mother and father self-report, and teacher report) will be used to address the constructs of interest across child ages 5, 6, and 7. This study will provide the opportunity to longitudinally explore important public health issues related to the whole family system, its antecedents, and the sequelae for children at risk during the transition to school period.

History of Family Systems

The family has long been considered a critical influence in the development of children's competence and often for the emergence of psychopathology. Yet, it was not until the middle of the 20th century that research first began to explore complex marital and family relationships (Cowan & Cowan, 2006). During that time, theorists began to conceptualize families in multiple ways, eventually merging into theories of family systems.

Systems research was not originally focused on families, or even on psychology, but rather in finding similarities across disciplines as varied as physics and economics. Ludwig von Bertalanffy (1950) theorized a "general systems theory" in which the same laws that applied to a biological system could also apply to a psychological, economic, or chemical system. In finding these similarities, von Bertalanffy (1950) defined a system as any complex of mutually interacting elements. A key concept in systems theory is wholeness, and the implication that a change in one element causes changes in all the other elements

and the system as a whole. Wholeness is in contrast to previous ideas of summativity, where each element acts independently and the system is simply the sum of all elements. As von Bertalanffy (1950) stated, "You cannot sum up the behaviour of the whole from isolated parts, and you have to take into account the relations between the various subordinated systems and the systems which are super-ordinated to them in order to understand the behaviour of the parts" (p. 148).

Von Bertalanffy's general systems theory was revolutionary at the time of its conception, along with his concepts of open and closed systems. Open systems are systems in which people, materials, and ideas can enter and depart; the system's environment can change. Today, almost no systems are thought of as completely closed, although the degree of openness varies widely. In contrast to a more closed system, such as an electrical system in one's home, all individuals and families are inherently open systems where the environment is much more modifiable. As such, equifinality and multifinality are possible. Following von Bertalanffy's work, a number of theorists began to apply systems theory to their field of research, including personality theory (Allport, 1960). The Palo Alto Research Group, led by Don Jackson, Gregory Bateson, Jay Haley, and colleagues (Watzlawick, Beavin, & Jackson, 1967) began to examine the family as a system, something von Bertalanffy had never specifically investigated. They began their research by examining how human interaction and communication acted in systematic ways, the family being what they considered the best example. Their definition of an interactional system was "two or more communicants in the

process of, or at the level of, defining the nature of their relationship"
(Watzlawick et al., 1967, p. 121).

In addition to translating ideas such as wholeness, summativity, and equifinality into more familial concepts, these family theorists also incorporated newer ideas about feedback loops, rules, and homeostasis into their work, adding greater complexity and depth to family systems theory. The Palo Alto group (Watzlawick et al., 1967) hypothesized that all families face stressors and encounter difficulties. Ideally, families should evolve slowly over time; too much or too little change could be detrimental. Yet, many families remained remarkably stable in spite of such troubles. Families that do not evolve are said to be in "family homeostasis," which is maintained by negative feedback loops (Jackson, 1957; White & Klein, 2008). Feedback loops describe a process in which the output, or "behavior" of the system affects the environment, which in turn affects the system. These loops occur constantly over time, between and within subsystems. For example, two parents may have a conflictual marriage, which in turn affects the child's behavior, which in turn continues to affect the marriage. In contrast to positive feedback loops, that provoke evolution and change in the system, negative feedback loops and homeostasis operate to bring the family back to its original state, creating repetition of the same maladaptive patterns and leading families to be more resistant to change.

Although Bateson and colleagues utilized systems theory in their development of family systems, they were also influenced by the concurrent interest in schizophrenia research that was occurring in the 1950s (Cowan & Cowan, 2006).

Previously, psychologists had believed that schizophrenia was the result of schizophrenogenic mothers, who acted in contradicting ways, confusing their children and thus causing schizophrenia (Bateson, Jackson, Haley, & Weakland, 1956). Although these theories were eventually shown to be false, efforts to find the cause and treatment of schizophrenia resulted in the emergence of family therapy. Murray Bowen took this a step further, becoming one of the founders of systemic family therapy (1978). Bowen examined unbalanced families, where the families were either too distant or enmeshed and lacking differentiation of self. Bowen emphasized the importance of boundaries, where boundaries that were either too rigid or absent would lead to problematic family interactions. In addition, Bowen suggested that two members of a family that fought would form a "family triangle" and each would attempt to engage a third member to side with them. Bowen hypothesized that these enmeshed and triangulated relationships were particularly problematic in families with a schizophrenic member.

Bateson and colleagues (1956) incorporated these concepts of the schizophrenogenic mother and distorted family relations into another theory of family systems. Their "double bind" hypothesis of schizophrenia postulated that in certain families, two or more people are engaged in a particularly divisive and conflicting set of family rules. A child may be given sets of contradictory demands, both of which have negative consequences, so that there is no way for the child to succeed. Due to family rules, homeostasis, and feedback loops, the child is incapable of leaving the situation and this pattern of negativity and contradiction continues, eventually leading to schizophrenia.

In creating structural family therapy, Salvador Minuchin (1974) utilized the basic tenants of family systems that had been conceptualized by his predecessors. Minuchin incorporated von Bertalanffy's concepts of wholeness and equifinality, Bowen's work on enmeshment, as well as the concepts of family rules, into the formation of the structure of the family. In particular, Minuchin's theory of family development concentrated on the hierarchal nature of families and the importance of maintaining structure and boundaries. Minuchin diagramed the structure of families, examined hierarchies and power struggles within the families, and intervened in order to work on boundaries and balance within the system.

In examining the emergence of family theory, one can recognize multiple core concepts that have developed over the course of the last century (Cowan & Cowan, 2006; Cox & Paley, 1997). The most important may be that of wholeness, where the whole family is conceptualized as a different entity from any individual or subsystem, and is not represented simply by the sum of its parts. Inherent in the concept of wholeness is that the family system is affected both by individuals and subsystems. These relationships (i.e. marital, parent-child) have separate and important influences on the family. The boundaries between these systems also may be rigid or enmeshed, so that any subsystem may have differential influence on the family. Another key notion is homeostasis; that the family is able to self-regulate, in both helpful and hurtful ways, to maintain order. But families also have both a structure and a way in which they function (or process). Families can be described in static ways, from marital status to size of family to number of subsystems. Yet, families can also be represented in more descriptive ways (i.e.

level of conflict, level of closeness) that can change and evolve over time. Lastly, causality is not unidirectional. Any change in one part of a family system can produce change in other parts and the system as a whole, and this change continues to occur and evolve over time. Sameroff (1975) later termed this concept between parents and children as "transactional" in that influences are bidirectional and occur across time. Overall, these foundational ideas of the family as a system are vital to our understanding of both family and child development today.

Family Risk Theory

Although family systems models were prevalent throughout the 1970s, research eventually turned its focus away from the whole system and began to examine family risk and family process. Models of family risk are rooted in developmental psychopathology and generally examine the multitude of factors that underlie pathways of children's adaptation or maladaptation. In contrast to prior research that focused on one risk factor (i.e. parental symptomatology), models of family risk examine how multiple individuals and subsystems may be involved in child or parent adaptation. There are multiple ways in which to conceptualize family risk, although two specific models have been key to developmental conceptualizations.

One early model conceptualizing family risk was Belsky's (1984) determinants of parenting model. Belsky theorized that parental quality and functioning is determined by the degree of support from three different subsystems. The first subsystem is the personal resources of the parent, including

parental well-being and personality. Child characteristics are the second subsystem, and other contextual sources of support and stress are the third. This model was recently updated (Belsky and Jaffee, 2006) to also incorporate the influences of the marital/partner relationship and the neighborhood. Parenting is generally buffered against a threat to any one subsystem, but the more subsystems under stress, the lower the quality of parenting. Aside from the concept of buffering, the determinants of parenting may be considered to be more of a summative model. The more resources and subsystems functioning properly, the better the quality of parenting.

A more recent model of family risk expanded the number of potential subsystems that may be involved in children's development. Cowan and Cowan (2006) have proposed a six-domain family risk model for children's adaptation to elementary school in which the critical domains include (1) individual characteristics (mother, father, child), (2) marital adjustment, (3) parent-child relationship quality (mother-child, father-child), (4) intergenerational family patterns, (5) stress, work, and social support, and (6) sibling relationships. Although the scope of Cowan and Cowan's model is somewhat more extensive than Belsky's (1984) model, both models of family risk solely examine how family subsystems affect individual adaptation. Family risk models account for a number of subsystems and individual factors, and perhaps assume that by doing so, they have measured the effect of the family system. However, the assumption that families act in summative ways ignores how the family system and higher-order family constructs may act differentially.

Current Definitions

Perhaps one reason that whole family systems research has lagged is that definitions and terminology regarding the family have varied over time, and are often used inconsistently. System constructs are difficult to capture, and no definition has been free of critique. However, clear definitions are imperative to support ongoing research. For the purposes of this paper, the term family systems will be used to describe the higher-order relationship processes present in the family that develop and change across time and various compositions of the family. These family system attributes would reflect overarching characteristics that are descriptive of the whole family. One example may be cohesion, or the degree to which the family unit is unified and emotionally close as a group. It cannot be represented solely by examining dyadic interactions of pairs of family members and then creating a composite index because it is a higher-order process that operates at the level of the group, and as each member is added the nature of cohesion is likely to change on the basis of the dynamics of that addition.

Family process is differentiated from family systems in that it involves individual, dyadic, or contextual factors that affect and influence the family system (i.e. marital adjustment, parental symptomatology, parent-child relationships, parenting stress). Although family process factors can be either beneficial or detrimental, the degree to which family process factors increase risk in the family system will be referred to as "family risk." Although an understanding of family risk is valuable, it is not a substitute for research that addresses the nature of the family system.

Current Research on Family Systems

    Dyadic versus triadic relationships. As much of the literature on families

has focused on family process, rather than a specific interest in family system

attributes, research on the importance of family systems has lagged. Yet, the

existing literature does support that concepts of wholeness and broader family

interactions are important in family development. Furthermore, examining dyadic

relationships is not a substitute for examining whole families in that family

members behave differently in dyads than they do in when in triadic interactions

(Gjerde, 1986).

    An early study by Clarke-Stewart (1978) examined mother-child relations

when the father was either present or absent from the room. Using matched pairs

of families, Clarke-Stewart found that mothers were less verbally responsive and

initiated less play with their child when the father was present in the room (versus

elsewhere in the house). Although this early study has multiple limitations,

including a small and cross-sectional sample, it provides some insight into

potential differences when both parents are present. More recent research

continues to suggest that mothers are less involved, less sensitive, and more likely

to display negative emotion in triadic interactions (Lindsey & Caldera, 2006).

Yet, mothers do not seem to have consistently poorer parenting in triadic

interactions. Lindsey and Caldera (2006) also found that mothers were more

likely to have positive emotions in triadic contexts, and Johnson (2001) found no

differences in maternal warmth were found across contexts. These apparently

conflicting findings may be due to issues of using different measurements, but

may also indicate that level of involvement, which appears lower in triadic interactions, and degree of emotion, where the findings are more inconsistent, are qualitatively different aspects of family interactions. Thus, the effects of triadic interactions on parenting may be more nuanced in ways that are not entirely well understood.

Similar to mothers, fathers may also be less engaged in triadic interactions. In a study of fathering behavior, Goldberg, Clarke-Stewart, Rice, and Dellis (2002) found that in comparison to father-child dyadic interactions, fathers talked less, showed less affection, and engaged in less physical and object play in triadic interactions (although level of social play was equal across interactions). Overall, findings that parents are less engaged with children in the context of triadic interactions appear to hold across developmental periods from infancy to adolescence (Johnson, 2001; Lytton, 1979; McHale & Rasmussen, 1998; Smetana, Abernethy, & Harris, 2000), although the research is marred by relatively small samples (majority have samples between 15-80 families).

Differences between dyadic and triadic parenting also appear to hold true across typically developing families and families of children with difficulties. Burhmeister, Camparo, Christensen, Gonzalez and Hinshaw (1992) compared dyadic and triadic interactions in sons with and without ADHD. Both mothers and fathers were more engaged in dyadic in comparison to triadic interactions. Additionally, in contrast to other studies that focused solely on parent attributes, sons also behaved differently in dyadic and triadic interactions. Sons were more resistant toward and less engaged with their fathers in triadic interactions, and

warmer and more expressive in dyadic interactions with both parents. Thus, not only does it appear that the behavior of parents changes in triadic observations, but children's behavior may also change.

Family systems and emerging psychopathology in children. Given that parents behave differently in dyadic and larger family interactions, it is essential to study not just dyads, but the entire family system for its contribution to the development of psychopathology in children. Indeed, evidence suggests that family system attributes (i.e. low cohesion, low expressiveness, enmeshment, conflict, control, and low organization) have been associated with a number of child mental health problems, including behavior problems (Halpern, 2004; Kerig, 1995; Pettit & Bates, 1989; Schoppe, Mangelsdorf, & Frosch, 2001; Stadelmann, Perren, von Wyl, & von Klitzing, 2007), anxiety (Burt et al., 1988; Jacobvitz, Hazen, Curran, & Hitchens, 2004), depression (Jacobvitz et al., 2004; Park, Garber, Ciesla, & Ellia, 2008; Steiner, 1992), poorer academic achievement (Smith, Prinz, Dumas, & Laughlin, 2001), and social difficulties (Bullock & Pennington, 1988; Feldman & Masalha, 2010).

The majority of research analyzing the relations between family attributes and child outcome has utilized self-report measures of family environment. Halpern (2004) found that lower family cohesion, as measured by the Family Environment Scale (FES; Moos & Moos, 1981, 1986) was a significant predictor of both externalizing and internalizing behaviors in preschoolers. Other work has also found that mothers who rate their families as less cohesive also rate their children as having higher externalizing symptoms (Kerig, 1995). Additionally, Park et al.

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(2008) formed two latent factors of positive and negative family environment by using both maternal and child self-reports of family environment (including constructs such as cohesion, expressiveness, and conflict). Both positive and negative family environments were associated with children's depression, in the expected directions.

Using multiple self-report and interview measurements of family systems, Smith et al. (2001) examined the influence of the family on problem behavior, social competence, and academic achievement in African-American families. Their findings demonstrated complexity in the relative importance of different family constructs. While higher levels of cohesion, structure, and beliefs about family purpose were associated with higher levels of social competence, only structure and beliefs were related to academic competence. With regard to child behavior, structure emerged as the only important predictor. Overall, important information about the nature of family systems and child development have been revealed with self-report measurements, yet there are inherent biases in having parents rate both the family environment and their child's behavior. Multi-method approaches are necessary in order to more fully understand the relations among family systems and child psychopathology.

Importantly, family system constructs have been shown to be strong predictors of child functioning, even after controlling for more well-studied family risk factors, such as parental depression and marital adjustment. Jacobvitz et al. (2004) used observational family interactions at child age 2 to identify balanced, enmeshed, disengaged, and hostile family interactions. Five years later,

enmeshed, disengaged, and hostile family interactions were still associated with child depressive symptomatology, anxiety, and attention-deficit disorder, even after controlling for maternal depression. McHale and Rasmussen (1998) examined family patterns in infancy for their contribution to children's aggression three years later. Three family factors were created from observational data: hostile-competitive, family harmony, and parenting discrepancy and all three were associated with children's aggression in expected directions, after controlling for both maternal and paternal well-being and marital quality.

Other studies have also found that the family system may provide unique contributions to children's behavior, over and above other dyadic relationships. For example, poorer family cohesion has been associated with increased externalizing behaviors in adolescents, over and above individual parent-child relationships (Richmond & Stocker, 2006). The study assessed cohesion using videotaped family observations of two parents and two adolescents. In addition, questionnaires were completed to assess level of parent-child hostility in the parent-child relationship. Although mother-child and father-child hostility were both associated with more externalizing behaviors in adolescents, family cohesion acted as a significant predictor, over and above the parent-child relationships.

Other research also suggests that the family relationship plays a unique role in children's development. Feldman and Masalha (2010) observed Israeli and Palestinian families at both 5 and 33 months in families and triadic interactions. After controlling for mother-child and father-child interactions, family cohesion remained predictive of children's social competence at both 5 and 33 months.

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However, family rigidity did not appear to significantly contribute to children's behavior. Additionally, research has indicated that poor family organization contributes uniquely to children's externalizing behavior, over and above the mother-child, father-child, and mother-father dyadic relationship (Johnson, Cowan, & Cowan, 1999). These findings are consistent with family systems concepts such as wholeness, where whole family interactions contribute separately from the parent-child relationship. Furthermore, these differential findings with regards to dyadic relationships, marital conflict, and maternal depression suggest that the family system may be a particularly salient and unique factor in children's developing psychopathology.

Developmental considerations in family systems. The majority of research on family systems has focused on children in infancy and preschool (McHale & Rasmussen, 1998; Pettit & Bates, 1989; Schoppe et al., 2001) or in adolescence (Hughes & Gullone, 2008; Richmond & Stocker, 2006). Yet, relatively little research has examined family systems during the transition to kindergarten (Davies, Cummings, & Winter, 2004). The ages of 4 to 7 are considered a particularly important transitional period for children and families (Rimm-Kaufman & Pianta, 2000), as children are expected to conform to the rules and expectations of teachers, while possibly maintaining a different set of guidelines in the home (Rimm-Kaufman & Pianta, 2000). They are also exposed to changes in daily routine and increased influences from people outside of the family (Cowan, Cowan, Ablow, Johnson, & Measelle, 2005; Lloyd, Steinberg, & Wilhelm-Chapin, 1999). Simultaneously, children face increased communication

demands from teachers and peers, and peers begin to play a more central role in children's social development (Guralnick, 1999). The transition to school is also important because behavior problems that begin early in life often place children on a trajectory of behavior problems that can last a lifetime (Campbell, Shaw, & Gilliom, 2000; Hinshaw & Lee, 2003; Mesman, Bongers, & Koot, 2001).

Recognizing this key period, Cowan et al. (2005) completed a large scale study examining children, family, and schools during the transition to kindergarten. Although the study used self-reports of the family system, family environment at age 5 predicted academic and school competence a year later (Johnson, 2005), and family organization at age 6 was predictive of externalizing behavior problems a year later (Johnson et al., 1999).

Davies et al. (2004) also created profiles of family functioning based on reports of marital, coparenting, and parent-child functioning during the transition to kindergarten. The clusters included cohesive families (high levels of warmth, low levels of conflict, and well-defined, but flexible boundaries) enmeshed families (high levels of conflict, inconsistent discipline, roles, and boundaries) disengaged families (high levels of conflict, low levels of warmth and support) and adequate families (similar to cohesive families, but more controlling). In comparison to cohesive families, enmeshed and disengaged families were more reactive and insecure concurrently, and showed higher levels of internalizing and externalizing behaviors one year later. The study used children at ages 6 and 7, during that important period during the transition to kindergarten, and had a multi-method, longitudinal approach. However, Davies et al. (2004) also used a

summative model of family risk in creating family systems, rather than actually

observing family interactions, so it is unclear whether the same findings would be

true with an observational measurement of the entire family.

Given that the transition to school can be a period of flux for children and

self-report data of family system has a tendency to be global and retrospective

(Margolin et al., 1998), system level constructs using observational methodology

would add importantly to the emerging knowledge base. To date, research

suggests that the family system plays an important role in development of

psychopathology in children, although there has been heavy reliance on self-

reports of the family system. As parents may behave differently when in dyadic

and whole family contexts, it is important to explore the potentially unique effect

of whole family systemic constructs on children's behavior, particularly during

the challenging developmental transition to elementary school.

Measurement of Family Systems

Family system attributes are higher-order relational processes that are

descriptive of the whole family functioning. However, despite the dynamic nature

of family systems, the majority of family systems research uses more static self-

report methods (see above; Johnson et al., 1999). In general, self-reports lack the

independent objectivity of observational methodology, as self-report is influenced

by personal disposition and experiences (Slee, 1996). This is even more

problematic in the measurement of family systems, as self-report on family

constructs is not actually a systemic measurement, but rather an assessment of an

individual's appraisal and/or perception of the family. Furthermore, mothers are

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often the only reporter used in studies, which precludes gaining a broad understanding of the whole family's appraisal. A number of self-report scales such as the FACES (Olson, Portner, & Lavee, 1985) and McMaster Family Assessment Device; (Epstein, Baldwin, & Bishop, 1983) have been used to capture dimensions of the family. The often used Family Environment Scale (FES; Moos & Moos, 1981, 1986) assesses ten subscales on three higher-order dimensions: relationships, personal growth, and system maintenance. However, factor analysis has inconsistently found support for the three-dimension and ten-subscale solutions (Boake & Salmon, 1983; Robertson & Hyde, 1982), and the FES has also been criticized for reliability concerns (Boyd, Gullone, Needleman, & Burt, 1997; Roosa & Beals, 1990).

Although observational methodology has played a less prominent role in the understanding of family systems, it is more equipped to capture the intricacies inherent in families (Kerig, 2001). Margolin et al. (1998) outlined the difficulties of doing observational work. Yet, both she and Kerig (2001) suggest that observational research is necessary to obtain an outsider's view as well as a current context-based assessment of the family as opposed to the global, retrospective, individual perspective obtained in self-reports. Despite the difficulties in observational approaches, a number of family systemic observational coding systems do exist (see Table 1).

Family observational coding systems can be classified into one of three categories: microanalytic, mesoanalytic, and macroanalytic. The majority of observational studies examining whole family interactions use macroanalytic

methods (See Table 1). These systems often involve separate global codes of individual, dyadic, and family-level behavior. Carlson and Grotevant (1987) suggest that macro-based, or global, rating systems are best in studying family system constructs because they better take into account context and thus capture stable relational patterns (Lindahl, 2001). Very few systems use microanalytic methods, which counts occurrences of specific discrete behaviors. Recent work suggests that microanalytic methods may be less useful in whole family interaction because they are less able to take context into account (Lindahl, 2001; Mahoney, Coffield, Lewis, & Lashley, 2001). Other systems use mesoanalytic, or interval, methods of coding data (Mahoney et al., 2001; Margolin & Gordis, 1992). These methods use global coding within discrete interval periods of time that are shorter than the entire coding period. Mesoanalytic methods may better capture variability and change in behavior over a briefer discrete coding period (Gordis & Margolin, 2001).

Research on observed whole family interactions has primarily focused on the dimensions of the family system present in ten coding systems represented in Table 1. Many of these dimensions are also reflected on self-report measures such as the FES (i.e. cohesion, conflict, organization, control; Moos & Moos, 1981). First, nine out of ten systems measured warmth or positivity in the family relationship, while seven systems also measured negative, hostile, and conflictual families. It is important to note that positivity and negativity were not, and should not, be measured in the same construct, as the absent of positivity is not necessarily negativity, but perhaps more neutral behavior. Six systems measured

cohesion, and four systems measured structure/organization. Alliance formation, or triangulation, in families was measured in four systems, child centeredness was measured in six systems, communication was measured in four systems, and control was measured in three systems. As mentioned previously, constructs such as cohesion, warmth, conflict, and structure have also been associated with psychological symptomatology and peer relationships in children. Thus, these dimensions are beginning to emerge as generally agreed-upon key constructs of value in observational family interactions, and continuing to utilize them is critical to provide more valid approaches to exploring family systems.

Determinants of Family Systems

It is not sufficient only to understand elements of the family system and their effects; it is equally important to determine the predictors of family system functions. Recently, Davies and Cicchetti (2004) called for an integration of family theory and developmental psychopathology, specifying a need to identify "the biopsychosocial antecedents, correlates, and sequelae of different configurations of relationship quality and boundaries in the family system across a broad portion of the life span" (p. 479) as well as to "elucidate the multiplicity of pathways between forms of family adversity, system conceptualizations of family relationship quality…and child adaptation and maladaptation" (p. 479).

Two separate models address the concepts highlighted by Davies and Cicchetti (2004). Moos (2002) proposed a conceptual model in which family environment is determined by adults' personal characteristics and well-being, children's personal characteristics and well-being, and extra-familial context.

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Subsequently, Cowan and Cowan (2006) have proposed a six-domain family risk model for children's adaptation to elementary school that was discussed above. Given the paucity of whole family research, there is little current work directly connecting the family risk factors suggested by Moos (2002) and Cowan and Cowan (2006) to qualities of the family system.

Although multiple factors influence the family system and child competencies, a compelling case can be made for four specific family risk factors. Parental symptomatology, marital adjustment, parenting stress, and parent-child relationships are representative of key concepts from critical domains mentioned by Cowan & Cowan (2006). Each factor has substantial empirical support as a risk factor, and all have been consistently linked to various domains of parenting and child functioning over time (Cummings et al., 2000). As the literature supporting these risk factors is substantial, they will only be briefly reviewed and research highlighted for their potential predictive role in family systems.

Parental symptomatology has long been implicated in parenting and the development of psychopathology in children, although its specific effect on the family system is largely unknown. A wealth of research indicates specific relations among parental mental health concerns and parent-child relationships, children's behavior problems, and peer problems (Chronis et al., 2007; Cummings, Keller, & Davies, 2005; Elgar, Mills, McGrath, Waschbusch, & Brownridge, 2007; Goodman & Gotlib, 1999; Lovejoy, Graczyk, O'Hare, & Neuman, 2000; Malik et al., 2007). Recent work has also begun to focus on the associations between parental symptomatology and family environment.

Depression has been linked with less positive and greater negative family environments (Park et al., 2008) and Dickstein et al. (1998) found that maternal mental illness was associated with poorer global family functioning. In fact, stronger associations between nonspecific symptomatology and whole family functioning were found than with marital or parent-child functioning.

Marital adjustment is a factor long associated with parenting and child adjustment, and emerging research indicates that mother-father relationships may also affect broader family system constructs. A meta-analytic review of interparental conflict and parenting found that marital conflict in the home is negatively associated with parenting acceptance and parenting quality, and positively associated with harsher punishment (Krishnakumar & Buehler, 2000). Other studies have also found associations between interparental discord and lower quality parenting (Kaczynski, Lindahl, Malik, & Laurenceau, 2006; Sturge-Apple, Davies, Boker, & Cummings, 2004), lower parental warmth (Bonds & Gondoli, 2007), and more tension in the parent-child relationship (Almeida, Wethington, & Chandler, 1999; Margolin, Gordis, & John, 2001). The presence of both a good marriage and good parenting has also been predictive of better child adjustment over the first six years of life (Belsky & Fearon, 2004).

Research has found direct associations between marital conflict and components of the family system, including poorer family functioning (Davies & Cummings, 2006), greater family negativity (Kitzmann, 2000; Margolin, Gordis, & Oliver, 2004), and higher levels of enmeshment, disengagement, and lower levels of cohesion (Davies & Cicchetti, 2004; Davies et al., 2004). A positive

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marital bond has also been associated family cohesion, family warmth, and family structure (Doohan, Carrere, Siler, & Beardslee, 2009). Lindahl, Malik, Kaczynski and Simons (2004) also found that broad family functioning mediated the relation between couple's power dynamics and children's internalizing and externalizing behaviors, suggesting an important mediational role for the family system.

Perceived parenting stress is well established as an important contextual determinant of parenting, family functioning, and children's development. Although there are many potential stressors for parents, including life stress (Pianta & Egeland, 1990) and financial stressors (Conger et al., 1992), parenting stress may be a particularly relevant contributor to the family system (Crnic & Low, 2002). Crnic, Gaze, and Hoffman (2005) found that more parenting stress was associated with less maternal positivity, less pleasure in the parent-child relationship, more child negativity, and more behavior problems. Other studies have also found a significant association between parenting stress and behavior problems and depression in children (Deater-Deckard, 1998, 2005; Huth-Bocks & Hughes, 2008; Williford, Calkins, & Keane, 2007). The direct effects of parenting stress on the family system are understudied, but its associations with parenting and child behavior suggest it may play an important role.

Parent-child relationships are one subsystem of the family, but yet their influence on the larger family system is not well understood. As discussed previously, parent-child relationships are markedly different from family relationships (Burhmeister et al., 1992; Gjerde, 1986; Minuchin, 1985). Yet, parent-child conflict and rejection have been associated with many child

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difficulties, including ADHD symptomatology (Lifford, Harold, & Thapar, 2008), child maladjustment (Gerard, Krishnakumar, & Buheler, 2006), and externalizing behavior problems (Foster, Garber, & Durlak, 2008; Johnson et al., 1999; Richmond & Stocker, 2006). Associations between parent-child relationships and children's social competence have also been found (Feldman & Masalha, 2010). A meta-analysis revealed that interventions designed to improve the parent-child relationship have also been associated with improvements in child behavior and parenting, although effect sizes varied based on program (Thomas & Zimmer-Gembeck, 2007). Given the importance of parent-child relationships on the development of psychopathology in children, this subsystem deserves further study to understand its influence on the whole family system.

Although a myriad of factors could be chosen as important determinants of family system interactions, the above four represent particularly salient and important constructs. Marital adjustment and parent-child relationships are perhaps the key dyadic relationships occurring within the family, while parental symptomatology and parenting stress represent key individual and contextual parent factors that can affect how the parent then relates to the other members. Family interactions do not occur in isolation, separated from all else that is occurring to and within the family. Both family systems and family risk theory would suggest that family interactions would be influenced by individuals within the family, levels of stress, and the various dyadic relationships that are occurring simultaneously.

Children at Risk and their Impact on the Family System

In addition to risk presented by parents and dyadic relationships, child risk is another important determinant of family systems that does not always get the attention that is warranted. Both parenting and family process theories suggest that child characteristics play a central role in family functioning (Belsky, 1984; Cowan & Cowan, 2006), and the presence of cognitive deficit has been an important predictor of familial risk research for some time (Crnic et al., 1983; Hodapp & Dykens, 2003). When a child has problems or difficulties early in life, it presents an inherent risk to the family system. Crnic et al. (1983) proposed a model for the impact of children with intellectual disabilities on families that suggests mental retardation is an extra stressor on the family system. The degree to which a delayed child affects the family system is dependent on the resources, coping system, and stress already present in the family environment. Thus, factors including parental psychological health, social support, problem-solving skills, and socio-economic status affect the degree to which families adapt to raising a developmentally delayed child.

There is often confusion between the use of the terms developmental delay and intellectual disability because the terminology has evolved over time. The current study will use the following definitions for the two diagnoses. Intellectual disability (previously termed mental retardation) requires significantly below average intellectual functioning, as well as multiple impairments in adaptive functioning. From birth to age 4 or 5, IQ can be very unstable. Developmental progress is not uniform, and thus children with low IQs at 12 months may

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function within the normal ranges by age 6. Thus, a diagnosis of mental retardation only occurs when there have been multiple measurements over a number of years to determine that the child's IQ is stable. Until a diagnosis of intellectual disability has been made, children with cognitive deficits are considered to have a developmental delay. Children with developmental delays not only have cognitive difficulties, but often also have difficulties with motor, speech, and language development (Hodapp & Dykens, 2003).

Presence of cognitive deficit has been an important predictor of familial risk and stress in research for years (Hodapp & Dykens, 2003). In part, this may be a function of the fact that children with early developmental problems have been found to be at increased risk for developing comorbid externalizing, internalizing, and attention behavioral problems (Baker et al., 2002; Dekker, Koot, van der Ende, & Verhulst, 2002). In fact, it appears that these increased behavior problems may be more responsible for parental stress than the cognitive deficit alone (Baker et al., 2003). Given this increased risk, research on families of children with developmental problems has most often focused on the child's impact on the family and familial adaptation to living with a child with delays (Hauser-Cram, Warfield, Shonkoff, & Krauss, 2001). Historically, having a child with delays was considered to have a negative impact on family functioning (Wolfensberger & Menolascino, 1970). However, recent research has focused more on the range of family adaptation possible (Baker, Blacher, Kopp, & Kraemer, 1997).

Although research has examined family adaptation in children at risk, very

little is known about the direct effects of having a child at risk on family systems. Mink et al. (1983) examined typologies of families with a child with intellectual disabilities. Using parent report and observational data, five distinct family types were found: 1) cohesive, harmonious; 2) control-oriented, somewhat unharmonious; 3) low-disclosure, unharmonious; 4) child-oriented, expressive; and 5) disadvantaged, low morale. Children from cohesive families (cluster 1) had higher self-esteem and were more accepted at school than clusters two, four, and five. While this research has provided great descriptive insight into the family system for children with intellectual disabilities, it is not conclusive in terms of how these family typologies may be similar or dissimilar to families of typically developing children, or if these categories might be differentially predictive in different types of children.

Since Mink's work, very little research has used observational methods to examine the whole family system of children with developmental disabilities (Rousey, Wild, & Blacher, 2002). Floyd, Harter, and Costigan (2004) did examine family system attributes during family problem-solving tasks. Low cohesion and independence, as measured by the FES, were associated with more negative parent-child exchanges for all siblings in a family. These negative parent-child exchanges were also associated with more behavior problems, although direction of effect is difficult to ascertain as measurements were completed at the same time.

Although not encompassing the entire family, research on parents of children at risk may provide related insight into how risk may relate to the family system.

Research indicates that mothers of children with developmental delays may be more intrusive and didactic (Marfo, 1990), as well as less warm and more focused on teaching, rather than playing with children (Hodapp, 2002; Roach, Barratt, Miller, & Leavitt, 1998). In addition, parents of children with developmental delays are also at greater risk in a variety of areas, including greater parenting stress (Baker et al., 2003; Fidler, Hodapp, & Dykens, 2000). Crnic and Low (2002) posit that everyday parenting stresses may be especially meaningful to families of children with delays, and research has found associations between parenting stress in mothers of children with delays and more authoritative parenting (Woolfson & Grant, 2006), as well as more intrusive mother-child interactions (Spiker, Boyce, & Boyce, 2002). Other research indicates that parents of children with developmental delays have high rates of depression symptomatology that are also associated with increased behavior problems (Hastings, Daley, Burns, & Beck, 2006), although the data are more inconclusive (Feldman et al., 2007; Herring et al., 2006; Olsson & Hwang, 2001). Findings also suggest that parents of children with disabilities have slightly poorer marital adjustment (Risdal & Singer, 2004). However, the progress of research on families of children with DD has been hampered by the lack of adequate comparison groups.

Research on families of children at risk has made some promising strides, but many questions still remain. There is still almost no research on the differences and similarities of family systems in typically developing children and children with developmental delays. Given the increased demands already facing children

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with developmental delays during the transition to school (McIntyre, Blacher, & Baker, 2005), it is important to determine those other factors that may affect these families. From prior research, it appears that having a child at risk is associated with increased stress to multiple family process constructs, which consequently implies that risk status may act as a moderator between family risk and family systems.

Present Study

Although the family context has long been considered important to understanding children's development, the majority of research has focused on self-reports of the family rather than direct observation of the whole family system, an approach which has hampered progress in this area. Given prior research and theory on the family system (Cox & Paley, 1997), it is expected that the family system will contribute uniquely to children's developing competence and/or psychopathology, over and above more well-studied family risk factors. Although the effects among all of these factors are obviously reciprocal, the direction of influence proposed (see Figure 1) appears to be an empirically validated principal pathway (Davies & Cicchetti, 2004). Furthermore, little research has examined the family system of children at developmental risk, let alone how having a child at risk may moderate the relations among family risk, family systems, and child competency. The present study seeks to understand family system functioning through a complex developmental moderated mediational path model during the transition to school period. The study is one of the first of its kind to compare the structure of family systems of children with

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developmental delays (DD) to those of typically developing (TD) children across
time, using both observational and multiple reporter methods (mother, father, and
teacher).

Hypotheses

The present study has three specific aims and a number of associated hypotheses
(See Figure 1).

1) The first aim is to contrast patterns of whole family systemic interactions
   in children with and without early developmental risk. Families of
   children with DD are hypothesized to have higher control, conflict, and
   organization, and lower warmth and cohesion than families of TD
   children. Again, as virtually no research has compared the structure of the
   family system in these two populations, this will be an important
   contribution to the field.

2) The second aim seeks to assess those aspects of the model that address
   mediational processes in which family system constructs partially mediate
   the relation between relevant risk factors and children's behavior problems
   or social competence. The following sub-hypotheses for the mediation
   processes are proposed:

   2a. Family risk factors at age 5 (higher parental symptomatology, poorer
   marital adjustment, greater parenting stress, less parent-child pleasure)
   are hypothesized to have a direct negative effect on children's
   behavior problems and social competence at age 7.

   2b. Greater family risk at age 5 is expected to be associated with a more

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dysfunctional family system (less warmth, cohesion and organization, more conflict and control) at age 6.

2c. A more dysfunctional family system at age 6 is expected to be associated with greater internalizing and externalizing problems and poorer social skills at age 7.

2d. Family system constructs are expected to partially mediate the relation between family risk and children's behavior, such that the strength of the direct path between family risk and children's behaviors will meaningfully decrease when the family system is included in analyses, but will maintain some prediction of child behavioral status at age 7.

3) The third aim is to examine the full complex moderated mediational pathway model. It is hypothesized that having a child at risk may moderate all the mediational processes, and particularly between family risk factors and the family system. It is hypothesized that having a child with DD will act as an additional burden on the family system that magnifies the effects of family risk in DD children, even though the direction of effect should be the same.

METHODS

Participants

The participants of this study are 242 children between ages 5 and 7 years and their families. Participants were drawn from a larger longitudinal investigation, the Collaborative Family Study, which prospectively examines parenting, family process, emotion regulation, and the emergence of behavior problems in developmentally delayed and typically developing children from child ages 3 to 9 years. An additional cohort of 5 year old children with developmental delays was recruited in the second part of the study. They were followed through age 9 with a battery identical to the original cohort. The attrition rate was 19% across the ages 5-7. Participants for the larger study were recruited from community agencies, such as family resource centers, early intervention programs, preschools, and daycare centers, as well as via flyers posted throughout the community. Families of children with developmental delays were recruited principally from community agencies serving people with developmental disabilities. Exclusion criteria for the larger study included severe neurological impairment, non-ambulation, and a history of abuse. Of the families, 56 were located in rural/suburban communities in Central Pennsylvania, while 186 families were from urban areas in the greater Los Angeles area.

The children were either typically developing (TD; n=144) or had developmental delays (DD; n=98). Developmental status was assessed at age 5 using the Stanford-Binet Intelligence Test 4th Edition (Thorndike, Hagen, & Sattler, 1986), and scores below 85 classified a child as delayed.

Ethnicity was representative of the populations at each site (see Table 2). Demographic characteristics of the sample by group status (delayed vs. non-delayed) are shown in Table 3. A few significant differences were observed between groups: families of typically developing children have mother and fathers with higher levels of education, as well as families with higher incomes, which are both components of socioeconomic status. Thus, analyses controlled for socioeconomic status. There were no significant differences in the number of family members in the home, or the percentage of mothers who were married.

Procedures

Procedures were all completed between child ages 5 and 7.

   Naturalistic home observations. Between ages 5 and 7, home visits were conducted yearly to obtain observational data regarding family interactions. The naturalistic observation lasted approximately 60 minutes, during which time two trained graduate students collected data on child behaviors, parenting, parent-child, and mother-father interactions using the Parent-Child Interaction Rating System (PCIRS) developed by Belsky, Crnic, and Gable (1995). The coders collected information over four observational episodes. Each episode lasted 10 minutes, after which the graduate students scored parent, child, and dyadic behavior for 5 minutes. Following the 5 minute scoring period, the next 10 minute episode began. The two coders always followed the child during the visit to assess the child's behavior and interactions. To maintain reliability within and across sites, reliability between coders was maintained at kappa=.6 or higher.

   Family game. At child age 6, following the naturalistic home observations, a

series of structured parent-child tasks was conducted and videotaped in the home. The last task in the series (following two homework and two puzzle tasks each completed with one parent) was structured to include the entire family, including siblings. The family played a 10 minute game created by the Collaborative Family Study that was based on the game Sorry$^{©}$. Graduate students gave the family instructions on how to play the game, and identified the study's focal child as the first person to draw a card. Two additional rules set forth at the start of the game by the graduate students were to only move the pieces when it was one's turn, and to not get out of one's seat. There was no intervention if the family decided to move out of turn or change the rules of the game. The game was designed ("rigged") so that the focal child would initially do well and move through the game board quickly, but would begin to suffer setbacks once he or she appeared close to winning (creating some mild frustration) while the other players would begin to move ahead. The intention was to provide a whole family context for the observation of regulatory behavior.

Questionnaires. Every year, mothers and fathers also completed questionnaires to assess overall child functioning, parent functioning, marital relationships, and parental attitudes and beliefs. Starting at age 6, teachers also completed measures of the child's behavior in the classroom. Parents and teachers were instructed to complete the booklet of questionnaires independently and to return them by mail to the study in postage-paid envelopes. Every year, demographic information about family members' employment status, income, education level, marital status and health history was also collected.

Questionnaires about parenting daily hassles were completed on the same day as the naturalistic observations and turned into the graduate students.

Measures

All measures are listed in Table 4.

    Family risk factors.

    Parental symptomatology. Every year of the study (across child ages 3 through 9 years), both parents completed the Symptom Checklist-35, a self-report of their own psychological distress (SCL-35, Derogatis, 1993). The SCL-35 is a short-form of the Symptom Checklist-90 and the Brief Symptom Inventory. Measures of distress have been found to be reliable predictors of depression symptoms (Foley, Neale, & Kendler, 2001). There are 35 questions that are rated on a 5 point scale from 0 (not at all) to 4 (extremely). The SCL-35 has a total sum score of perceived distress as well as subscales for somatization, interpersonal sensitivity, depression, anxiety, and hostility. In this study, the total sum score of perceived distress was used, as reported by both parents at child age 5. Adequate reliability for this measure ($\alpha= .84$) has been previously reported (Cicirelli, 2000).

    Marital adjustment. From child age 3 to 5, both parents completed the Dyadic Adjustment Scale (DAS) to report on marital adjustment across multiple domains (Spanier, 1976, 1979). The DAS is a 32 item self-report with four subscales: affection, cohesion, conflict, and satisfaction. In the total sum score of marital adjustment, the conflict subscale is reverse-coded, so that higher scores reflect better marital adjustment. The total sum score of marital adjustment was used in the study, as reported by both parents at child age 5. Adequate reliability for this

measure (α = .96) has been previously reported (Spanier, 1976).

Parenting stress. During every home observation, both parents completed the Parenting Daily Hassles self-report measure (PDH; Crnic & Greenberg, 1990). The PDH is a questionnaire that has questions on child, family, and general life hassles. The PDH consists of 20 specific items related to child behaviors and parenting tasks that can be trying or challenging for parents. Using 5-point scales for each item, parents report both how often the hassle occurs and the perceived intensity of the hassle. Two summary scores were created: the frequency of parenting hassles and the perceived intensity of those hassles. The perceived intensity score is an index of appraised stressfulness by the parent, whereas the frequency reflects only the presence of stressors. Prior research has indicated that individual cognitive appraisal of significant events as stressful best predicts the impact of a stressor (Lazarus, DeLongis, Folkman, & Gruen, 1985). Thus, the sum of perceived intensity of hassles at child age 5, as reported by both parents, was used in the study. Adequate reliability for this measure (α = .90) has been previously reported (Crnic & Greenberg, 1990).

Parent-child pleasure. As noted above, naturalistic home observations were conducted every year in the study. Home observations were scored using the Parent Child Interaction Rating Scale (PCIRS; Belsky et al., 1995), which measures mothering, fathering, child behavior, and dyadic relationships among all three members. The mother-child and father-child dyadic pleasure scale at child age 5 was used in analyses. According to the manual, dyadic pleasure is defined as "enthusiasm, joyfulness, mutual enjoyment, and a sense of dyadic 'joie de

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vivre.' A general sense that these two people enjoy being with one another. This may be reflected in energy level, facial expressions, cheerfulness, positive tone and content of conversation between the two individuals." (p. 16, Belsky et al., 1995). Dyadic pleasure is represented on a 5-point scale, and a composite score is averaged across all four coding periods. The reliability of this measure was maintained at a kappa of .6 or above.

Child risk moderator.

Child developmental level. Children's developmental level was assessed at age 5 by a trained graduate student using the Stanford-Binet Intelligence Test 4th Edition (Thorndike et al., 1986). The Stanford-Binet has a composite IQ score for general intelligence, as well as standard subscales for verbal reasoning, abstract visual reasoning, quantitative reasoning and short-term memory. The study used the composite score. The composite IQ is normed and has a mean of 100 and a standard deviation of 15.

According to the normative data of the Stanford-Binet, a score of 75 or below classifies the child as developmentally delayed. There were 17 children classified as borderline, with IQ scores between 75 and 85. For the purpose of this study, the borderline and delayed groups were combined, and any scores one standard deviation or below the mean IQ of 100 were categorized as developmentally delayed (IQ<85). There are 144 TD children in the study (Mean IQ=103.21, SD=11.43) and 98 DD children in the study (Mean IQ=60.20, SD=15.48).

Child outcome.

Child behavior problems. Every year, both parents filled out the Child

Behavior Checklist (CBCL) to report on their children's behavior problems (Achenbach, 1991). The CBCL is a 3 point rating scale, and has broad-band subscale scores for internalizing and externalizing behaviors, in addition to narrow-band subscales for more specific behavior problems. From child ages 6 to 9, teachers also completed a teacher-report version (TRF) to report on behavior problems in school (Achenbach, 1991). Internalizing and externalizing sum subscales collected at child age 7 were used in the study. Adequate reliability for this measure has previously been reported for both parents and teachers (α = .87; Achenbach, 2001).

Child social skills. Starting at child age 6, both parents and teachers filled out the Social Skills Rating Scale (SSRS; Gresham & Elliot, 1990). The scale has subscales for cooperation, assertion, self-control, externalizing behavior, internalizing behavior, hyperactivity, and academic competence. Two index scores are created from the subscales: social skills and behavior problems. The social skills score (composed of cooperation, assertion, and self-control subscales) at child age 7 was used in the study. Adequate reliability for this measure has been previously reported for both parents (α = .87) and teachers (α = .88; Gresham & Elliot, 1990).

Family system attributes. As discussed in the procedure section, all family members played a structured game together in the home when the focal child was age 6. Board games reflect a routine activity in families where the complexities in relationships among family members might be readily observed. The game in the home was videotaped, labeled with an identification number, and the videotapes

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were stored in locked cabinets within the research laboratory. The family game was coded using the Observational Assessment of Family Systems (Gerstein & Crnic, 2009), which measures five family system attributes: cohesion, warmth, conflict, organization, and control. The manual can be found in Appendix A. The family system attributes were created based on prior family observational and self-report research, and have specific roots in the System for Coding Interactions and Family Functioning (SCIFF; Lindahl & Malik, 2001) and the Family Structure And Processing coding system (FSAP; Teichman, Cowan & Cowan, 1988). Three other dimensions reviewed in the background, child-centeredness, communication style, and alliance formation, were not included in the manual in order to keep the coding to a reasonable number of the most salient factors for a family game. The attributes were each coded globally on a 5-point scale.

The five attributes are briefly defined below; more complete descriptions may be found in Appendix A.

Cohesion reflects the degree of unity, closeness, and interaction within the family. In order to receive high scores on cohesion, all family members should appear comfortable with one another, be collectively focused and engaged together in the game (reading aloud, following when it is someone else's turn), and have high levels of conversation. In contrast, low cohesion scores occur when members are disengaged or separated into smaller conversations. Low cohesion scores are also marked by interpersonal distance, awkwardness, and stiffness.

Warmth involves the degree to which families are nurturing, affectionate, caring, and responsive in warm ways with one another. High warmth is also

defined by the level of positive emotional tone present and the shared positivity among family members. Warmth can be assessed by voice, facial expressions, body language, as well as degree of affective sharing. For families with high warmth, the entire family is engaged in warm behavior. In low warmth families, the affective tone is predominantly neutral/flat or not positive.

Conflict is the degree to which there is an overall negative tone, anger, and tension within the family. Conflict includes expressions of tension, frustration, anger, irritation, and hostility. It may include threats, put-downs, fighting and arguing, and raised voices, but can also include more subtle signs, including negative/annoyed tones of voice, frustration evident in body language, impatience, and abruptness. A high conflict score indicates that that there are multiple incidents of conflict among family members or an overall feeling of negativity and tension among multiple family members for a substantial portion of the game. The entire game does not need to be hostile in order for a family to receive a score of five. A score of one indicates that no conflict is apparent. There may be an individual child who becomes upset when the cards do not go their way, but unless it affects the mood of multiple members or creates conflict, sadness is not in and of itself conflict.

Organization is defined by the extent to which the family, their roles, and the family game are approached in structured ways. Given that the game already has instructions, higher levels of organization require that all members of the family understand and follow the game. Parents elaborate on rules, help younger children to play (reading aloud, counting spaces), and help everyone know when it is their

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turn and what to do. If parents choose to change the given rules, organization is based on consistently following the new rules that the parents have set up, and the degree to which the changes have improved organization. However, organization is more than simply following the rules to the game. It is also the way in which the family is structured and how they work together. High levels of organization may also present when parents split up roles in order to make sure children are taken care of. Understanding developmental level is important in organization. A member may need to constantly help a child with the rules, counting and reading. The fact that the child does not understand is not poor organization, but the overall help provided by other members does count toward the score. In low organization families, these distinct roles cannot be seen, or are seen but do not function successfully. Overall, the degree to which the family appears chaotic or orderly impacts the organization score.

Control is the degree to which members of the family attempt to dictate the behavior of other family members, over and above what is necessary. There is little flexibility, and parents may leave little or no latitude for changes. Although any member of a family can be controlling, the point is that control affects the entire family. Similarly, control may primarily be seen as a top-down, from parents, type of behavior. However, it could also come from the children, where the children seek control above and beyond what is necessary for the family. Control is a feeling of restriction and over-demandingness that is felt throughout the family. In a score of one, there are no elements of control that are seen, whereas higher scores indicate multiple instances of controlling behavior, whether

from one person or multiple people.

The system was coded using a team of trained undergraduates who were blind to the hypotheses of the study, and a master coder. Two undergraduates watched the family game on videotape at least twice and coded it separately, each coming up with their own score for each family attribute. The undergraduates then came to a consensus on all of the scores. Consensus scores were compared with the master coder on a minimum of 20% of all tapes. Weekly reliability was established and maintained using a kappa=.6 as the acceptable minimum. All family system attributes had adequate reliability. Intraclass correlation coefficients were computed at the conclusion of the coding and are as follows: cohesion (ICC=.948), warmth (ICC=.882), conflict (ICC=.889), organization (ICC=.923), and control (ICC=.840).

RESULTS

Descriptive Statistics

Descriptive statistics for all variables in the analyses are presented in Table 6. The descriptive statistics are presented in the combined sample format, as well as separated by developmental status. A composite socioeconomic status (SES) variable was formed to provide a more accurate measurement and reduce the number of variables in analyses. This variable was formed by first performing z-score transformations on the maternal education and family income variables, and then creating a composite of the two z-scores ($\alpha=.66$) by averaging the two scores. Most variables were distributed normally. According to West, Finch, & Curran (1995), skew and kurtosis exceeding 2 and 7, respectively, pose difficulties for maximum likelihood estimation, which is employed in the structural equation modeling (SEM) components of the results. Nonnormality of variables in SEM analysis inflates the overall chi square test of model fit, but also leads to underestimation of standard errors of path coefficients and therefore over-estimation of significance. No individual measure for the combined sample had skew and kurtosis outside the limits indicated by West et al (1995). However, the teacher report of internalizing behaviors for typically developing children exhibited skew and kurtosis (2.19 and 6.04, respectively). In addition, although not meeting criteria, fathers' reports of internalizing were substantially positively skewed and kurtotic, reflecting a narrow range of low endorsement of internalizing behavior. Upon examination of frequency tables, teachers reported a complete absence of internalizing behavior problems for 31.6% of the typically

developing children, in contrast to only 4.9% of the children with developmental delays. Finally, mothers' reports of their own symptomatology in families of TD children are also relatively skewed in comparison to other variables.

Table 6 also presents t-tests and Cohen's d effect sizes measuring the potential significance of differences between the two groups on all study variables, with no covariates included. In general, the family systems attributes of children with DD were relatively similar to families of TD children for warmth, conflict, and organization. Families of DD children had higher levels of control in the game (p=.03, Cohen's d=-.32, TD-DD), and there was a trend for cohesion to be greater among TD families (p=.055, d=.28, TD-DD). The majority of family risk variables were also relatively similar in level for both groups of families, although some differences were found in maternal parenting stress and the parent-child relationship. Mothers of children with DD had higher levels of parenting stress (d=-.26, TD-DD), and both parents had less pleasure in the parent-child relationship (d=.33, .40, for mothers and fathers, respectively, TD-DD). In contrast, there were significant differences between TD and DD children on levels of externalizing behavior problems (d=-.41, -.42, -.66, for mothers, fathers, and teachers, respectively, TD-DD), and social skills (d=.98, .54, 1.07, for mothers, fathers, and teachers, respectively, TD-DD), such that DD children had more externalizing behavior problems and fewer social skills. This is consistent with the literature suggesting children with delays have more behavioral difficulties across a variety of domains in comparison to their typically developing peers (Emerson 2003).

With respect to the hypothesized relations among the family risk variables, family system variables, and outcome measures, some, but not all of the expected relations were supported with zero order correlations. Correlations are reported in Table 7, stratified by developmental status. In Table 7, three sections of the table are highlighted in grey. These highlighted sections demonstrate the correlations within the 8 family risk variables, within the 5 family systems attributes, and within the 9 outcome measures. Table 8 presents the correlations for the combined sample, while partialing out developmental status. As such, the correlations in Table 8 are pooled within class correlations, and each reported correlation is the pooled correlation for TD and DD (i.e. the average of the two correlations, with sample size taken into account). Thus, these correlations are not a function of differences between the means of the TD and DD groups on each variable. Instead, interpreting these correlations makes the assumption that a pooled correlation applies to both TD and DD families. In Table 8, sections representing the correlations within the family risk variables, within the family system variables, and within the outcomes are highlighted.

In general, there were consistent significant correlations found among the family risk variables at age 5, with the exception of mother and father relationship to the child. Measures of maternal and paternal-reported marital adjustment were highly correlated with one another, while dyadic adjustment and parental symptomatology had small to moderate correlations with one another. Correlations among the same rater (i.e. maternal ratings of dyadic adjustment, symptomatology, and parenting stress) were larger than cross-rater correlations.

Mother-child pleasure and father-child pleasure were largely uncorrelated with the other family risk factors, with the exception of the association between paternal parenting stress and mother-child pleasure in families of children with DD ($r=-.30$), which was significantly stronger than in TD families ($r=.09$, $z=2.65$, $p=.01$, TD-DD). However, mother-child pleasure and father-child pleasure showed small to moderate correlations with one another ($r=.26$, for the pooled correlation). Of note, a few correlations between family risk variables were significantly stronger in families of DD children than TD children. For example, the correlation between maternal symptomatology and maternal parenting stress was significantly smaller in TD families ($r=.17$) than in DD families ($r=.66$; $z=-4.59$, $p<.001$, TD-DD), as was the correlation between maternal symptomatology and paternal parenting stress ($r=.04$, .41, for TD and DD families, respectively, $z=-2.61$, $p=.01$, TD-DD).

Within the family system variables at age 6, the most powerful positive relationship was between cohesion and warmth ($r=.74$ for the pooled correlation). The strongest negative correlations were from conflict to both cohesion ($r=-.40$ for the pooled correlation) and organization ($r=-.42$ for the pooled correlations). Of note, the correlation between conflict and organization was significantly stronger in TD families ($r=-.62$) than in DD families ($r=-.16$, $z=-3.76$, $p<.001$, TD-DD).

Among the child outcome variables at age 7, internalizing and externalizing behaviors were positively related to one another and both were negatively related to social skills. The correlations between the two parents were large ($r=.65$, .50,

and .51 for externalizing, internalizing, and social skills, respectively in pooled correlations), but exhibited only small to moderate correlations with teacher reports.

There were some significant findings associating the family risk variables at age 5 with certain child outcome variables at age 7. In Table 8, measures of marital adjustment, parental symptomatology, and parenting stress all seemed to show small to moderate relations with measures of externalizing, internalizing, and social skills behaviors. Only a few small correlations were found between the parent-child relationship and outcomes (i.e. teacher report of internalizing behaviors). Among the associations between family systems variables and outcomes, conflict and control seemed to be associated with externalizing and social skills behaviors for families of TD children (Table 7). However, positive measurements of the family system (i.e. cohesion, organization) were associated with social skills behaviors for both families of TD and DD children. A few small correlations were found among family risk variables at age 5 and family systems variables at age 6. In particular, cohesion and organization were associated with less parenting stress and the more pleasure in the parent-child relationship, while warmth was associated with greater marital adjustment. Given some distinctly different correlations between the two groups both among family variables themselves and among correlations of family system with outcome variables, further exploration of developmental status as a moderator was necessary.

Data Reduction

Due to the substantial number of variables in the study, attempts were made to

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create latent or composite variables to reduce the number of analyses. Maternal

and paternal reports of marital adjustment (MDAS and PDAS, see Table 7) were

highly correlated (r=.57 in TD families, r=.76 in DD families, respectively) and

thus, those two variables were averaged into an overall measure of marital

adjustment (DAS combined report, α=.79). If only one parent completed a report

(primarily the mother), just the mother's score was used. As such, the mother's

perception may be somewhat overrepresented in the analysis of overall marital

adjustment.

    Outcome measures. Each of the three behavioral problem indices

(externalizing behavior, internalizing behavior, and social skills) had three

reporters (mother, father, and teacher). The correlations among reporters were

examined to determine whether creating a latent variable for each index was

possible. In Table 8, the pooled correlations between mother and father reports are

large (r=.65, .50, and .51 for externalizing, internalizing, and social skills,

respectively). However, the correlations between parent and teacher were smaller,

particularly for internalizing and externalizing behavior problems, which is

consistent with the literature (Achenbach, McConaughy, & Howell, 1987;

Eisenberg et al., 2001). As such, a latent factor of all three reporters was not

created. Instead, the sum scores for maternal and paternal report of each of the

three outcomes were averaged together, and teacher reports were analyzed

separately. As with marital adjustment, when only one parent completed the form,

the score represents just that parent's score. Almost exclusively, if only one

person filled out the form, it was the mother, so the mother's perception of her

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child's behavior may be somewhat overrepresented in the variable.

Family latent factors. Confirmatory factor analyses (CFA) were used to determine if the family system attributes formed one or two latent factors. Preliminary analyses were first completed using the combined sample in Mplus 5.0 (Muthén and Muthén, 2007). All of the cases for both groups (TD and DD) were first combined into one dataset, and the correlations were based on the full dataset (n=194). Initially, a one factor model of the family system was tested, using all five family system attributes. The one family factor model did not fit the data well, $X^2(5)=39.082$, $p<.001$, CFI=.867, RMSEA=.187, SRMR=.079. Next, analyses were completed using a two factor model of family systems. High cohesion and high warmth were specified to load on one factor (harmonious families) and poor organization, high conflict, and high control loaded on the second factor (enmeshed families). The indicators and factor loadings for the two factor model are in Figure 2. Results indicated that the two factor model had improved fit over the one factor model (ΔX^2 (1)=32.43, p<.001). The two factor model also appeared to have good fit, $X^2(4)=6.648$, $p=.156$, CFI=.990, RMSEA=.058, SRMR=.020.

Further analyses were subsequently completed to test the usefulness of the two factor model for both families of TD and DD children. The model was conducted identically to the above model but in a stacked format that allowed comparison across groups. However, this model did not converge. Analyses were then computed using only the families of DD children. The two factor model when using only families of DD children did converge (See Figure 3) and

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appeared to have adequate fit, $X^2(4)=7.321$, $p=.120$, CFI=.964, RMSEA=.105, SRMR=.032. However, when the model was conducted using only families of TD children, the model would not converge.

As there were discrepancies in findings for the family factors, exploratory factor analyses were then completed in SPSS Version 17. Analyses explored two factor solutions, given the empirical basis and above findings in the CFA. First, an exploratory factor analysis using the combined sample in principal axis factoring with a promax rotation was conducted. However, the unrotated factor loading matrix would not converge and thus the findings were not interpretable.

Second, a principal components analysis (PCA) with promax rotation using the combined sample was conducted (see Table 9). A two factor solution had distinct factors with satisfactory loadings and was similar to the factors first theorized in confirmatory factor analysis. The first factor explained 48.54% of the variance, while the second factor explained 19.56% of the variance. The two factors were correlated with one another at $r=-.42$.

Third, the same PCA with promax rotation was run separately for the TD and DD groups. The PCA for families of TD children came to a solution resembling the solution for the combined sample, with two factors correlated at $r=-.37$ (See Table 10). However, the PCA for families of DD children came to a solution that was dissimilar to the combined and TD model, in which conflict and control loaded more strongly onto factor 1 (See Table 11). The correlations between the two factors for the DD group was $r=-.40$.

Given the discrepancies and abnormalities in both the exploratory and

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confirmatory factor analyses, the family system variables were examined individually, rather than as latent factors.

Group Differences on Family Attributes

The first hypothesis posited that family systems attributes would differ based on the risk status of the child. First, univariate Analyses of Covariance (ANCOVAs) were used to test for significant differences along each of the five dimensions of the family system for both TD and DD children. The following demographic variables were examined as potential covariates: SES, child gender, total number of players in the game, and presence of a father in the game. Mothers participated in the game in every instance, so presence of a father was also an indication of two parents in the game. Each covariate was first examined on its own, both as a potential main effect and as a potential interaction with status. If multiple demographic factors were significant predictors of a family system attribute, subsequent models were conducted using all significant covariates. Only the final models are reported in the following analyses.

Cohesion. Table 12 shows the results of the ANCOVA for cohesion. A main effect emerged for SES, such that families with higher SES also had higher levels of cohesion. Although nonsignificant, there was a trend for an interaction between status and child gender (See Figure 4). A main effect also emerged for child gender, such that families of male children were more cohesive than those of female children. However, this should be interpreted within the context of the trend of the interaction. Table 13 shows the number of subjects and adjusted means and standard deviations for each cell on status and gender. Families of

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females with DD had particularly low scores on cohesion, while families of males, as well as families of TD females, had somewhat similar scores. Post-hoc univariate analyses adjusted for covariates indicated that TD females had significantly higher levels of cohesion than DD females, $F(1,189)=9.97$, $p=.002$. In contrast, there were no significant differences on level of cohesion between TD and DD males based on sex, $F(1, 189)=1.39$, $p=.239$. Results indicated that after controlling for SES, child gender, as well as the interaction between status and child gender, there was not a significant difference between families of TD and DD children on levels of cohesion, $F(1, 189)=2.248$, $p=.135$.

Warmth. Both SES and the presence of a father were significantly associated with level of warmth in the family (See Table 14). Post-hoc analyses revealed that families with higher SES and families with two parents had higher levels of warmth. The adjusted means and standard deviations, accounting for socioeconomic status and presence of two parents, were $M=3.16$ (SE=0.10) for TD families, and $M=3.27$ (SE=0.13) for DD families. No other covariates were significantly associated with warmth, nor were there any significant interactions with status. Results indicated that after controlling for the presence of father and SES, there was no significant difference between families of TD and DD children on levels of warmth, $F(1, 190)=0.40$, $p=.530$

Conflict. No covariates were significantly associated with level of conflict, nor were there any significant interactions with status. Results indicates that there was no significant different between families of TD and DD children on levels of conflict, $F(1, 192)=0.67$, $p=.413$.

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Organization. Presence of a father was significantly associated with level of organization in the family (See Table 15). Post-hoc analyses revealed that families with two parents present had higher levels of organization than did families with one parent. The adjusted means and standard deviations, accounting for presence of two parents, were M=4.10 (SE=0.09) for TD families, and M=3.99 (SE=0.11) for DD families. No other covariates were significantly associated with organization, nor were there any significant interactions with status. Results indicated that after controlling for the presence of father, there was no significant difference between families of TD and DD children on levels of organization, $F(1, 191)=0.53$, $p=.452$.

Control. No covariates were significantly associated with level of control, nor were there any significant interactions with status. Results indicated a significant main effect of status on level of control, $F(1, 192)=5.28$, $p=.023$, such that families of children with DD had higher levels of control, M=2.25(SE=0.10), than families of TD children, M=1.89 (SE=0.12), with partial η^2=.027.

Mediation of Family Risk Factors to Child Outcome

The second hypothesis addressed the complex mediational processes wherein family system attributes partially mediate the relation between family risk and child outcome. Structural equation modeling (SEM) was employed, with full information maximum likelihood estimation (FIML) in order to estimate parameters in the face of missing data. SES was covaried in all analyses in which it was associated with a predictor, mediator, and/or outcome.

Using the standard notation for mediation analysis (MacKinnon, 2008), three

sets of paths involved in mediation analysis were first examined separately

(Figure 1). First were the total or "c" paths from the independent variables to the

outcomes, here from the family risk factors to child outcome. When the mediator

is included in the model, this adjusted path was called "c' ". "c' " is then the path

from the independent variables to the outcome that is not accounted for by the

mediation. Second were the "a" paths from independent variables to putative

mediators, here from family risk factors to family system attributes. Third were

the "b" paths from putative mediators to outcomes, here from family system

attributes to child outcomes.

Analyses initially examined individual paths of significance among the

predictor and outcome variables, that is, each model considered *only* an "a" or "b"

or "c" path. Next, single mediator models were tested using the product of the

coefficients method. Significance of the indirect effect, that is, the product of the

"a" and "b" mediation paths, was tested using a modification of the Sobel test

(Sobel, 1982) in which the Sobel standard error estimate by the delta method is

replaced with 95% confidence intervals constructed by bias-corrected

bootstrapping (MacKinnon, 2008). All models were conducted in a stacked

format so that comparisons between families of TD and DD children could be

made. Comparisons between TD and DD children were examined using equality

constraints. The path of interest was examined by constraining the path to be

equal between the two groups, and then letting the path coefficient vary between

groups. The difference in fit between the two models was tested using chi-square

difference tests.

Regression diagnostics. Regression diagnostics were performed in order to assess for multicolinearity, outliers, and influential data points on each model. Variance Inflation Factors (VIFS) were examined to assess multicolinearity, and all VIFs statistics were below 2.0 and thus well within acceptable range of less than 10 (Cohen, Cohen, West, & Aiken, 2003, p. 423). In order to detect influential data points, two casewise diagnostic indices were used: a global measure of influence of how one case affects the overall regression equation (DFFITS) and a more specific measure of standardized change in each individual regression coefficient when a case is deleted (DFBETAS). In small to moderate size data sets, it is recommended that DFFITS and DFBETAS should not exceed 1 (Neter, Wasserman, & Kutner, 1989). Additionally, it is also recommended to examine plots and cases that may be relatively extreme in comparison to others (Cohen et al., 2003). Based on plots and comparisons relative to other cases, one case did act as a significant outlier (case 2143) when examining the effect of cohesion and/or warmth on parent-reported externalizing and internalizing behaviors. Case 2143 is a child with DD. For the regression of parent-reported internalizing behaviors on cohesion and warmth for families of DD children, the DFFITS was 1.221, and the DFBETAS were .969 and .471, respectively. A scatterplot plot of the regression diagnostics data for cohesion is in Figure 5. In this specific case, the family scored high on levels of cohesion and warmth, and the child also was rated as high by the mother on both internalizing and externalizing behavior. In fact, the child had the highest raw score on both externalizing and internalizing behaviors at age 7 for all children (i.e., scores of

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39 and 33, respectively). These scores are equivalent to an externalizing behavior t-score of 79 and an internalizing behavior t-score of 78, In contrast, although relatively high, the ratings by the teacher on externalizing and internalizing behavior were lower (i.e., scores of 12 and 15, respectively). These scores are equivalent to an externalizing behavior t-score of 60 and internalizing t-score of 68. There was no father present in this family at ages 6 or 7, so the combined score of both parents report on behavior problems reflects only the mother's perception. The mother also reported high levels of behavior problems in previous years, according to additional data. Upon review of this case's information, the data appeared to have been entered correctly, and there is no mention of extenuating circumstances that would lead to this case being an inappropriate case to be used. Thus, there is not sufficient reason to remove this case from analyses and findings will be reported including the case. However, in data involving how levels of warmth and cohesion affect behavior problems, findings were also reported with the case removed when the outlier appeared to affect the findings.

Individual regression analyses. Initial regressions were computed wherever correlations between predictors and mediators (underlying the "a" paths of mediation analysis), mediators and outcomes (underlying the "b" paths of mediation analysis), or predictors and outcomes (underlying the "c" paths in mediation analysis) were significant in either the TD or DD group. These regressions were conducted using stacked models in SEM with FIML estimation, while controlling for SES. The models are just identified; therefore no fit statistics can be computed. Results are reported in Tables 16, 17, and 18. Models were then

conducted a second time using equality constraints, so that the path of interest was constrained to be equal across groups. The difference in fit between the constrained and unconstrained model was tested using the chi-square difference test for all findings, which is reported in Tables 16, 17, and 18. When the chi-square difference test was nonsignificant, the pooled path coefficient for the model with equality constraints was reported. If the chi-square difference test was significant, then the pooled regression coefficient was not reported, and further analyses involving this variable continued to keep the two groups (TD and DD) separated in analyses. For example, in Table 16, the "b" paths from cohesion, warmth, and control to parent-reported internalizing behaviors significantly differed by group. Thus, the pooled path coefficients were not reported.

There were a few instances in which the findings for the TD and DD groups appeared to differ and the signs of the coefficients are in opposite directions (i.e. warmth as a predictor of parent report of externalizing behavior, control as a predictor of parent report of social skills). However, the chi-square difference test was not significant. In order to have a consistent strategy in all analyses, the pooled findings of these analyses were reported. The implications of this strategy will be addressed further in the discussion.

In Table 16, the path coefficient between cohesion and pooled parent report of internalizing behaviors was significant, such that greater cohesion was associated with greater internalizing behaviors (B(SD)=1.37(.61), p=.03). However, when the outlier was removed from analyses, this finding was no longer significant (B(SD)=.71(.57), p=.22). Additionally, there was a similar trend of significance

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between warmth and pooled parent report of internalizing behaviors

(B(SD)=1.17(.62), *p*=.06) that was no longer significant when the outlier was

removed from analyses (B(SD)=.73(.56), *p*=.19).

Overall, trends or significant differences between groups were found for

variables involving the following models: Pooled Parent Report of Externalizing

Behaviors, Pooled Parent report of Internalizing Behaviors, Teacher Report of

Externalizing Behaviors, and Teacher Report of Social Skills. Thus, analyses

continued to keep the TD and DD groups separated in these outcome models in all

subsequent analyses. In contrast, there were no significant differences between

groups for the following models: Teacher Report of Internalizing Behaviors, and

Pooled Parent Report of Social Skills. Analyses involving these models used the

combined sample in the subsequent analyses, although invariance testing was

completed at each step to ensure equivalence.

Single mediator models. Whenever a path existed between a predictor and a

mediator ("a" path) as well as mediator and an outcome ("b" path) within a

developmental status group, path models were conducted and tested for mediation

(See Tables 19 and 20), using the product of the coefficients method with 95%

confidence intervals for bootstrapping. Only models in which both the "a" and

"b" path were significant (in Tables 16-18) were tested as possible mediation

paths. If the path was only significant for one group (i.e. the TD group), mediation

was only tested for that group. However, in other cases, the path coefficients were

pooled in Tables 16-18 because there were no significant differences between

groups (according to the chi-square difference tests). In these cases only, if the

"a" path and "b" path were significant in the pooled path coefficients, then mediation was tested using the combined sample.

A few significant mediations emerged. In particular, cohesion and organization emerged as potentially important mediators for parent-reported social skills. Both cohesion and organization were significant mediators between maternal parenting stress and social skills, such that higher levels of maternal parenting stress were associated with less cohesion or organization, which were in turn associated with fewer social skills. Cohesion and organization were also significant mediators for all families between mother-child pleasure and parent-reported social skills and father-child pleasure and parent-reported social skills, such that higher levels of parent-child pleasure were associated with higher levels of organization and cohesion, which were then associated with higher levels of social skills.

For families of TD children, control was a significant mediator between maternal symptomatology and both parent-reported internalizing behavior problems and teacher-reported social skills. In families of TD children, maternal symptomatology was associated with less control, and less control was associated with either fewer internalizing behavior problems or more social skills. The implications of these findings will be addressed further in the discussion.

Final models. Given some differences in the findings for families of TD and DD children for parent-reports of externalizing and internalizing behaviors, separate models were created for each group to explore these outcomes. All significant predictors and mediators were combined to create final models. These

models are presented in Figures 6 through 10, with results also listed in Tables 21-24. All models had adequate to good fit. The paths that had significant mediation in the single mediator models remained largely the same when examined within the larger models. Within families of TD children, control acted as a significant mediator between maternal symptomatology and parent-reported internalizing behaviors such that higher maternal symptomatology was associated with less control, although less control was associated with fewer internalizing behaviors. For families of DD children, the models for parent-reports of internalizing behaviors are shown with the outlier included (Figure 9) and with the outlier not included (Figure 10). Cohesion acted as a significant mediator between maternal stress and parent-reported internalizing behaviors when the outlier was included, but was not a significant mediator when the outlier was not included. Given the degree to which the outlier is deviant from the data, the model without the outlier is believed to be the better representation of the sample.

Separate models were also created for each group for teacher report of externalizing behaviors and teacher report of social skills. There were no significant findings in the DD group for these two models, above and beyond the individual regression analyses reported earlier. Within families of TD children, control continued to act as a significant mediator between maternal symptomatology and teacher reported social skills (Figure13/Table 27). However, there were also significant direct paths ("c'" paths) in that lower maternal symptomatology and higher mother-child pleasure were associated with greater social skills. No significant mediation emerged when predicting teacher reports of

externalizing behaviors for families of TD children (Figure 11/Table 25).

According to the earlier chi-square difference tests, TD and DD families did not differ meaningfully on any of the measured paths for teacher report of internalizing behaviors, or for pooled-parent report of social skills. Still, invariance testing was completed on the full models in order to ensure that the two groups were equivalent for these models. First, a fully constrained model for each model was created. In this model, all paths ("a" paths, "b" paths, "c'" paths, correlations) were entirely constrained to be equal across groups. Second, the paths were freed to vary, one at a time, and the fit was compared between the constrained model and where one and only one path was constrained. When examined, none of these paths for any of the models had significant chi-square differences. Thus, the two groups were combined for all models of teacher-reported internalizing behaviors and parent-reported social skills.

The model for teacher-reported internalizing behaviors is reported in Figure 12/Table 26; significant mediation by family system attributes was not found for this model.

Three models of parent-reported social skills were examined, each with a different family system attribute or combination in the mediator position: organization (Figure 14/Table 28); cohesion (Figure 15/Table 29); and cohesion and organization (Figure 16/Table 30). As results from the ANCOVAs indicated that the presence of a father significantly predicted organization, and SES and child gender were significant predictors of cohesion, these were respectively controlled in analyses. Organization was a significant mediator between pleasure

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in the mother-child relationship and parent-reported social skills, pleasure in the

father-child relationship and social skills, and maternal-reported parenting stress

and social skills. Cohesion was a significant mediator between pleasure in the

mother-child relationship and parent-reported social skills, as well as between

maternal-reported parenting stress and parent-reported social skills. When the

models were combined, there was a significant correlation between cohesion and

organization, and only the mediating path between mother-child pleasure,

organization, and social skills remained significant.

DISCUSSION

This study attempted to bridge family system and family risk theory by examining both how aspects of the family and the family as a whole may influence the development of children's psychopathology and competence. The findings were complex, as families themselves are, and offer multiple arenas to explore.

Little is still known about the whole family system in families of children with developmental risk. Indeed, this study is one of the first of its kind to explore how the family systems of children with and without DD may be comparable. Findings indicated that families were actually relatively similar in the majority of family system attributes regardless of the presence of child risk. Families of children with and without DD did not differ in levels on warmth, conflict, or organization. In order to provide perspective on these findings, comparative research on parenting in families of children with and without developmental risk may be useful. Certainly, parenting and systemic relationships are different levels of measurement and should not be confounded. Systems theory would suggest that parenting is related to the larger family context, but that the family system also acts in more independent ways. Still, comparative research on parenting and parent-child relationships in families of children with and without DD has often found greater differences in parenting between the two groups of families. In our own findings, families of children with DD experienced less mother-child and father-child pleasure in comparison to the TD counterparts. Similarly, other research examining parenting in children with DD have suggested that mothers of

children with DD are less positive, less warm, and more negative (Crnic, Pedersen

y Arbona, Baker & Blacher, 2009; Hodapp, 2002; Roach et al., 1998).

Given the research on parenting, it had been hypothesized that families of

children with DD would also show lower levels of positive family attributes and

higher levels of negative family attributes. However, the relative similarities in

family system attributes across both groups of families are actually consistent

with a conceptualization of the family system as involving distinct, higher-order

processes. Summative models, for example, would predict that families of

children with DD would have less warmth. However, more systemic family

functions may provide a buffer to risk that is not present in dyadic relationships.

As such, the whole family system of children with DD may be somewhat more

resilient to the stresses associated with risk than the individual parent-child

relationships. In related research on families of children with spina bfida,

Holmbeck and Devine (2010) suggest that while families are initially disrupted by

the diagnosis, many family systems are often resilient and adapt appropriately.

Furthermore, Sameroff and colleagues (Sameroff & Seifer, 1983; Sameroff &

Chandler,1975) have suggested that caregiving environments can have "self-

righting" tendencies, so that the environment regulates and adjusts appropriately

in order to produce an optimal environment for the child. Perhaps the family

system, as a higher-order construct, may be better able to adjust and compensate

in these families, while an individual mother-child relationship may have more

difficulty. Thus, when considering intervention techniques for children with DD,

it is critical to understand the reason for these differences in outcome between

family and individual family risk constructs. Future interventions may be able to maximize the more positive effect of the family by focusing on higher-order family constructs.

Two attributes of family systems may differentiate DD and TD families and play a key role in understanding developmental risk. Overall, cohesion did not differ between the two groups of families, although this finding may be somewhat dependent on gender of the child. Families of female children with DD were less cohesive than families of male children with DD, as well families of all TD children. Given the relative paucity of research on family systems in children with DD, and the relatively fewer number of females with DD in both this sample and the general population, the reasons for gendered effects are somewhat unknown (Hodapp & Dykens, 2005). Cohesion measured the amount of interaction and collective focus of all family members, and therefore a single member who was not participating fully would result in a lower cohesion score. Anecdotally, it seemed as if some of the females with DD were quieter and less engaged in the task when it wasn't their turn. In contrast, the males with DD seemed to act out more, which may have required more intervention by family members, but might still have appeared as cohesive behavior if all members were all collectively interacting to address the behavior in the service of the game. Males with DD have especially high rates of behavior problems in comparison to both the general population and females with DD, which help explain the gender-specific findings (Hodapp & Dykens, 2005; Hinshaw & Lee, 2003). However, as this is one of the first findings of gender differences in family functioning for children with

developmental risk, further research examining the moderating effects of gender is needed.

Families of DD children also appear to engage in more control in comparison to families of TD children, but control was also differentially associated with children's behavior. For families of TD children, control effects were consistent with theory and prior research (Barber, Stolz, Olsen, Collins, & Burchinal, 2005; Grolnick, 2003; Campbell, Pierce, Moore, Marakovitz, & Newby, 1996), indicating that control was a consistently negative influence on children's functioning, both in terms of behavior problems and social skills. Yet, control was not predictive of problematic behavior for DD children. Recent literature on cultural comparisons of control and directiveness may provide some insight into these differences. Although control has typically been thought to have a negative connotation in mainstream Western, typically-developing populations, emerging evidence suggests that control is not necessarily detrimental across cultures (Barber et al, 2005). For example, Feldman and Masalha (2010) found that while paternal control contributed negatively to Israeli children's social competence, paternal control was actually associated with better social competence in Palestinian children. Similar findings on directiveness suggest that control may be differentially influential, depending on the level of developmental risk in the population. Directiveness has been defined as "maternal strategies that provide more control and structure through increased information and less choice" (p. 1044, Landry, Smith, Miller-Loncar & Swank, 1997). Directiveness is somewhat unique in that while it was initially considered a negative parenting attribute, it is

now considered to be a somewhat positive attribute for children with developmental delays (Marfo, 1990), and it is associated with better outcomes in children with a variety of developmental risks (Warren & Brady, 2007; Spiker et al., 2002). Although the measure of control in the current study was not designed as a measure of directiveness, the concepts share some qualities, and directiveness rather than control may be what was actually captured in the observation. Examining control from the point of directiveness would explain the differential findings with regards to both level and predictiveness of control between groups.

Contrary to expectations, latent constructs of the family could not be formed. Although the different family attributes all share meaning and function, individual families are unique and overarching characteristics of all families may not exist. Certainly, families differ substantially in number and ages of parents and siblings, ethnicity, and socioeconomic status, to name a just a few of the elements that may define the variation among families. To suggest that all families may have identical underlying structures may not be sensible or consistent with the complexities inherent in family systems. Furthermore, different factor structures did emerge when running the principal components analysis. It is important to be circumspect in interpreting these differences due to the analysis difficulties in forming factors. Yet, it is likely that the underlying structures for families of children with and without developmental risk may differ, and exploring the nature of such differences should prove of value in future research.

Family cohesion and organization emerged as particularly important to the development of social competence. In contrast to models of behavior problems,

the model of parent-reported social skills was the same for both groups of families. These findings replicate work by Fenning et al. (2011) that suggested that the development of social skills may be similar across developmental risk groups. However, the two groups of families still differed substantially in both the amount of social skills each child had, as well as the level of multiple risk factors (i.e. maternal parenting stress, parent-child relationships). Yet, despite these differences in level, both groups of families followed the same model of social competence, suggesting that the process for the development of social skills may be somewhat more universal.

Furthermore, the family appears to be particularly influential in the development of social skills, in terms of individual characteristics, dyadic relationships, and the overarching family system. In particular, family cohesion and family organization emerged as key family attributes to child socialization. Prior research has suggested that cohesion is associated with better social competence, peer relationships, and fewer externalizing behaviors, aggression, depression, and internalizing disorders (Feldman & Masalha, 2010; Park et al., 2008; Richmond & Stocker 2006; Davies et al., 2004; Halpern 2004, McHale & Rasmussen, 1998). In a study of children with developmental delays, Mink et al. (1983), found that families with high cohesion had greater psychosocial adjustment both in home and at school. More recently, Bennett and Hay (2008) found that healthy cohesive family relationships were associated with better social skills in children across a wide range of physical disabilities. With regard to social competence, this study confirms the important contribution of cohesion to social

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competence for children at different degrees of risk, using observational methodology.

Organization also emerged as an important contributor to social competence in children. In prior research, Johnson et al. (999) found that observational measurements of family organization were associated with better classroom behavior. Other research on family organization has been more often measured using self-report scales, like the Family Environment Scale (FES; Moos & Moos, 1981, 1986). Although the FES and other self-report measures capture family structure and organization, the items address a more specific type of organization, such as level of neatness, amount of scheduled planning, and timeliness in the family. By taking a broader, more global perspective on organization, the current study suggests that observational methodology can also capture structure and organization.

In fact, relatively few studies have examined family systems using observational methodology, particularly for children with developmental risk. Family research has instead relied on self-report methodology, which perhaps best captures a retrospective, parental perception of the family, rather than a higher-order systemic process (Margolin et al., 1998). Observational assessment is necessary to capture an independent point of view, as well as to obtain a current, context-based assessment of the family. The Observational Assessment of Family Systems (Gerstein & Crnic, 2009) used in the current study was based on prior family coding systems conducted at similar developmental periods, but in primarily typically developing populations (Lindahl & Malik, 2001; Teichman et

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al., 1988). The current study demonstrates that observational approaches to family measurement can capture a range of behavior in both typical and non-typical families, while still measuring similar concepts to those present in self-report measurements (i.e. cohesion, organization; Moos & Moos, 1981). Further exploration using both observation and self-report measurements of the family will advance understanding of the family system, as well as further substantiate the value of observational methods.

Developmental period may determine the nature of family system influence, such that cohesion and organization may be particularly critical for children during the transition to school period over and above other family attributes. Interactions with families certainly differ from interactions in the classroom and with peers, but there are similarities. Both types of interactions require engaging with multiple people simultaneously, learning how to carry on a conversation, and following social rules and conventions. For children with delays, acquiring these skills can be more difficult. Children with delays tend to be delayed in learning these skills and have more trouble with peer friendships, joining in groups, participating in conversations, and understanding the rules of structured and unstructured play (Guralnick, Neville, Connor, & Hammond, 2003; Guralnick, 1999). Thus, cohesion and organization may be especially related to learning these social skills. Yet, as children age and transition to adolescence, understanding the nuances of social convention and participating in activities that are not "game-based" becomes more relevant. Perhaps cohesion and organization will be relatively stable in their influence. However, as the influence of peers

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continue to develop, the relations among families, peers, and social competence becomes more complex (Ladd, 1999).

For families of typically developing children, maternal symptomatology was indirectly associated with later behavior problems, but only through its relation with family control. As mentioned previously, family control was associated with poorer child outcomes for TD children, yet not for children with DD. The underpinnings of control may also be related to authoritarian parenting, where parents provide high levels of structure, directiveness, and discipline, expecting obedience and conformity in response (Baumrind, 1968, 1971). Authoritarian parenting has similarly been associated with poorer outcomes in typically developing children of American middle-class families, although there is debate about the ethnocentricity of authoritarianism (Wang, Pomerantz, & Chen, 2007; Chao, 1994).

The findings for mediation were somewhat contrary to expectations. The direction of influence was such that greater maternal symptomatology was associated with less control in the family, but that less family control was consequently associated with fewer behavior problems or greater social competence. Thus, indirectly, greater maternal symptomatology was associated with better child outcomes, although there was no direct association. However, for teacher-reported social skills, greater symptomatology was also associated directly with fewer social skills.

This inconsistent mediation is somewhat perplexing, but a couple of hypotheses may provide some explanation. First, mothers of TD children had

relatively low levels of symptomatology. This was not a sample of depressed mothers, where research has more consistently shown effects on child behavior (Goodman & Gotlib, 1999). Additionally, the Symptom-Checklist (SCL) is a measure that examines multiple components of symptomatology, including symptoms of depression, anxiety, interpersonal sensitivity, and hostility. As such, mothers in the sample may have had varying types of symptoms; some may have had more depressive symptoms, while others would have more anxiety. When conceptualizing the relation between symptomatology and control, it might be expected that higher levels of depression might be associated with less control, while higher levels of anxiety might be associated with more control. Thus, the construct of symptomatology and its measurement may have been somewhat muddled, which could lead to inconsistent findings.

Second, it is important to remember that control is a higher-order family construct, while symptomatology is a more specific maternal characteristic. Other components of the family also contribute to the level of control, and these other processes may compensate for or aggravate maternal behavior. For example, fathers contribute to the amount of control in a family as well, and when mothers are symptomatic, fathers may compensate and work to counteract the mother's influence. Thus, although mediation was found, these paths may indicate separate spheres of influence, or may be missing other contributing aspects of the family that may further mediate behaviors.

Overall, the study did not uncover an understanding for the emergence of externalizing and internalizing behavior problems in children with DD that seems

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sufficiently explanatory. It may be that families are relatively less influential on behavior problems during this age period. For children with developmental delays (as well as typically developing children), psychopathology may begin to emerge earlier in development (Baker, Neece, Fenning, Crnic, & Blacher, 2010). Perhaps at an earlier age, when behaviors are first developing, the family may have more of an influence on the emergence or prevention of behavior problems. Once those problems have become more established, the family's influence on the behavior may diminish. Furthermore, given the emerging evidence that emotion regulation is a key predictor of behavior problems for children with DD, (Gerstein et al., 2011; Baker, Fenning, Crnic, Baker, & Blacher, 2007; Wilson 1999), the failure to account for emotion regulation and its potential connections with the family systems may preclude the opportunity to capture an important component of children's development.

One aspect complicating the development of models for children with DD was the presence of an outlier affecting the relations between cohesion and warmth with internalizing and externalizing models. These relations were significant and positive when the outlier was included, yet were significantly diminished when the case was removed. The findings not including the outlier are probably the more proper models to interpret, given the relative influence of one case. However, despite being nonsignificant, the path coefficients are still in the same direction when not including the outlier, so there may be some aspect of having high cohesion/warmth that is associated with more problems in families of DD children. Perhaps some of these families of children with DD have high warmth

and cohesion, but those family attributes are not consequently associated with better parenting skills. However, it is premature to offer interpretations in the absence of replication.

There are a few limitations in this study that should be mentioned. First, the study used multiple reporters, questionnaire and observational data, over a period of two years. This was done to provide a strong test of the hypotheses and eliminate the bias in single-reporter methods. Nevertheless, some of the relations did seem to suggest possible instrument bias. Questionnaires using the same rater (maternal reports of her own behavior to other maternal-reports of herself, or to maternal reports of children) were associated with one another, as were some of the observationally observed variables.

Second, the design and methodology of the family game task provides an excellent opportunity to examine whole family interactions, but it is not without its limitations. The game task was designed to capture a typical moment of family interaction, as well as bring out some of the competitiveness and playfulness of families. Its design seemed to be adept at capturing elements of cohesion and organization. However, there are other types of family tasks (Table 1) that may engender other family behaviors better. For example, many coding systems use a family discussion task, where the family has to make a joint decision for a family, or discuss a prior moment of conflict (Lindahl & Malik, 2001; Margolin & Gordis, 1992). Tasks such as these may be less adept at capturing levels of organization, but may instead better capture conflict in the family. As none of our

final models included conflict, the family game task may have not sufficiently captured the range of conflictual behavior in families.

Third, although the sample size is relatively substantial for research on high risk populations, the absolute number of families limits the power to detect more subtle relations among constructs. This may be particularly true in the models solely examining DD families. Relatedly, decisions were made in the study to only combine groups when equality constraints indicated no significant differences among paths. This rule was established in order to provide a consistent pattern of decision-making, but there are potential negative effects of such a strategy. Significance testing is based on sample size, and as such, some nonsignificant differences may have been due to sample size, rather than a genuine similarity in the strength of paths. There were a couple of paths in which the direction of the path coefficient differed between groups (i.e. warmth to parent-reported externalizing behavior). However, in these cases, the paths were not significant in either group, and were mostly dropped out of the final model. Effort was made to not combine groups when any variables seemed to be substantially different, and for that reason, trends were treated as significantly different.

Although the family is one of the primary influences on children's development, the meaning of family varies in definition and construct. Approaches to family research have often taken a piecemeal approach to the family, examining the influence of one parent, or one dyadic relationship on children's development. More complex understandings of the family do examine

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the multiplicity of family influences by suggesting multiple domains (i.e.

individual influences of each member, marital relationships, parent-child

relationships, stress, siblings, intergenerational family members) of family

functioning can affect the child (Cowan & Cowan, 2006). Yet, these models still

infer a summative approach to families, in that if all the individual pieces were

measured and compiled, the total effect of the family would be known. In this

study, family system and family process attributes were differentially important to

children's functioning, and only somewhat related to one another. Individual,

dyadic, and systemic attributes all contributed uniquely to children's emerging

psychopathology and competence. Thus, more summative family models in place

of whole systemic measurement do not seem adequate to capture the entirety of

family influence. Instead, findings support the notion that the family system is a

higher-order process, certainly influenced by its members, but also behaving in

more autonomous ways.

Developmental risk appeared as differentially influential depending on which

aspect of families and children were being examined. At times, families of

children at risk appear to be very similar to families of typically developing

children. At other points, it appears that the existing models for the development

of children's psychopathology may apply more to typically developing

populations, and are insufficient in understanding a broader range of children and

families. The complexities in this study are representative of the complexities in

families and family systems, particularly for families at risk. Each family presents

with its own unique set of circumstances. This broader examination of families

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captures important emerging patterns of development, but systems theory

suggests deeper analysis into the nuances of family process over time. Further

consideration of those family attributes that operate at various developmental

time-points for specific children will help expand the ways in which we

understand family contribution to children's well-being.

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Table 1

Review of Observational Family Coding Systems

Coding System	Type of System	Ages	Tasks	Negativity/Hostility/Conflict	Warmth/Positivity	Cohesion	Structure/Organization	Alliance Formation	Child Centeredness	Communication/Parenting Style	Control/Intrusiveness
FSAP	Macro	4-7	Puzzle & Unstructured Play	X	X	X	X				
FCS	Meso	9-13	Discussion	X	X			X		X	
SCIFF	Macro	5-12	Discussion	X	X	X		X	X	X	
IFIRS	Macro	2-18	Discussion &Structured Play		X		X			X	
SFSR	Macro	6-18	Discussion			X	X	X	X		
MeBRF	Meso	4-7	Structured & Unstructured Play	X	X						X
YFICS	Macro	2-3	Building Task	X	X	X		X	X		
CFRS	Macro	8mo-5	Structured & Unstructured Play	X	X				X		
FMCM	Macro	8-10	Game & Discussion	X	X	X			X	X	X
CIB	Macro	5mo-4	Unstructured Play		X	X	X		X		X

Notes: FCS=Family Coding System (Margolin & Gordis, 1992), FSAP=Family Structure and Processing Coding System (Teichman, Cowan, & Cowan, 1988), SCIFF=System for Coding Interactions and Family Functioning (Lindahl & Malik, 2001), IFIRS=Iowa Family Interaction Rating Scales (Melby et al., 2005), SFSR=Structural Family Systems Ratings (Hervis, Szapocznik, Mitrani, Rio, & Kurtines, 1991), MeBRF=Meso-Analytic Behavioral Rating System for Family Interactions (Mahoney et al., 2001), YFICS=Young Family Interaction Coding System (Paley, Cox, & Kanoy, 2001), CFRS=Coparenting and Family Rating System (McHale, Kuersten-Hogan, & Lauretti, 2001), Family Macro-Coding Manual (Holmbeck, Belvedere, Gorey-Ferguson, & Schneider, 1995), CIB=Coding Interactive Behavior (Feldman, 1998; Feldman & Eidelman, 2003).

Table 2

Participant Ethnicity

	African-American	Asian	Caucasian	Hispanic	Other
Child	8.7%	1.4%	60.4%	15.5%	14.0%
Mother	9.2%	3.9%	64.7%	19.8%	2.4%
Father	7.7%	3.1%	67.0%	13.9%	8.2%

Table 3

Demographic Characteristics of Delayed and Nondelayed Sample

Variable	NonDelayed (TD) (n=144)	Delayed (DD) (n=98)	t or chi square TD-DD
Child Variables			
IQ[a]	Mean=103.21 SD=11.43	Mean=60.20 SD=15.48	**23.49****
Gender (% male)	57.6%	61.9%	.43
Race (% Caucasian)	61.1%	59.8%	0.04
Parent Variables			
Marital Status at child age 3 (% married)	84.0%	77.3%	1.72
Mother's Race (% Caucasian)	68.1%	58.8%	2.18
Father's Race (% Caucasian)	66.9%	63.5%	0.27
Mother Highest Grade Completed	15.53	14.41	**3.73****
Father Highest Grade Completed	15.69	14.50	**2.94***
Family Variables			
Total Number of Players in Game	4.03	3.91	0.70
Median Family Income	$50,000-$70,000	$35,000-$50,000	**2.28***

[a]Stanford-Binet Intelligence Scale

*p<.05. **p<001.

Table 4.

List of Measures

Type of Measure	Name of Instrument	Type of Measurement	Child Age at Measurement
Family Risk Factors:			
Parental Symptomatology	Total sum of the Symptom Checklist-35 (SCL-35; Derogatis, 1993)	Mother, Father Report	5
Marital Adjustment	Total sum of Dyadic Adjustment Scale (DAS; Spanier, 1976)	Mother, Father Report	5
Parenting Stress	Total perceived parenting hassles of Parenting Daily Hassles (PDH; Crnic & Greenberg, 1990)	Mother, Father Report	5
Mother-Child Relationship	Parent-Child Pleasure of Parent-Child Interaction Rating Scale (PCIRS; Belsky et al., 1995)	Naturalistic Observation of Mother, Father	5
Child Risk Moderator:			
Developmental Level	Composite IQ of Stanford-Binet Intelligence Test (Thorndike et al., 1986)	Child Assessment	5

Child Outcome:

Externalizing Behavior	Externalizing sum subscale of Child Behavior Checklist (CBCL; Achenbach, 1993)	Mother, Father, Teacher Report	7
Internalizing Behavior	Internalizing sum subscale of CBCL (Achenbach, 1993)	Mother, Father, Teacher Report	7
Social Skills	Social Skills subscale of Social Skills Rating Scale (SSRS; Gresham & Elliot, 1990)	Mother, Father, Teacher Report	7

Family System:

Cohesion	Cohesion scale from Observational Assessment of Family Systems (OAFS; Gerstein & Crnic, 2009)	Observation of Family Game Task	6
Warmth	Warmth Scale from OAFS (Gerstein & Crnic, 2009)	Observation of Family Game Task	6
Conflict	Conflict Scale from OAFS (Gerstein & Crnic, 2009)	Observation of Family Game Task	6
Organization	Organization Scale from OAFS (Gerstein & Crnic, 2009)	Observation of Family Game Task	6
Control	Control Scale from OAFS (Gerstein & Crnic, 2009)	Observation of Family Game Task	6

Table 5

Missing Data on Reported Variables

Variable	% Mother Data Missing	% Father Data Missing	% Teacher Data Missing
Parent Symptomatology at 5 years	2.5%	19.8%	N/A
Marital Adjustment at 5 years	15.7%[a]	20.2%	N/A
Parenting Stress at 5 years	1.7%	19.0%	N/A
Parent-Child Relationship at 5 years	2.1%	20.2%	N/A
Child Externalizing Behavior at 7 years	22.3%	37.6%	35.5%
Child Internalizing Behavior at 7 years	22.3%	37.6%	35.5%
Child Social Skills at 7 years	22.7%	37.6%	36.0%

[a]Note that 15.7% includes maternal marital adjustment data that is structurally missing (not married or involved).

Table 6

Descriptive Statistics of Study Variables

Measure	N	Mean	St. Dev	Range	Skewness	Kurtosis	T-Test TD-DD	Cohen's d TD-DD
Maternal DAS at 5								
Combined Sample	204	107.94	20.40	22-146	-1.39	2.94	.59	.08
TD	125	108.66	19.41	40-142	-1.78	2.61		
DD	79	106.80	24.76	22-146	-1.36	2.07		
Paternal DAS at 5								
Combined Sample	193	107.47	20.22	37-144	-1.28	1.78	-.29	-.04
TD	120	107.13	19.41	49-140	-1.00	.94		
DD	73	108.01	21.63	37-144	-1.65	2.88		
Maternal SCL at 5								
Combined Sample	236	23.72	22.16	0-122	1.81	3.61	-1.38	-.18
TD	141	21.99	19.31	0-111	1.98	5.33		
DD	95	26.27	25.71	0-122	1.55	1.98		
Paternal SCL at 5								
Combined Sample	194	17.78	16.92	0-92	1.53	2.48	.62	.09
TD	121	18.36	18.05	0-92	1.64	2.75		
DD	73	16.81	14.93	0-66	1.11	.63		
Maternal PDH at 5								
Combined Sample	238	48.42	12.62	20-91	.313	.397	**-2.02***	-.26
TD	143	47.01	11.07	20-74	-.11	-.17		
DD	95	50.54	14.46	22-91	.42	.12		

Measure	N	Mean	St. Dev	Range	Skewness	Kurtosis	T-Test TD-DD	Cohen's d TD-DD
Paternal PDH at 5								
Combined Sample	196	43.82	12.86	20-99	.73	1.03	-.67	-.10
TD	123	43.34	12.30	20-99	.88	2.45		
DD	73	44.62	13.80	23-80	.53	-.48		
Mother-Child Rel. at 5								
Combined Sample	237	1.52	.52	1-4	1.21	1.84	**2.51***	.33
TD	142	1.59	.56	1-4	1.17	1.62		
DD	95	1.43	.43	1-3	1.00	.74		
Father-Child Rel. at 5								
Combined Sample	193	1.56	.63	1-4	1.37	1.46	**2.79***	.40
TD	120	1.65	.69	1-4	1.21	.92		
DD	73	1.41	.51	1-3	1.49	1.73		
Cohesion at 6								
Combined Sample	194	3.44	1.14	1-5	-.48	-.48	**1.93[†]**	.28
TD	119	3.56	1.09	1-5	-.52	-.29		
DD	75	3.24	1.20	1-5	-.38	-.72		
Warmth at 6								
Combined Sample	194	3.20	1.16	1-5	-.02	-.86	.39	.06
TD	119	3.23	1.16	1-5	.01	-.86		
DD	75	3.16	1.18	1-5	-.06	-.84		
Conflict at 6								
Combined Sample	194	1.62	.94	1-5	1.70	2.82	-.82	-.12
TD	119	1.58	.92	1-5	1.81	3.40		
DD	75	1.69	.97	1-5	1.56	2.34		

Measure	N	Mean	St. Dev	Range	Skewness	Kurtosis	T-Test TD-DD	Cohen's d TD-DD
Organization at 6								
Combined Sample	194	4.06	.99	1-5	-1.04	.80	1.08	.16
TD	119	4.12	.95	1-5	-1.09	.94		
DD	75	3.96	1.06	1-5	-.97	.62		
Control at 6								
Combined Sample	194	2.03	1.08	1-5	.83	-.02	**-2.22***	-.32
TD	119	1.89	1.00	1-5	1.00	.42		
DD	75	2.25	1.18	1-5	.57	-.45		
CBCL Ext (Mother) at 7								
Combined Sample	188	9.22	7.98	0-39	1.32	1.97	**-2.82***	-.41
TD	112	7.89	7.69	0-36	1.34	1.68		
DD	76	11.17	8.04	0-39	1.45	2.66		
CBCL Ext (Father) at 7								
Combined Sample	151	7.77	7.07	0-34	1.35	1.86	**-2.60***	-.43
TD	96	6.66	7.17	0-34	1.77	3.50		
DD	55	9.71	6.51	1-29	.87	.30		
CBCL Ext (Teacher) at 7								
Combined Sample	156	5.40	6.78	0-35	1.39	1.79	**-4.09****	-.66
TD	95	3.63	5.81	0-27	1.94	3.27		
DD	61	8.16	7.29	0-35	.94	1.35		
CBCL Int (Mother) at 7								
Combined Sample	188	6.24	5.76	0-33	1.43	2.69	-.71	-.10
TD	112	6.00	5.22	0-27	1.24	1.88		
DD	76	6.61	6.49	0-33	1.51	2.80		

Measure	N	Mean	St. Dev	Range	Skewness	Kurtosis	T-Test TD-DD	Cohen's d TD-DD
CBCL Int (Father) at 7								
Combined Sample	151	5.18	5.08	0-29	1.72	4.38	-.21	-.03
TD	96	5.11	5.17	0-29	1.79	4.65		
DD	55	5.29	4.97	0-26	1.64	4.38		
CBCL Int (Teacher) at 7								
Combined Sample	156	5.56	6.53	0-31	1.86	3.79	**-2.85***	-.46
TD	95	4.39	5.80	0-31	2.19	6.04		
DD	61	7.38	7.21	0-31	1.56	2.25		
Social Skills (Mother) at 7								
Combined Sample	187	94.70	18.57	47-131	-.16	-.71	**6.64****	.98
TD	111	101.42	16.21	67-131	-.29	-.71		
DD	76	84.88	17.47	47-127	.20	-.39		
Social Skills (Father) at 7								
Combined Sample	151	91.85	16.90	54-130	-.15	-.54	**3.27***	.54
TD	96	95.16	16.31	65-130	.24	-.65		
DD	55	86.09	16.49	54-122	.10	-.72		
Social Skills (Teacher) at 7								
Combined Sample	155	98.32	14.65	62-131	-.17	-.50	**6.61****	1.07
TD	95	103.79	11.90	66-131	-.22	-.02		
DD	60	89.67	14.49	62-128	.45	-.16		
Socioeconomic Status at 5								
Combined Sample	241	.00	.86	-2.01-1.67	-.21	-.79	**3.50***	.45
TD	144	.16	.85	-2.01-1.67	-.30	-.73		
DD	97	-.23	.83	-2.01-1.67	-.17	-.90		

[†]=p<.08, *p<.05, **p<.001

Table 7

Correlation Table of All Study Variables, Split by Developmental Status (TD above diagonal, DD below diagonal)

	Family Risk Factors at 5 years old								Family Systems at 6 years old				
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. MDAS	--	.57**	-.34**	-.30*	-.34**	-.03	.09	-.01	.13	.22*	-.05	.06	-.05
2. PDAS	.76**	--	-.27*	-.49**	-.17†	-.24*	-.02	-.11	.15	.17	-.06	-.08	-.02
3. MSCL	-.39**	-.32*	--	.16	.17†	.04	-.06	.10	-.08	-.09	-.04	.02	-.18†
4. PSCL	-.12	-.35*	.25*	--	.08	.25*	.06	.09	-.12	-.07	.01	.15	-.08
5. MPDH	-.33*	-.20	.66**	.25*	--	.18*	-.13	.02	-.11	-.11	.08	-.17†	.01
6. PPDH	-.27*	-.36*	.41**	.47**	.46**	--	.09	-.12	-.15	-.17	.26*	-.06	.09
7. MCREL	.06	-.02	-.15	-.14	-.26*	-.30*	--	.39**	.32*	.16	-.10	.23*	-.05
8. PCREL	.10	.11	.03	-.05	-.16	-.13	.26*	--	.15	.16	-.10	.16	-.10
9. COH	.12	.13	-.17	-.21	-.21†	-.16	.17	.16*	--	.74**	-.40**	.35**	-.08
10. WARM	.22	.13	.-.14	-.14	-.14	-.04	.24*	.16	.75**	--	-.28*	.31*	-.14
11. CONF	.03	.04	-.03	.00	.03	-.01	.20	.06	-.41**	-.30*	--	-.62**	.31*
12. ORG	-.02	-.04	-.21†	.04	-.12	-.01	.29*	.32*	.32*	.22†	-.16	--	-.28*
13. CONT	.00	.04	.10	-.07	.16	-.01	-.24*	-.14	-.29*	-.40**	.31*	-.16	--
14. MEXT7	-.42*	-.13	.27*	.14	.46**	.27*	-.09	-.21	.08	.06	-.03	-.14	-.16
15. PEXT7	-.46	-.48**	.37*	.37*	.42*	.39*	-.22	-.20	-.02	-.08	.02	-.25	-.17
16. TEXT7	-.13	-.05	-.04	.06	.21	-.17	-.07	-.22	-.11	-.05	.18	-.06	.15
17. MINT7	-.26*	-.01	.29*	.08	.40**	.16	-.10	-.04	.11	.07	.09	-.11	-.08
18. PINT7	-.49**	-.42*	.56**	.41*	.50**	.46*	-.22	-.08	-.08	-.06	-.08	-.04	-.12
19. TINT7	-.44*	-.23	.13	.03	.23	.08	-.09	-.20	-.14	-.13	-.07	.14	-.15
20. MSS7	.21	.11	-.31*	-.24†	-.48**	-.30*	.17	.12	.32**	.13	-.09	.32*	.01
21. PSS7	.19	.28*	-.30*	-.08	-.29*	-.28*	.03	.26†	.00	-.06	.14	.22	.35*
22. TSS7	.13	.09	-.11	.02	-.15	-.01	-.03	.09	.01	-.11	.05	.03	.08
23. SES	.12	-.04	-.01	-.03	-.00	.10	-.00	-.09	.31*	.40**	-.01	.12	.11

	Child Outcome at 7 years old									
	14	15	16	17	18	19	20	21	22	23
1. MDAS	.01	-.11	-.18	-.27*	-.31*	-.06	.16	.04	.09	-.01
2. PDAS	-.08	-.27*	-.06	-.16	-.32*	-.03	.05	.08	-.01	.18*
3. MSCL	.20*	.00	.07	.26*	-.03	.02	-.16	-.06	-.18	-.19*
4. PSCL	-.02	.23*	.15	.08	.35*	-.01	-.01	.09	-.00	-.10
5. MPDH	.22*	.20 †	.17	.22*	.13	.12	-.19†	.19†	-.16	.03
6. PPDH	.16	.24*	.05	.11	.20†	-.02	-.14	-.29*	-.12	-.13
7. MCREL	.04	.03	-.21*	.07	-.11	.25*	.19*	.10	.27*	-.07
8. PCREL	.08	.17	-.03	.07	-.03	-.17	.02	.03	.12	-.04
9. COH	-.11	-.19†	-.02	-.07	-.22*	-.04	.15	.24*	.05	.22*
10. WARM	-.08	-.20†	.04	-.06	-.25*	-.04	.12	.11	-.06	.16
11. CONF	.24*	.25*	.09	.05	.15	-.02	-.06	-.29*	-.01	.02
12. ORG	-14	-.11	-.06	.06	-.06	.14	.12	.26*	.06	-.07
13. CONT	.20*	.21*	.30*	.14	.27*	.07	-.04	-.22*	-.27*	.03
14. MEXT7	--	.67**	.33*	.52**	.31*	-.04	-.47**	-.42**	-.37**	-.15
15. PEXT7	.62**	--	.52**	.23*	.58**	.02	-.39**	-.41**	-.34*	-.17
16. TEXT7	.20	.12	--	.25*	.45**	.36**	-.22*	-.17	-.56**	-.00
17. MINT7	.60**	.37*	-.03	--	.47**	.11	-.40**	-.24*	-.27*	-.10
18. PINT7	.44*	.71**	-.18	.56**	--	.14	-.37**	-.30*	-.19	-.05
19. TINT7	.30*	.36*	.24†	.29*	.41**	--	-.23*	-.14	-.35**	-.07
20. MSS7	-.34*	-.29*	-.17	-.21†	-.23	-.31*	--	.54**	.35*	.10
21. PSS7	-.27*	-.26†	-.08	.03	-.19	-.16	.46**	--	.35*	.13
22. TSS7	-.10	-.18	-.42*	-.05	-.13	-.52**	.38*	.37*	--	.14
23. SES	-.16	-.11	.14	-.25*	-.22	-.24†	-.07	-.13	.04	--

†=p<.08, *=p<.05, **=p<.001

Note: Highlighted sections are comparisons of correlations at same time point. MDAS=Maternal Dyadic Adjustment, PDAS=Paternal Dyadic Adjustment, MSCL=Maternal Symptomatology, PSCL=Paternal Symptomatology, MPDH=Maternal Parenting Hassles, PPDH=Paternal Parenting Hassles, MCREL=Mother-Child Relationship, PCREL=Father-Child Relationship, COH=Cohesion, WARM=Warmth, CONF=Conflict, ORG=Organization, CONT=Control, MEXT7=Maternal report externalizing, PEXT7=Paternal report externalizing, TEXT7=Teacher report externalizing, MINT7=Maternal report internalizing, PINT7=Paternal report internalizing, TINT7=Teacher report internalizing, MSS7=Maternal report social skills, PSS7=Paternal report social skills, TSS7=Teacher report social skills.

Table 8

Correlation Table of All Study Variables, Partialing out the Effect of Status

	Family Risk Factors at age 5								Family System at age 6				
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. MDAS	--	.65**	-.37**	-.22*	-.33**	-.15*	.07	.03	.12	.22*	-.01	.02	-.02
2. PDAS	--	--	-.29**	-.44**	-.18*	-.29**	-.02	-.04	.14†	.15†	-.02	-.06	.01
3. MSCL	--	--	--	.19*	.43**	.22*	-.10	.06	-.12	-.11	-.04	-.09	-.04
4. PSCL	--	--	--	--	.14†	.33**	-.01	.05	-.15†	-.10	.01	.11	-.07
5. MPDH	--	--	--	--	--	.31**	-.17*	-.05	-.16*	-.13	.06	-.15*	.08
6. PPDH	--	--	--	--	--	--	-.04	-.13	-.17*	-.11	.15†	-.05	.05
7. MCREL	--	--	--	--	--	--	--	.26**	.19*	.01	.25**	.26*	-.12
8. PCREL	--	--	--	--	--	--	--	--	.16*	.16†	-.06	.22*	-.12
9. COH	--	--	--	--	--	--	--	--	--	.74**	-.40**	.34**	-.18*
10. WARM	--	--	--	--	--	--	--	--	--	--	-.29**	.28**	-.25**
11. CONF	--	--	--	--	--	--	--	--	--	--	--	-.42**	.31**
12. ORG	--	--	--	--	--	--	--	--	--	--	--	--	-.22*
13. CONT	--	--	--	--	--	--	--	--	--	--	--	--	--
14. MEXT7	--	--	--	--	--	--	--	--	--	--	--	--	--
15. PEXT7	--	--	--	--	--	--	--	--	--	--	--	--	--
16. TEXT7	--	--	--	--	--	--	--	--	--	--	--	--	--
17. MINT7	--	--	--	--	--	--	--	--	--	--	--	--	--
18. PINT7	--	--	--	--	--	--	--	--	--	--	--	--	--
19. TINT7	--	--	--	--	--	--	--	--	--	--	--	--	--
20. MSS7	--	--	--	--	--	--	--	--	--	--	--	--	--
21. PSS7	--	--	--	--	--	--	--	--	--	--	--	--	--
22. TSS7	--	--	--	--	--	--	--	--	--	--	--	--	--
23. SES	--	--	--	--	--	--	--	--	--	--	--	--	--

	Child Outcome at age 7									
	14	15	16	17	18	19	20	21	22	23
1. MDAS	-.21*	-.24*	-.14	-.27*	-.38**	-.25*	.18*	.09	.09	.05
2. PDAS	-.11	-.34**	-.05	-.09	-.35**	-.12	.09	.15†	.02	.09
3. MSCL	.24*	.16*	.03	.28*	.22*	.08	-.25*	-.18*	-.16*	-.10
4. PSCL	.06	.28*	.17†	.08	.37**	.04	-.14	.02	-.07	-.07
5. MPDH	.34**	.29**	.19*	.32*	.28*	.17*	-.34**	-.23*	-.16†	.01
6. PPDH	.21*	.30**	-.01	.14	.30**	.05	-.23*	-.29**	-.13	-.04
7. MCREL	-.01	-.04	-.14†	.00	-.15	-.18*	.17*	.08	.14†	-.04
8. PCREL	-.02	.07	-.11	.02	-.04	-.19*	.06	.09	.11	-.04
9. COH	-.03	-.14	-.03	.02	-.17*	-.07	.22*	.16†	.01	.26**
10. WARM	-.02	-.16†	.00	-.00	-.18*	-.08	.12	.05	-.07	.24*
11. CONF	.13	.19*	.12	.07	.07	-.05	-.07	-.15†	.03	.01
12. ORG	-.13†	-.16†	-.04	-.02	-.06	.15†	.18*	.25*	.02	.01
13. CONT	.05	.09	.23*	.03	.12	-.03	-.03	-.02	-.11	.05
14. MEXT7	--	.65**	.28**	.56**	.35**	.12	-.41**	-.37**	-.27*	-.17*
15. PEXT7	--	--	.37**	.27*	.62**	.17†	-.35**	-.36**	-.29*	-.16†
16. TEXT7	--	--	--	.11	.20*	.30**	-.19*	-.14	-.50**	.03
17. MINT7	--	--	--	--	.50**	.20*	-.31**	-.12	-.16*	-.17*
18. PINT7	--	--	--	--	--	.26*	-.31**	-.26*	-.20†	-.11
19. TINT7	--	--	--	--	--	--	-.27*	-.15	-.44**	-.15†
20. MSS7	--	--	--	--	--	--	--	.51**	.36**	.06
21. PSS7	--	--	--	--	--	--	--	--	.36**	.05
22. TSS7	--	--	--	--	--	--	--	--	--	.13
23. SES	--	--	--	--	--	--	--	--	--	--

†=p<.08, *=p<.05, **=p<.001

Note: : Highlighted sections represent correlations within the same time point. MDAS=Maternal Dyadic Adjustment, PDAS=Paternal Dyadic Adjustment, MSCL=Maternal Symptomatology, PSCL=Paternal Symptomatology, MPDH=Maternal Parenting Hassles, PPDH=Paternal Parenting Hassles, MCREL=Mother-Child Relationship, PCREL=Father-Child Relationship, COH=Cohesion, WARM=Warmth, CONF=Conflict, ORG=Organization, CONT=Control, MEXT7=Maternal report externalizing, PEXT7=Paternal report externalizing, TEXT7=Teacher report externalizing, MINT7=Maternal report internalizing, PINT7=Paternal report internalizing, TINT7=Teacher report internalizing, MSS7=Maternal report social skills, PSS7=Paternal report social skills, TSS7=Teacher report social skills.

Table 9

Factor Solution with Combined Sample (n=194) using Principal Components Analysis with Promax Rotation

Scale	Harmonious	Enmeshed	Communalities
Eigenvalue	2.427	.978	
Cohesion	.934	-.420	.874
Warmth	.922	-.353	.852
Conflict	-.413	.781	.618
Organization	.378	-.723	.529
Control	-.178	.716	.532

Table 10

Factor Solution with TD Sample (n=119) using Principal Components Analysis with Promax Rotation

Scale	Harmonious	Enmeshed	Communalities
Eigenvalue	2.461	1.152	
Cohesion	.930	-.344	.865
Warmth	.907	-.294	.824
Conflict	-.442	.824	.701
Organization	.445	-.805	.673
Control	-.024	.697	.550

Table 11

Factor Solution with DD Sample (n=75) using Principal Components Analysis with Promax Rotation

Scale	Harmonious	Enmeshed	Communalities
Eigenvalue	2.405	.891	
Cohesion	.816	.592	.748
Warmth	.826	.474	.706
Conflict	-.667	-.150	.462
Organization	.252	.926	.875
Control	-.677	-.078	.504

Table 12

Analysis of Covariance for Cohesion as a Function of Developmental Status, Child Gender, and Socioeconomic Status

Source	df	ms	F	p	Partial η^2
Corrected Model	4	8.38	7.26	<.001	.133
Intercept	1	2006.82	1738.10	<.001	.902
SES	1	10.49	9.09	.003	.046
Child Gender	1	11.93	10.33	.002	.012
Status	1	2.60	2.25	.135	.052
Status*Gender	1	3.67	3.18	.08	.017
Error	189	1.25			

Table 13

Adjusted Means and Standard Deviations for Cohesion as a Function of Status and Child Gender, Controlling for Socioeconomic Status

Status	Male				Female		
	N	M	SE		N	M	SE
TD	67	3.61	.13		52	3.38	.15
DD	45	3.65	.16		30	2.84	.20

Table 14

Analysis of Covariance for Warmth as a Function of Developmental Status, Using Socioeconomic Status and the Presence of a Father as Covariates

Source	df	ms	*F*	*p*	Partial η^2
Corrected Model	3	7.99	6.40	<.001	.092
Intercept	1	233.66	187.17	<.001	.496
SES	1	8.48	6.80	.010	.035
Dad Present	1	7.98	6.40	.012	.033
Status	1	0.49	.40	.530	.002
Error	190	1.25			

Table 15

Analysis of Covariance for Organization as a Function of Developmental Status, Using Presence of a Father as a Covariate

Source	df	ms	F	p	Partial η^2
Corrected Model	2	5.38	5.72	.004	.056
Intercept	1	430.62	457.89	<.001	.706
Dad Present	1	9.61	10.22	.002	.051
Status	1	0.53	0.57	.452	.003
Error	191	0.94			

Table 16

Predictions to Behavior Problems from Risk Factors (c paths) and Family Systems Attributes (b paths)

Predictors	TD B(SE)	DD B(SE)	X^2 diff	Constrained B(SE)
Predictions to Pooled Parent Reported Externalizing Behaviors				
c paths: Family Risk to Child Behavior				
DAS Combined Report	-.03(.04)	-.12(.03)**	2.598	-.08(.03)*
SCL Mother Report	.03(.03)	.08(.03)*	1.034	.05(.02)*
SCL Father Report	.03(.04)	.09(.06)	.710	.05(.04)
PDH Mother Report	.15(.06)*	.23(.05)**	1.105	.19(.04)**
PDH Father Report	.13(.06)*	.20(.07)*	.644	.16(.05)*
SES	-1.53(.76)*	-1.37(1.09)	.014	-1.48(.62)
b paths: Family Systems to Child Behavior				
Warmth	-.45(.57)	.85(.81)	1.672	-.02(.48)
Conflict	1.90(.67)*	-.30(.93)	3.631†	
Control	1.47(.63)*	-1.09(.74)	**6.747***	
Predictions to Teacher Reported Externalizing Behaviors				
c paths: Family Risk to Child Behavior				
M-C Pleasure	-2.57(1.28)*	-1.20(2.48)	.241	-2.28(1.14)*
SES	-.03(.70)	1.37(1.28)	.912	.29(.62)
b paths: Family Systems to Child Behavior				
Control	1.68(.56)*	.73(.87)	.857	1.40(.47)*
Predictions to Pooled Parent Reported Internalizing Behaviors				
c paths: Family Risk to Child Behavior				
DAS Combined Report	-.10(.03)**	-.05(.03)†	1.495	-.08(.02)**
SCL Mother Report	.04(.02)†	.09(.02)**	1.762	.06(.02)**
SCL Father Report	.08(.03)*	.06(.05)	.071	.07(.03)*
PDH Mother Report	.09(.04)*	.18(.04)**	2.464	.13(.03)**
PDH Father Report	.09(.05)*	.15(.05)*	.702	.12(.04)*
SES	-.50(.54)	-1.92(.86)*	1.927	-.90(.46) †
b paths: Family Systems to Child Behavior				
Cohesion	-.46(.45)	1.37(.61)* [a]	**5.600***	
Warmth	-.57(.42)	1.17(.62)† [b]	**5.139***	
Control	1.20(.46)*	-.46(.59)	**4.881***	

Predictions to Teacher Reported Internalizing Behaviors

c paths: Family Risk to Child Behavior

DAS Combined Report	-.02(.04)	-.09(.04)*	1.787	-.06(.03)*
M-C Pleasure	-3.08(1.26)*	-2.24(2.39)	.097	-2.90(1.11)*
SES	-.46(.69)	-2.43(1.24) †	1.907	-.92(.61)

†=p<.08, *=p<.05, **=p<.001   Note: Socioeconomic status is controlled for in all analyses. Combined path coefficient is reported only when X^2 difference test is nonsignificant. [a]When outlier case is not included, the path coefficient the regression of cohesion on parent reported internalizing behaviors is B(SD)=.71(.57), *p*=.22

[b]When outlier case is not included, the path coefficient the regression of warmth on parent reported internalizing behaviors is B(SD)=.73(.56), *p*=.19

Table 17

Prediction to Social Skills from Risk Factors (c paths) and Family Systems Attributes (b paths)

Predictors	TD B(SE)	DD B(SE)	X^2 diff	Constrained B(SE)
Predictions to Pooled Parent Reported Social Skills				
c paths: Family Risk to Child Behavior				
DAS Combined Report	.09(.09)	.16(.08)†	.328	.13(.06)*
SCL Mother Report	-.10(.07)	-.22(.07)*	1.494	-.16(.05)*
SCL Father Report	.06(.10)	-.23(.14)	2.880	-.04(.08)
PDH Mother Report	-.29(.12)*	-.51(.11)**	1.818	-.41(.08)**
PDH Father Report	-.33(.14)*	-.36(.14)*	.038	-.34(.10)**
M-C Pleasure	4.71(2.58)†	4.49(4.09)	.002	4.65(2.18)*
F-C Pleasure	1.07(2.37)	5.99(4.14)	1.042	2.24(2.07)
SES	1.59(1.66)	-1.70(2.35)	1.306	.50(1.37)
b paths: Family Systems to Child Behavior				
Cohesion	2.27(1.33)	4.52(1.64)*	1.135	3.15(1.04)*
Conflict	-2.63(1.50)†	-.82(1.98)	.532	-1.97(1.20)
Organization	3.38(1.47)*	5.78(1.74)**	1.101	4.37(1.14)**
Control	-1.91(1.39)	1.39(1.60)	2.399	-.51(1.07)
Predictions to Teacher Reported Social Skills				
c paths: Family Risk to Child Behavior				
M-C Pleasure	6.96(2.55)*	-.83(4.98)	1.918	5.37(2.30)*
SES	2.01(1.42)	.77(2.57)	.179	1.72(1.24)
b paths: Family Systems to Child Behavior				
Control	-3.06(1.16)*	.89(1.74)	3.516†	

†=p<.08 *=p<.05, **=p<.001
Note: Socioeconomic status is controlled for in all analyses. Combined path coefficient is reported only when X^2 difference test is nonsignificant

Table 18

Predictions to Family Systems Attributes from Family Risk Factors (a paths)

Predictors	TD B(SE)	DD B(SE)	X^2 diff	Constrained B(SE)
a paths: Family Risk to Family Systems				
Predictions to Cohesion				
PDH Mother Report	-.01(.01)	-.02(.01)†	.233	-.01(.01)*
M-C Pleasure	.65(18)**	.44(.30)	.395	.60(.15)**
F-C Pleasure	.29(.17)	.37(.30)	.047	.31(.15)*
Predictions to Warmth				
DAS Combined Report	.02(.01)*	.01(.01) †	.110	.01(.01)*
M-C Pleasure	.36(.20)†	.61(.28)*	.571	.44(.16)*
F-C Pleasure	.31(.18)†	.34(.27)	.011	.32(.15)*
Predictions to Conflict				
PDH Father Report	.02(.01)*	.00(.01)	3.501†	.01(.01) †
Predictions to Organization				
SCL Mother Report	.00(.00)	-.01(.00)†	2.064	-.00(.00)
PDH Mother Report	-.02(.01)†	-.01(.01)	.274	-.01(.01)*
M-C Pleasure	.41(.16)*	.70(.27)*	.838	.48(.14)**
F-C Pleasure	.24(.14)	.69(.25)*	2.217	.34(.13)*
Predictions to Control				
SCL Mother Report	-.01(.01)†	.00(.01)	3.608 †	
M-C Pleasure	-.10(.17)	-.64(.30)*	2.352	-.30(.15)†

†=p<.08 *=p<.05, **=p<.001

Note: Socioeconomic status is controlled in predictions to cohesion and warmth. Combined path coefficient is reported only when X^2 difference test is nonsignificant

Table 19

Table of Single Mediators to Behavior Problems

Mediators	a	b	c'	ab	95% CI of mediated effect Lower	Upper
Outcome: Pooled Parent Externalizing						
TD: PDH Dad to Conflict	.02(.01)*	1.64(1.07)	.09(.06)	.04(.03)	-.003	.136
TD: SCL Mom to Control	-.01(.00)*	1.54(.81)†	.04(.04)	-.01(.01)	-.043	.000
Outcome: Teacher Externalizing						
TD: SCL Mom to Control	-.01(.00)*	1.79(.96) †	.04(.03)	-.02(.01)	-.049	.001
Outcome: Pooled Parent Internalizing						
DD: PDH Mom to Cohesion	-.02(.01)	1.67(.73)*	.20(.04)*	-.07(.05)	-.088	.001
DD: DAS to Warmth	.01(.01)	1.54(.72)*	-.07(.03)*	.02(.02)	-.001	.063
DD: MC Pleasure to Warmth	.61(.26)*	1.51(.83)†	-3.06(1.62) †	.93(.70)	-.062	2.740
TD: SCL Mom to Control	-.01(.00) †	1.23(.56)*	.05(.03)	-.01(.01)	**-.024**	**-.001**

†=p<.08 *=p<.05, **=p<.001

Table 20

Table of Single Mediators to Social Skills

Mediators	a	b	c'	ab	95% CI of mediated effect	
					Lower	Upper
Outcome: Pooled Parent Social Skills						
DD: PDH Mom to Cohesion	-.02(.01)†	3.61(1.25)*	-.47(.11)*	-.06(.05)	**-.186**	**-.002**
Combined: PDH Mom to Cohesion	-.02(.01)*	2.84(1.04)*	-.44(.09)**	-.04(.02) †	**-.108**	**-.004**
Combined: MC Pleasure to Cohesion	.60(.15)**	2.88(1.17)*	4.48(2.32) †	1.74(.83)*	**.339**	**3.682**
Combined: FC Pleasure to Cohesion	.35(.14)*	3.05(1.16)*	3.36(2.08)	1.06(.63)	**.148**	**2.858**
TD: PDH Dad to Conflict	.02(.01)*	-1.91(1.66)	-.26(.14)†	-.04(.04)	-.192	.012
TD: SCL Mom to Organization	.00(.01)	3.37(1.44)*	-.09(.09)	.00(.01)	-.044	.033
TD: PDH Mom to Organization	-.02(.01)*	2.99(1.48)*	-.25(.13)†	-.05(.03)	**-.132**	**-.002**
Combined: PDH Mom to Organization	-.01(.01)*	3.65(1.19)*	-.41(.09)**	-.05(.03)	**-.115**	**-.006**
TD: MC Pleasure to Organization	.42(.16)*	3.04(1.45)*	3.52(2.89)	1.28(.81)	**.088**	**3.657**
DD: MC Pleasure to Organization	.68(.26)*	5.61(1.79)*	.40(3.18)	3.83(2.04)†	**.908**	**8.637**
Combined: MC Pleasure to Organization	.51(.14)**	4.19(1.22)*	4.19(2.29) †	2.14(.95)*	**.740**	**4.490**
TD: FC Pleasure to Organization	.25(.14)†	3.43(1.44)*	.21(2.56)	.86(.66)	-.016	2.716
DD: FC Pleasure to Organization	.69(.23)*	5.14(1.94)*	3.87(3.47)	3.52(1.97)†	**.800**	**8.981**
Combined: FC Pleasure to Organization	.38(.11)*	4.25(1.22)*	3.01(2.10)	1.63(.74)*	**.497**	**3.518**
Outcome: Teacher Social Skills						
TD: SCL Mom to Control	-.01(.00)*	-3.45(1.21)*	-.12(.05)*	.03(.02)	**.004**	**.080**

†=p<.08 *=p<.05, **=p<.001

Table 21

Table for Final Model of SEM Results Predicting Parental Reports of
Externalizing Behaviors for TD Children (n=144)

Parameter	B(*SE*)
SCL Mom $\rightarrow$ Control	-.01(.00)*
Control $\rightarrow$ Pooled Parent Externalizing	1.32(.76)
PDH Mom $\rightarrow$ Pooled Parent Externalizing	.13(.06)*
PDH Dad $\rightarrow$ Pooled Parent Externalizing	.08(.07)
SES $\rightarrow$ Pooled Parent Externalizing	-1.41(.70)*
Covariances	
SCL Mom with PDH Mom	35.14(22.98)
SCL Mom with PDH Dad	8.12(21.61)
SCL Mom with SES	-3.09(1.55)*
PDH Mom with PDH Dad	26.25(12.51)*
PDH Mom with SES	.28(.80)
PDH Dad with SES	-1.53(.97)

R^2 of Pooled Parent Externalizing=.142
R^2 of Control=.027

$X^2(4)=2.025$ $p=.731$
CFI=1.00
RMSEA=.000
SRMR=.027

95% CI from SCLMom$\rightarrow$Control$\rightarrow$ Pooled Parent Externalizing [-.045, .001]

†=p<.08 *=p<.05, **=p<.001
Note: These are the results of the full model, with all significant predictors, mediators, and covariates
included. B(SE) is the unstandardized coefficient and standard error.

Table 22

Table for Final Model of SEM Results Predicting Parental Reports of Externalizing Behaviors for Children with DD (n=98)

Parameter	B(*SE*)
DAS Combined→ Pooled Parent Externalizing	-.08(.04)†
SCL Mom → Pooled Parent Externalizing	-.02(.05)
PDH Mom → Pooled Parent Externalizing	.20(.07)*
PDH Dad → Pooled Parent Externalizing	.02(.09)
SES → Pooled Parent Externalizing	-.83(1.17)
Covariances	
DAS Combined with SCL Mom	-209.02(82.24)*
DAS Combined with PDH Mom	-96.74(51.75)†
DAS Combined with PDH Dad	-109.95(52.32)*
DAS Combined with SES	2.19(2.06)
SCL Mom with PDH Mom	241.17(56.13)**
SCL Mom with PDH Dad	147.15(47.99)*
SCL Mom with SES	-.30(2.14)
PDH Mom with PDH Dad	92.24(26.63)*
PDH Mom with SES	-.04(1.28)
PDH Dad with SES	.37(1.37)
R^2 of Pooled Parent Externalizing=.260	
Just identified model; no fit statistics available	

†=p<.08 *=p<.05, **=p<.001
Note: These are the results of the full model, with all significant predictors, mediators, and covariates included. B(SE) is the unstandardized coefficient and standard error.

Table 23

Table for Final Model of SEM Results Predicting Parental Reports of Internalizing Behaviors for TD Children (n=144)

Parameter	B(*SE*)
SCL Mom → Control	-.01(.00)*
Control → Pooled Parent Internalizing	1.03(.46)*
PDH Mom → Pooled Parent Internalizing	.04(.04)
PDH Dad → Pooled Parent Internalizing	.03(.05)
SCL Dad → Pooled Parent Internalizing	.03(.04)
DAS Combined → Pooled Parent Internalizing	-.08(.04)*
SES → Pooled Parent Internalizing	-.16(.52)
Covariances	
SCL Mom with PDH Mom	35.80(22.94)
SCL Mom with PDH Dad	10.78(22.59)
SCL Mom with SCL Dad	62.79(39.14)
SCL Mom with DAS Combined	-119.91(37.61)*
SCL Mom with SES	-3.08(1.54)*
PDH Mom with PDH Dad	26.29(12.72)*
PDH Mom with SCL Dad	15.81(16.26)
PDH Mom with DAS Combined	-55.59(18.23)*
PDH Mom with SES	.34(.81)
PDH Dad with SCL Dad	62.09(28.30)*
PDH Dad with DAS Combined	-30.23(20.82)
PDH Dad with SES	-1.60(.99)
SCL Dad with DAS Combined	-136.88(33.83)**
SCL Dad with SES	-1.85(1.40)
DAS Combined with SES	1.64(1.34)

R^2 of Pooled Parent Internalizing=.196
R^2 of Control=.025

$X^2(6)$=5.164 *p*=.523
CFI=1.00
RMSEA=.000
SRMR=.029

95% CI from SCLMom→Control→ Pooled Parent Internalizing
   [-.024, -.001]

†=p<.08 *=p<.05, **=p<.001
Note: These are the results of the full model, with all significant predictors, mediators, and covariates included. B(SE) is the unstandardized coefficient and standard error.

Table 24

Table for Final Model of SEM Results Predicting Parental Reports of
Internalizing Behaviors for DD Children (n=98, with outlier)

Parameter	B(*SE*)
PDH Mom → Cohesion	-.02(.01)†
Child Gender → Cohesion	.75(.26)*
SES → Cohesion	.35(.16)*
Cohesion→ Pooled Parent Internalizing	1.71(.80)*
PDH Mom → Pooled Parent Internalizing	.13(.06)*
PDH Dad → Pooled Parent Internalizing	.03(.08)
SCL Mom → Pooled Parent Internalizing	.04(.03)
DAS Combined → Pooled Parent Internalizing	-.01(.03)
SES → Pooled Parent Internalizing	-2.53(1.02)*
Covariances	
SCL Mom with PDH Mom	240.92(55.88)**
SCL Mom with PDH Dad	148.20(48.59)*
SCL Mom with DAS Combined	-228.29(85.14)*
SCL Mom with Child Gender	.44(1.23)
SCL Mom with SES	-.28(2.18)
PDH Mom with PDH Dad	92.61(26.83)*
PDH Mom with DAS Combined	-103.46(53.20)†
PDH Mom with Child Gender	-.00(.70)
PDH Mom with SES	-.04(1.28)
PDH Dad with DAS Combined	-110.96(53.54)*
PDH Dad with Child Gender	.21(.74)
PDH Dad with SES	.34(1.40)
DAS Combined with Child Gender	.64(1.17)
DAS Combined with SES	2.76(2.30)
Child Gender with SES	.09(.04)*

R^2 of Pooled Parent Internalizing=.364
R^2 of Cohesion=.228

$X^2(4)=1.323$ $p=.857$
CFI=1.00
RMSEA=.000
SRMR=.020

95% CI from SCLMom→Cohesion→ Pooled Parent Internalizing
    [-.086,- .001]

†=p<.08 *=p<.05, **=p<.001
Note: These are the results of the full model, with all significant predictors, mediators, and covariates
included. B(SE) is the unstandardized coefficient and standard error.

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Table 25

Table for Final Model of SEM Results Predicting Teacher Reports of Externalizing Behaviors for TD Children (n=144)

Parameter	B(*SE*)
SCL Mom → Control	-.01(.00)*
Control → Teacher Externalizing	1.67(.92)†
Mother Child Pleasure → Teacher Externalizing	-2.14(1.04)*
SCL Mom → Teacher Externalizing	.04(.03)
SES → Teacher Externalizing	-.36(.62)
Covariances	
Mother-Child Pleasure with SCL Mom	-.72(.75)
Mother-Child Pleasure with SES	-3.08(1.56)*
SCL Mom with SES	-.03(.04)

R^2 of Teacher Externalizing=.130
R^2 of Control=.027

$X^2(2)$=0.408 p=.815
CFI=1.00
RMSEA=.000
SRMR=.014

95% CI from SCL Mom→Control→Teacher Externalizing [-.046, .002]

†=p<.08 *=p<.05, **=p<.001
Note: These are the results of the full model, with all significant predictors, mediators, and covariates included. B(SE) is the unstandardized coefficient and standard error.

Table 26

Table for Final Model of SEM Results Predicting Teacher Reports of
Internalizing Behaviors for the Combined Sample (n=242)

Parameter	B(*SE*)
DAS Combined→ Teacher Internalizing	-.06(.03)*
Mother-Child Pleasure → Teacher Internalizing	-3.07(1.09)*
SES → Teacher Internalizing	-1.26(.59)*
Covariances	
DAS Combined with Mother-Child Pleasure	.35(.61)
DAS Combined with SES	1.69(1.25)
Mother-Child Pleasure with SES	-.00(.03)

R^2 of Teacher Internalizing=.127

Just identified model; no fit statistics available

†=p<.08 *=p<.05, **=p<.001
Note: These are the results of the full model, with all significant predictors, mediators, and covariates
included. B(SE) is the unstandardized coefficient and standard error.

Table 27

Table for Final Model of SEM Results Predicting Teacher Reports of Social Skills for TD Children (n=144)

Parameter	B(*SE*)
SCL Mom → Control	-.01(.00)*
Control → Teacher Externalizing	-3.03(1.19)*
Mother Child Pleasure → Teacher Externalizing	6.06(2.47)*
SCL Mom → Teacher Externalizing	-.11(.05)*
SES → Teacher Externalizing	1.17(1.40)
Covariances	
Mother-Child Pleasure with SCL Mom	-.73(.75)
Mother-Child Pleasure with SES	-.03(.04)
SCL Mom with SES	-3.08(1.55)*

R^2 of Teacher Social Skills=..178
R^2 of Control=.029

$X^2(2)$=.390 p=.823
CFI=1.00
RMSEA=.000
SRMR=.016

95% CI from SCL Mom→Control→Teacher Social Skills [.003, .071]

†=p<.08 *=p<.05, **=p<.001
Note: These are the results of the full model, with all significant predictors, mediators, and covariates included. B(SE) is the unstandardized coefficient and standard error.

Table 28

Table for Model of SEM Results Predicting Parental Reports of Social Skills for
the Combined Sample Using Organization only as a Mediator (n=242)

Parameter	B(*SE*)
PDH Mom → Organization	-.01(.01)†
Mother-Child Pleasure → Organization	.30(.14)*
Father-Child Pleasure → Organization	.23(.12)†
Presence of a Father → Organization	.56(.21)*
Organization → Pooled Parent Social Skills	3.26(1.18)*
PDH Mom → Pooled Parent Social Skills	-.28(.11)*
PDH Dad → Pooled Parent Social Skills	-.22(.11)*
Mother-Child Pleasure→ Pooled Parent Social Skills	2.77(2.19)
SCL Mom → Pooled Parent Social Skills	-.07(.06)
DAS Combined → Pooled Parent Social Skills	-.00(.07)
SES → Pooled Parent Social Skills	1.74(1.35)
Covariances	
PDH Mom with Mother-Child Pleasure	-1.23(.39)*
PDH Mom with Father-Child Pleasure	-.71(.53)
PDH Mom with SCL Mom	122.37(29.37)**
PDH Mom with DAS Combined	-74.11(25.37)*
PDH Mom with PDH Dad	53.05(13.94)**
PDH Mom with Presence of a Father	.26(.38)
PDH Mom with SES	-.13(.76)
Mother-Child Pleasure with Father-Child Pleasure	.13(.03)**
Mother-Child Pleasure with SCL Mom	-1.26(.62)*
Mother-Child Pleasure with DAS Combined	.46(.64)
Mother-Child Pleasure with PDH Dad	-.18(.57)
Mother-Child Pleasure with Presence of a Father	.02(.02)
Mother-Child Pleasure with SES	-.00(.03)
Father-Child Pleasure with SCL Mom	.26(1.15)
Father-Child Pleasure with DAS Combined	.09(1.08)
Father-Child Pleasure with PDH Dad	-.93(.79)
Father-Child Pleasure with Presence of a Father	.01(.04)
Father-Child Pleasure with SES	.00(.05)
SCL Mom with DAS Combined	-164.07(44.58)**
SCL Mom with PDH Dad	61.37(27.06)*
SCL Mom with Presence of a Father	-.69(.70)
SCL Mom with SES	-2.38(1.33)†
DAS Combined with PDH Dad	-60.43(29.06)*
DAS Combined with Presence of a Father	.65(1.18)
DAS Combined with SES	2.25(1.35)
PDH Dad with Presence of a Father	1.02(1.18)

PDH Dad with SES	-.29(.98)
Presence of a Father with SES	.11(.03)

R^2 of Pooled Parent Social Skills=.229
R^2 of Organization=.148

$X^2(6)= 3.437$ $p=.752$
CFI=1.00
RMSEA=.000
SRMR=.017

95% CI from PDH Mom→Organization→ Pooled Parent Social Skills [-.099, -.003]
95% CI from MC Pleasure→Organization→ Pooled Parent Social Skills [.105, 2.747]
95% CI from FC Pleasure→Organization→ Pooled Parent Social Skills [.025, 2.131]

†=p<.08 *=p<.05, **=p<.001

Note: These are the results of the full model, with all significant predictors, mediators, and covariates included. B(SE) is the unstandardized coefficient and standard error.

Table 29

Table for Model of SEM Results Predicting Parental Reports of Social Skills for the Combined Sample Using Cohesion only as a Mediator (n=242)

Parameter	B(*SE*)
PDH Mom → Cohesion	-.01(.01)*
Mother-Child Pleasure → Cohesion	.47(.17)*
Father-Child Pleasure → Cohesion	.17(.15)
Child Gender → Cohesion	.44(.16)*
SES → Cohesion	.33(.10)*
Cohesion → Pooled Parent Social Skills	2.34(1.06)*
PDH Mom → Pooled Parent Social Skills	-.32(.11)*
PDH Dad → Pooled Parent Social Skills	-.17(.11)
Mother-Child Pleasure→ Pooled Parent Social Skills	2.78(2.18)
SCL Mom → Pooled Parent Social Skills	-.08(.05)
DAS Combined → Pooled Parent Social Skills	-.01(.07)
SES → Pooled Parent Social Skills	.53(1.34)
Covariances	
PDH Mom with Mother-Child Pleasure	-1.23(.39)*
PDH Mom with Father-Child Pleasure	-.70(.53)
PDH Mom with SCL Mom	122.20(29.35)**
PDH Mom with DAS Combined	-74.66(25.02)*
PDH Mom with PDH Dad	52.67(13.75)**
PDH Mom with Child Gender	.34(.40)
PDH Mom with SES	-.13(.76)
Mother-Child Pleasure with Father-Child Pleasure	.13(.03)**
Mother-Child Pleasure with SCL Mom	-1.26(.632)*
Mother-Child Pleasure with DAS Combined	.42(.63)
Mother-Child Pleasure with PDH Dad	-.37(.50)
Mother-Child Pleasure with Child Gender	.00(.02)
Mother-Child Pleasure with SES	-.00(.03)
Father-Child Pleasure with SCL Mom	.45(1.13)
Father-Child Pleasure with DAS Combined	-.06(1.00)
Father-Child Pleasure with PDH Dad	-.99(.66)
Father-Child Pleasure with Child Gender	.04(.02)
Father-Child Pleasure with SES	.01(.04)
SCL Mom with DAS Combined	-161.68(43.55)**
SCL Mom with PDH Dad	67.73(25.72)*
SCL Mom with Child Gender	.39(.72)
SCL Mom with SES	-2.37(1.33)†
DAS Combined with PDH Dad	-66.57(25.68)*
DAS Combined with Child Gender	.46(.64)
DAS Combined with SES	2.16(1.27)

PDH Dad with Child Gender	-.22(.43)
PDH Dad with SES	-.90(.82)
Child Gender with SES	.03(.03)

R^2 of Pooled Parent Social Skills=.214
R^2 of Cohesion=.209

$X^2(5)= 2.259$ *p*=.812
CFI=1.00
RMSEA=.000
SRMR=.016

95% CI from MC Pleasure→Cohesion→ Pooled Parent Social Skills [.178, 2.666]
95% CI from FC Pleasure→ Cohesion→ Pooled Parent Social Skills [-.138, 1.684]
95% CI from PDH Mom→ Cohesion→ Pooled Parent Social Skills [-.084, -.001]

†=p<.08 *=p<.05, **=p<.001

Note: These are the results of the full model, with all significant predictors, mediators, and covariates included. B(SE) is the unstandardized coefficient and standard error.

Table 30

Table for Final Model of SEM Results Predicting Parental Reports of Social Skills for the Combined Sample Using Cohesion and Organization as Mediators (n=242)

Parameter	B(*SE*)
PDH Mom → Cohesion	-.01(.01)*
Mother-Child Pleasure → Cohesion	.45(.18)*
Father-Child Pleasure → Cohesion	.20(.17)
Child Gender → Cohesion	.40(.16)*
SES → Cohesion	.35(.10)**
PDH Mom → Organization	-.01(.01) †
Mother-Child Pleasure → Organization	.31(.14)*
Father-Child Pleasure → Organization	.22(.12) †
Presence of a Father → Organization	.47(.21)*
Cohesion → Pooled Parent Social Skills	1.53(1.13)
Organization → Pooled Parent Social Skills	2.65(1.29)*
PDH Mom → Pooled Parent Social Skills	-.28(.11)*
PDH Dad → Pooled Parent Social Skills	-.21(.12)†
Mother-Child Pleasure→ Pooled Parent Social Skills	2.20(2.17)
SCL Mom → Pooled Parent Social Skills	-.07(.05)
DAS Combined → Pooled Parent Social Skills	-.01(.06)
SES → Pooled Parent Social Skills	1.12(1.42)
Covariances	
Cohesion with Organization	.24(.10)*
PDH Mom with Mother-Child Pleasure	-1.22(.39)*
PDH Mom with Father-Child Pleasure	-.71(.55)
PDH Mom with SCL Mom	122.43(29.35)**
PDH Mom with DAS Combined	-74.58(25.32)*
PDH Mom with PDH Dad	53.21(14.02)**
PDH Mom with Presence of a Father	.26(.38)
PDH Mom with Child Gender	.34(.40)
PDH Mom with SES	-.12(.76)
Mother-Child Pleasure with Father-Child Pleasure	.13(.03)**
Mother-Child Pleasure with SCL Mom	-1.25(.62)*
Mother-Child Pleasure with DAS Combined	.45(.64)
Mother-Child Pleasure with PDH Dad	-.20(.57)
Mother-Child Pleasure with Presence of a Father	.02(.02)
Mother-Child Pleasure with Child Gender	.00(.02)
Mother-Child Pleasure with SES	-.00(.03)
Father-Child Pleasure with SCL Mom	.22(1.20)
Father-Child Pleasure with DAS Combined	.13(1.14)
Father-Child Pleasure with PDH Dad	-.83(.89)

Father-Child Pleasure with Presence of a Father	.03(.04)
Father-Child Pleasure with Child Gender	.04(.02)
Father-Child Pleasure with SES	.02(.05)
SCL Mom with DAS Combined	-163.34(44.87)**
SCL Mom with PDH Dad	61.84(27.15)*
SCL Mom with Presence of a Father	-.69(.70)
SCL Mom with Child Gender	.39(.72)
SCL Mom with SES	-2.37(1.33)
DAS Combined with PDH Dad	-60.74(29.15)*
DAS Combined wit Presence of a Father	.60(1.18)
DAS Combined with Child Gender	.45(.65)
DAS Combined with SES	2.25(1.36)
PDH Dad with Presence of a Father	.93(1.24)
PDH Dad with Child Gender	-19(.44)
PDH Dad with SES	-.36(1.01)
Presence of a Father with Child Gender	-.01(.01)
Presence of a Father with SES	.11(.03)**
Child Gender with SES	.03(.03)

R^2 of Pooled Parent Social Skills=.235
R^2 of Cohesion=.211
R^2 of Organization=.139

$X^2(12)= 9.750$ p=.638
CFI=1.00
RMSEA=.000
SRMR=.023

95% CI from PDH Mom→Organization→ Pooled Parent Social Skills
  [-.094, .001]
**95% CI from MC Pleasure→Organization→ Pooled Parent Social Skills
  [.020, 2.597]**
95% CI from FC Pleasure→Organization→ Pooled Parent Social Skills
  [-.014, 1.948]
95% CI from MC Pleasure→Cohesion→ Pooled Parent Social Skills
  [-.200, 2.152]
95% CI from FC Pleasure→ Cohesion→ Pooled Parent Social Skills
  [-.139, 1.670]
95% CI from PDH Mom→ Cohesion→ Pooled Parent Social Skills
  [-.073, .004]

†=p<.08 *=p<.05, **=p<.001
Note: These are the results of the full model, with all significant predictors, mediators, and covariates
included. β is the standardized regression coefficient, while B(SE) is the unstandardized coefficient and
standard error.

TD Families

Family System at age 6

Externalizing Behavior at age 7

Internalizing Behavior at age 7

Social Skills at age 7

Family Risk Factors at age 5

a *b₁* *b₂* *b₃* *c₁'* *c₂'* *c₃'*

DD Families

Family System at age 6

Externalizing Behavior at age 7

Internalizing Behavior at age 7

Social Skills at age 7

Family Risk Factors at age 5

a *b₁* *b₂* *b₃* *c₁'* *c₂'* *c₃'*
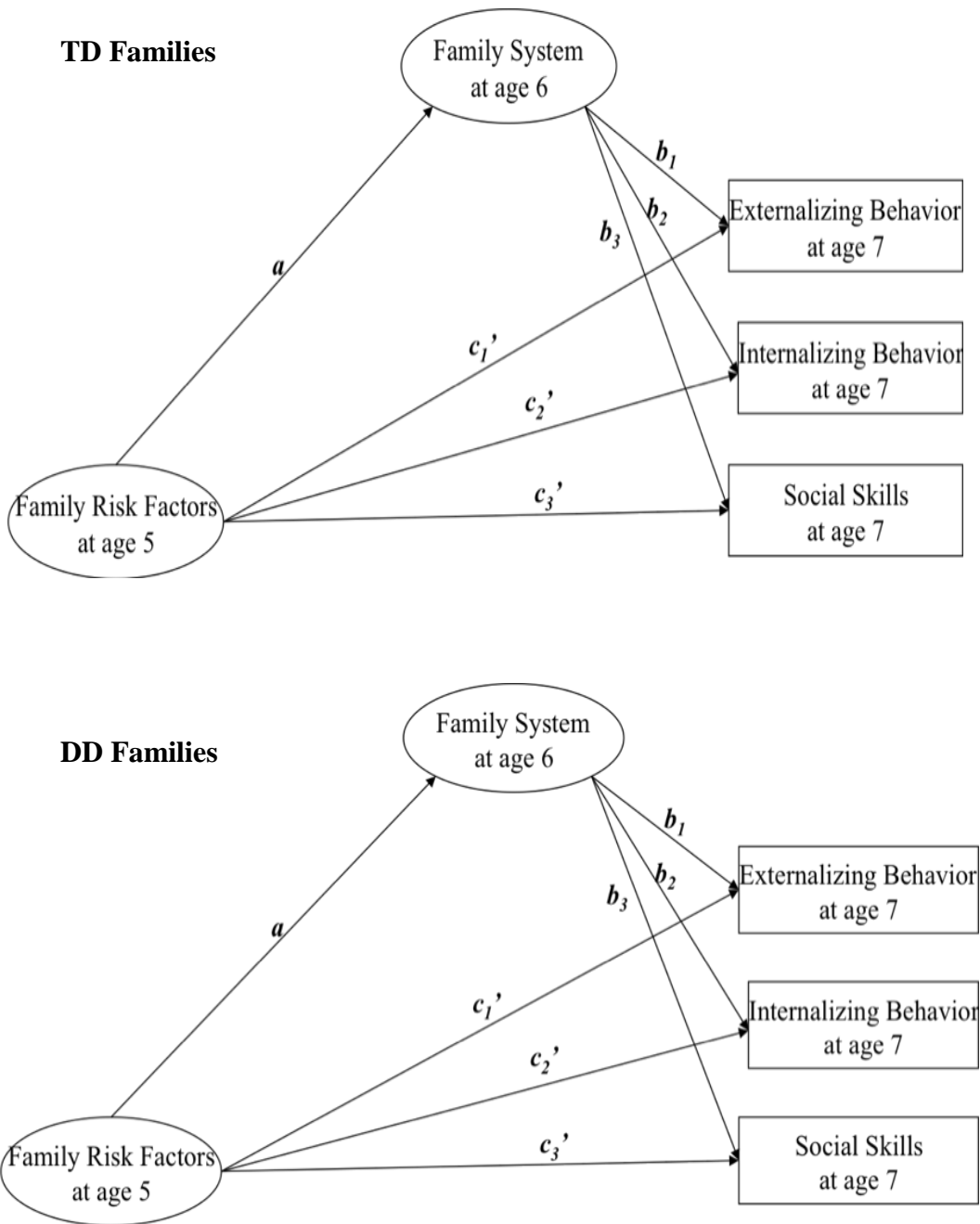
Figure 1. Conceptual model of associations among family risk, the family system, and family outcome. Moderation was tested using a stacked mean and covariance model and using equality constraints and freeing up paths one at a time (i.e. each *a* path, each *b₁* path).
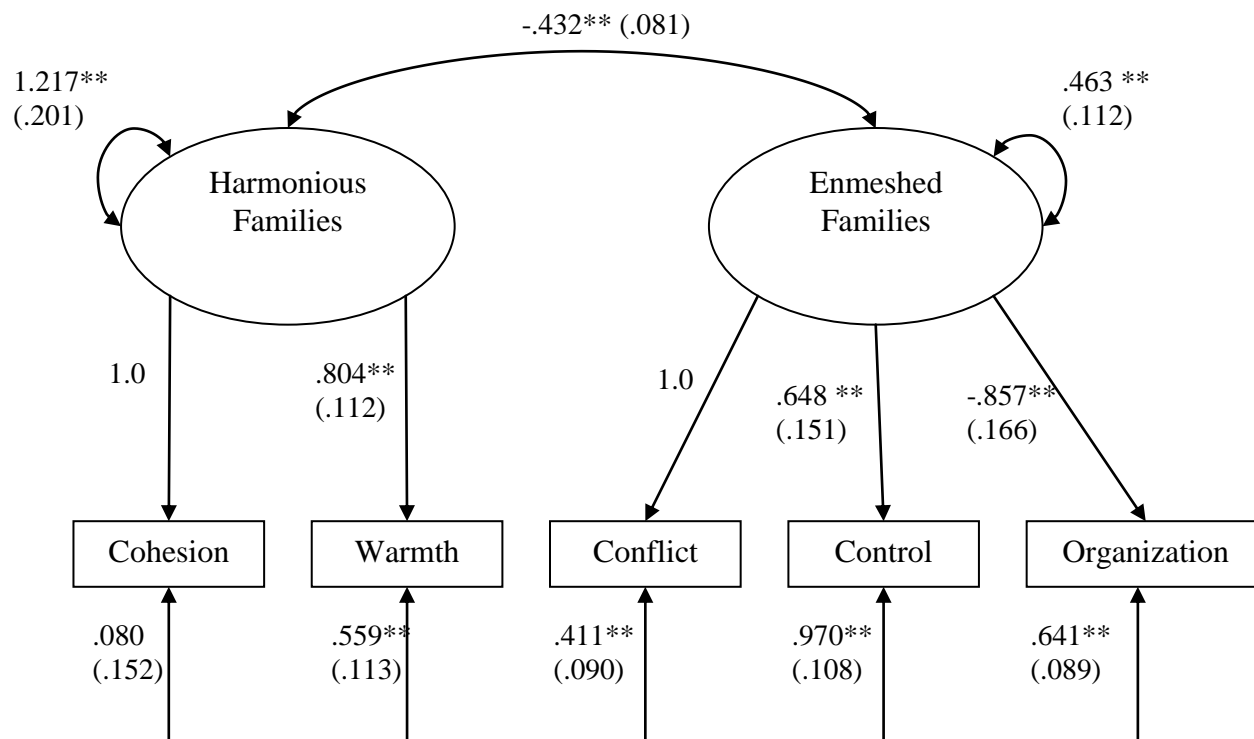
Figure 2. Two factor model of family systems with combined sample. Numbers are unstandardized path coefficients, with the standard errors in the parentheses. *p<.05. **p<001.

-.449* (.145)

1.166** (.300)

.273† (.148)

Harmonious Families

Enmeshed Families

1.0

.893** (.170)

1.0

1.088* (-.741)

-.741* (.337)

Cohesion

Warmth

Conflict

Control

Organization

.243 (.201)

.430* (.172)

.660** (.148)

1.040** (.220)

.955** (.169)
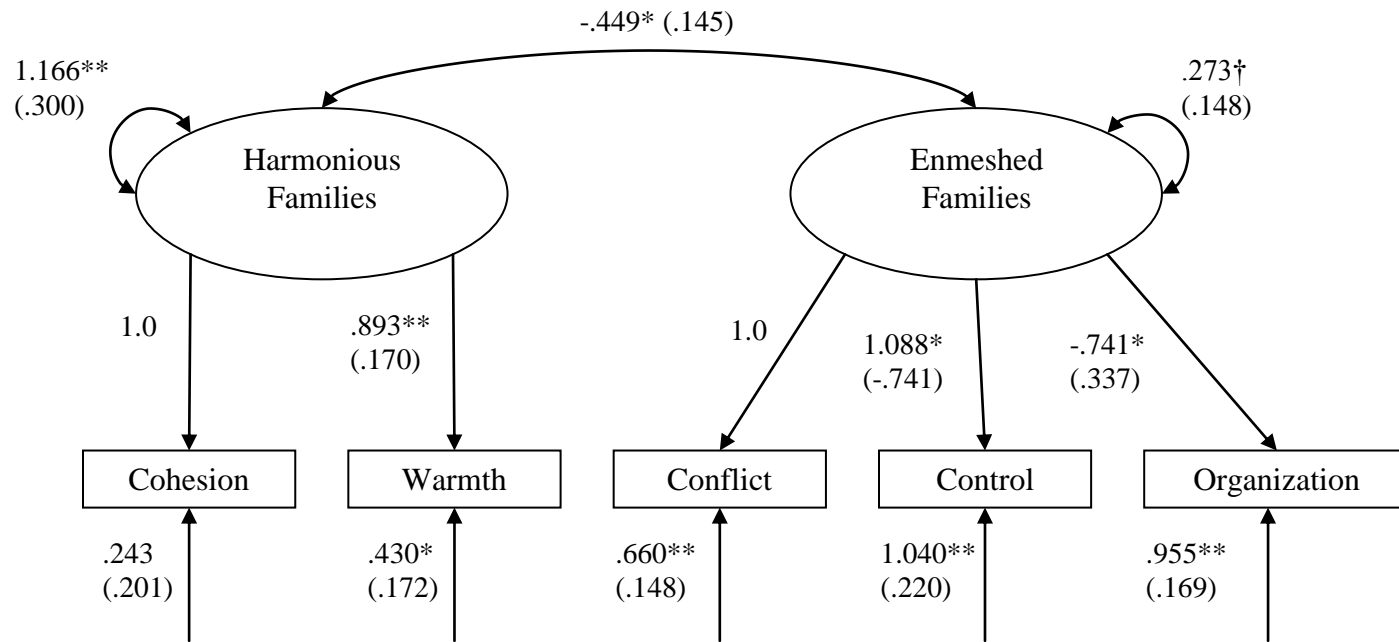
Figure 3. Two factor model of family systems with DD sample. Numbers are unstandardized path coefficients, with the standard errors in the parentheses. *p<.05. **p<001.
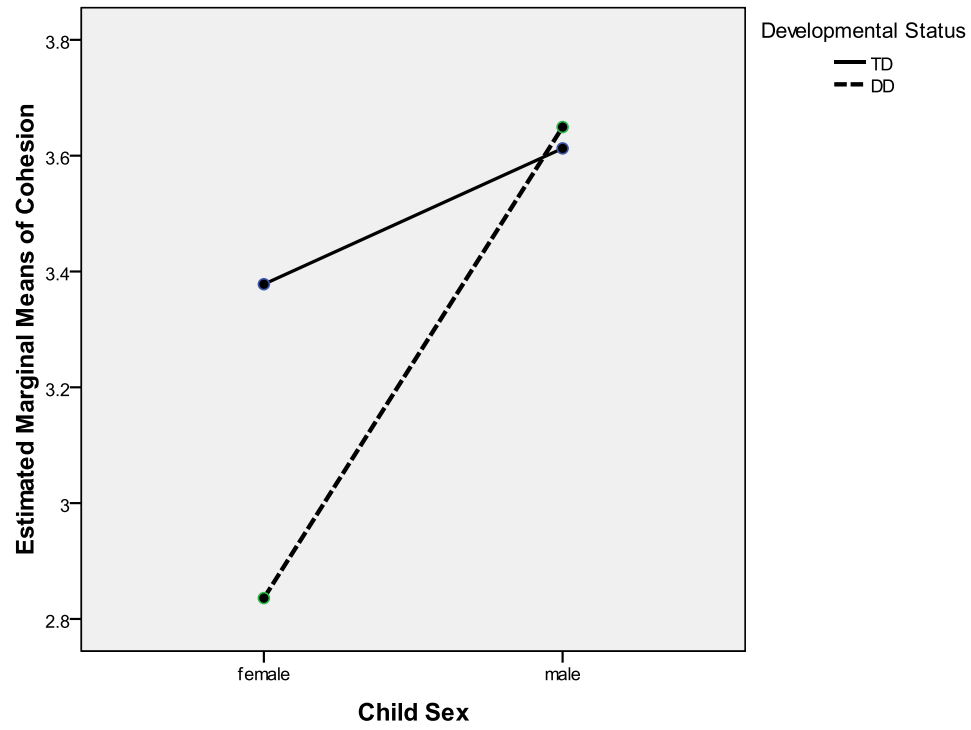
Covariates appearing in the model are evaluated at the following values: Socioeconomic Status = .0287

Figure 4. Graph of interaction between child gender and developmental status on cohesion.

Figure 5. Regression diagnostic scatterplot of cohesion and parent-reported internalizing behaviors.
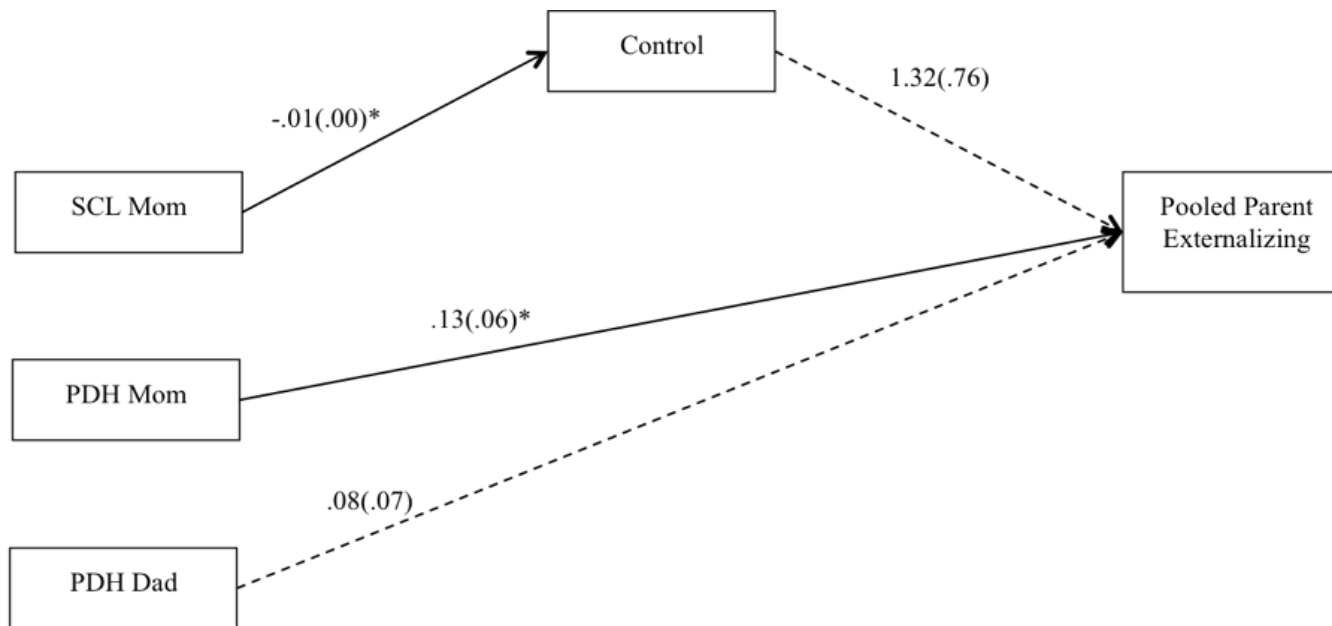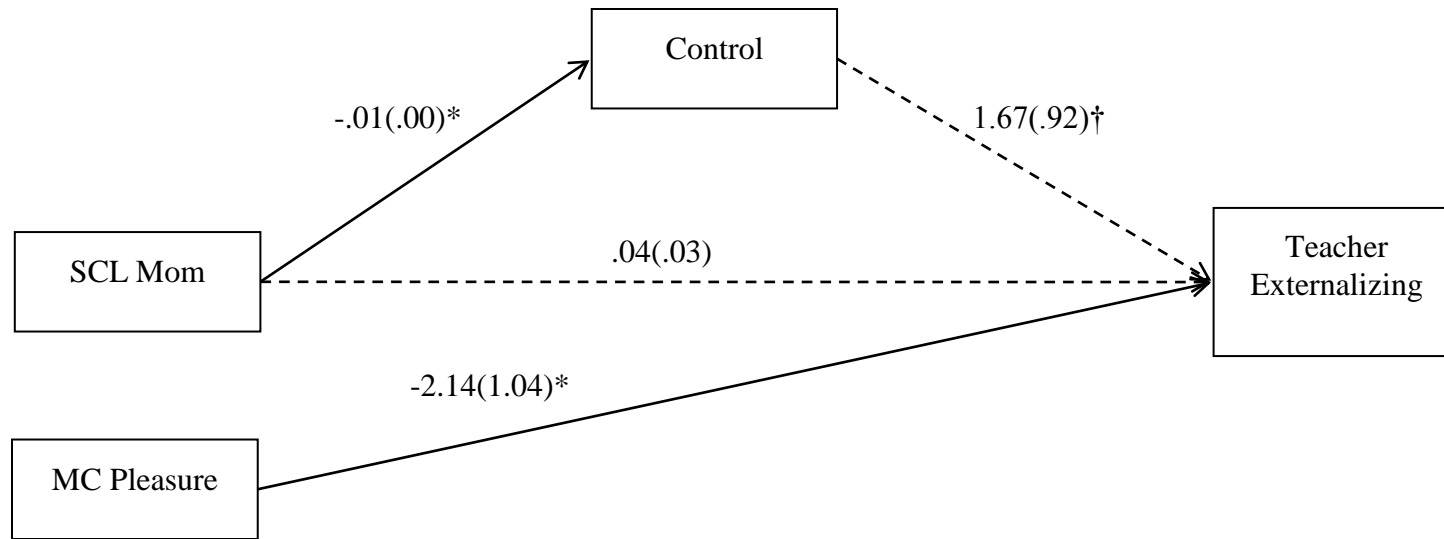
$X^2(4)=2.025$ $p=.731$
CFI=1.00
RMSEA=.000
SRMR=.027
95% CI from SCLMom→Control→ Pooled Parent Externalizing [-.045, .001]

Figure 6. Final model predicting parental reports of externalizing behaviors for TD children (n=144). Model is controlling for socioeconomic status in the outcome. †=p<.08 *=p<.05, **=p<.001.
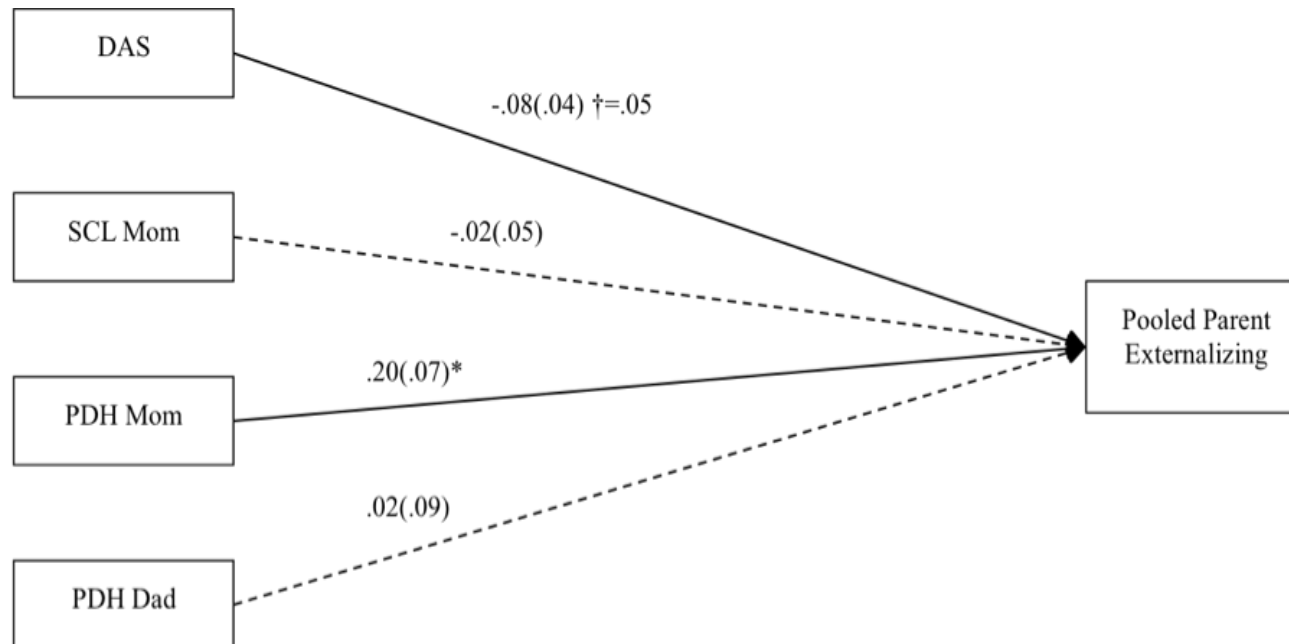
Figure 7. Final model predicting parental reports of externalizing behaviors for children with DD (n=98). It is a just identified model: No fit statistics available. Model is controlling for socioeconomic status in the outcome. †=p<.08 *=p<.05, **=p<.001
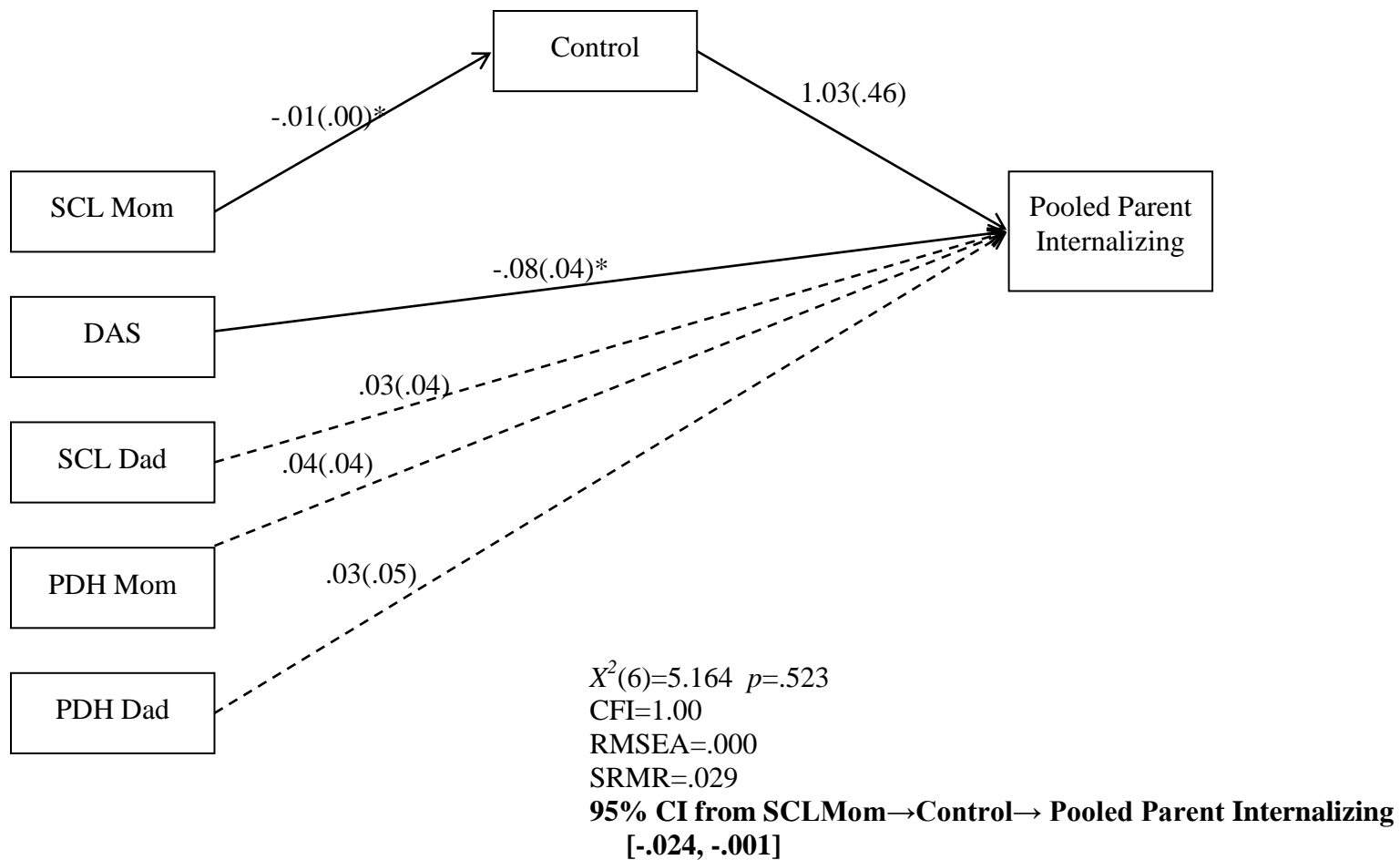
Figure 8. Final model predicting parent reports of internalizing behaviors for TD children (n=144). Model is controlling for socioeconomic status in the outcome. †=p<.08 *=p<.05, **=p<.001
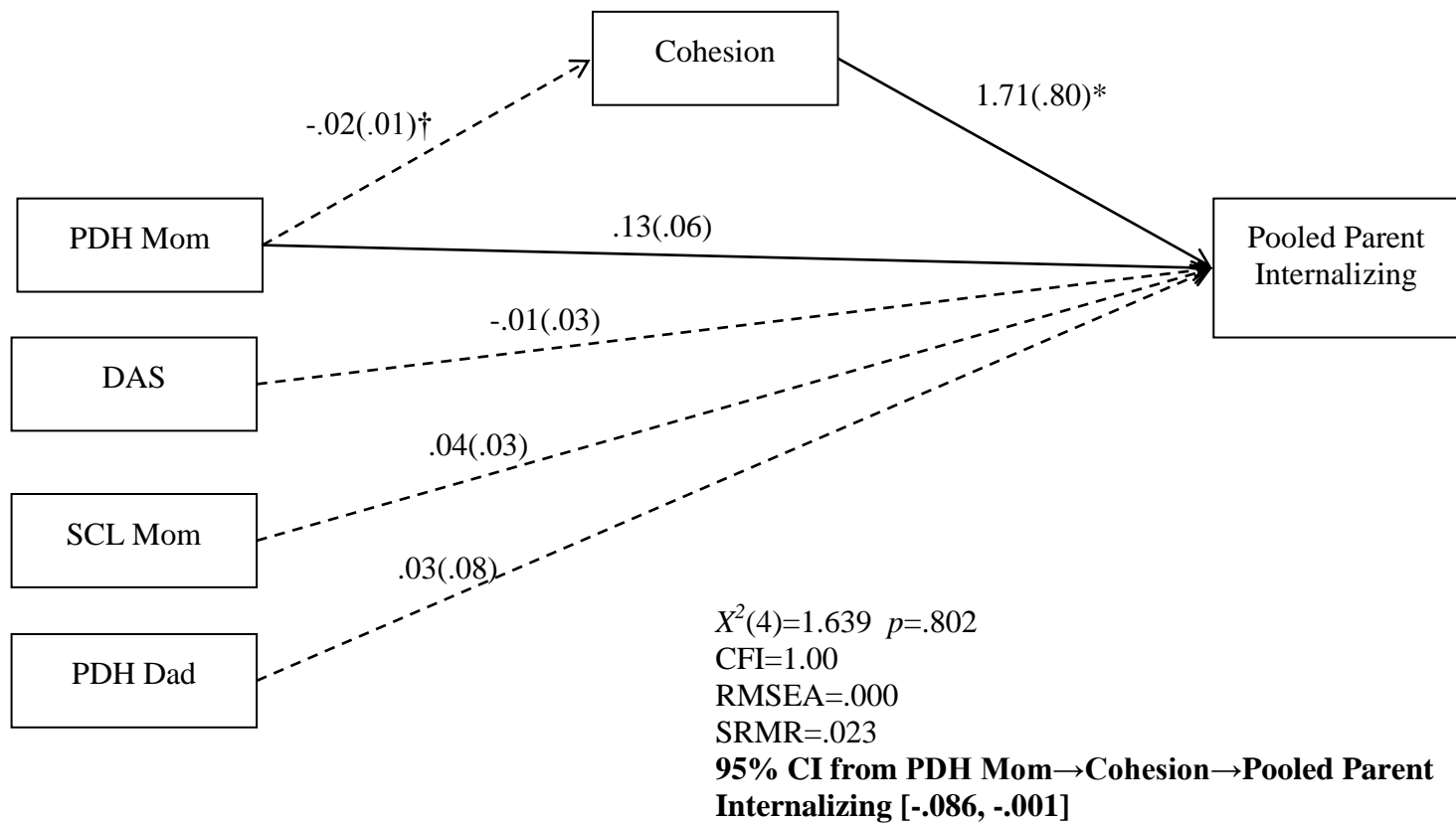
Figure 9. Final model predicting parent reports of internalizing behaviors for children with DD (outlier included) (n=98). Model is controlling for socioeconomic status in the mediator and outcome. †=p<.08 *=p<.05, **=p<.001
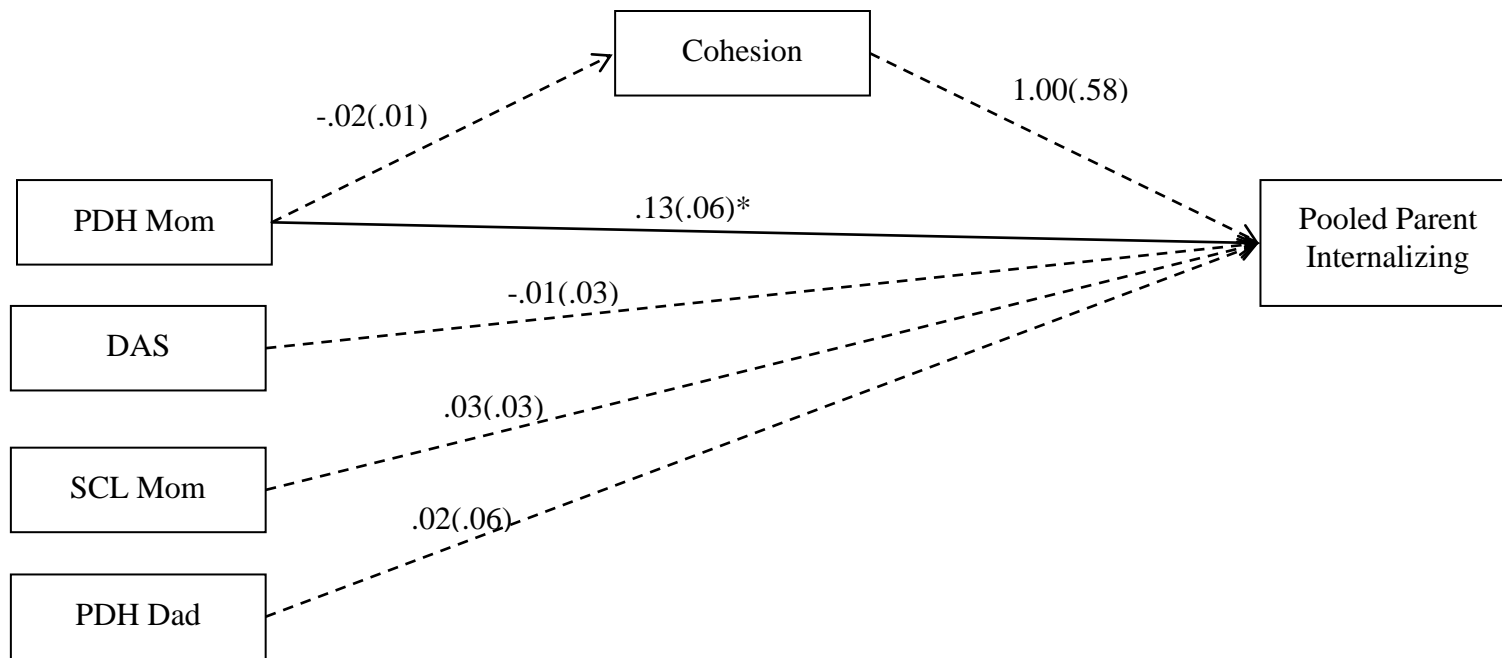
Figure 10. Final model predicting parent reports of internalizing behaviors for children with DD (outlier NOT included) (n=97). Model is controlling for socioeconomic status in the mediator and outcome, and child gender in the mediator. †=p<.08 *=p<.05, **=p<.001

$X^2(2)=0.408$ $p=.815$
CFI=1.00
RMSEA=.000
SRMR=.014
95% CI from SCL Mom→Control→Teacher Externalizing [-.046, .002]

Figure 11. Final model predicting teacher reports of externalizing behaviors for TD children (n=144). Model is controlling for socioeconomic status in the outcome. †=p<.08 *=p<.05, **=p<.001
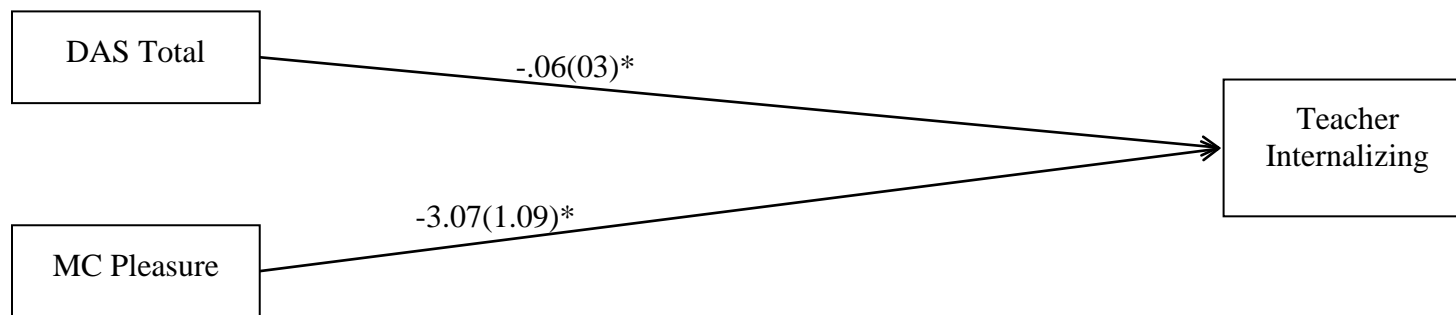
Figure 12. Final model predicting teacher reports of internalizing behaviors for the combined sample (n=242). This is a just identified model: No fit statistics available. Model is controlling for socioeconomic status in the outcome. †=p<.08 *=p<.05, **=p<.001
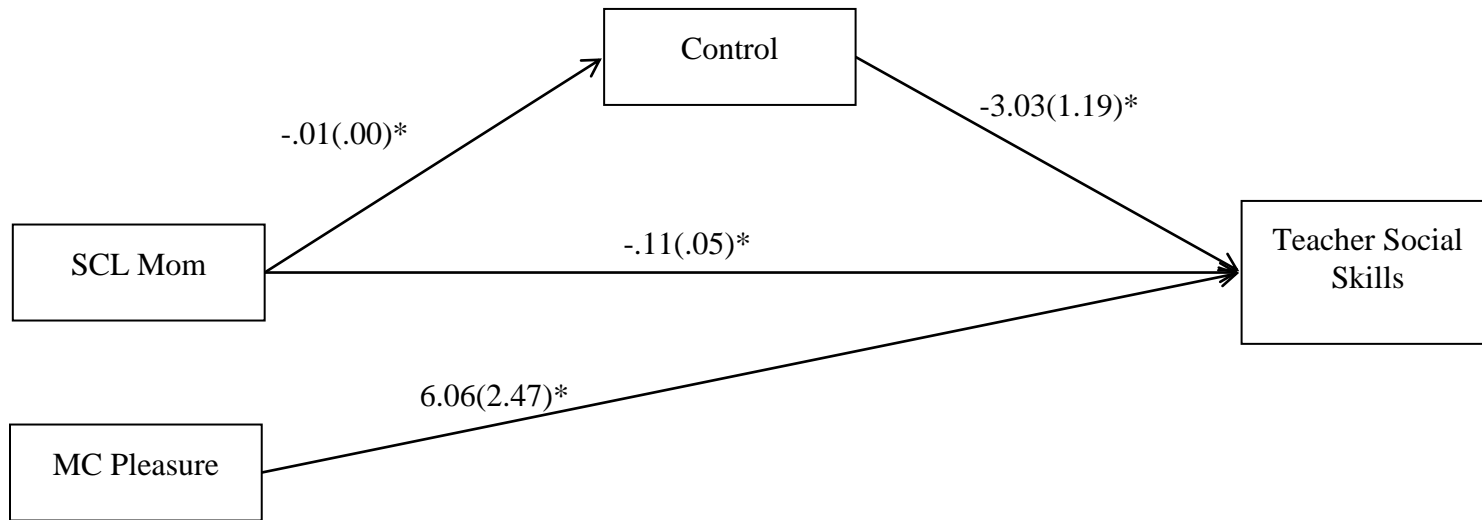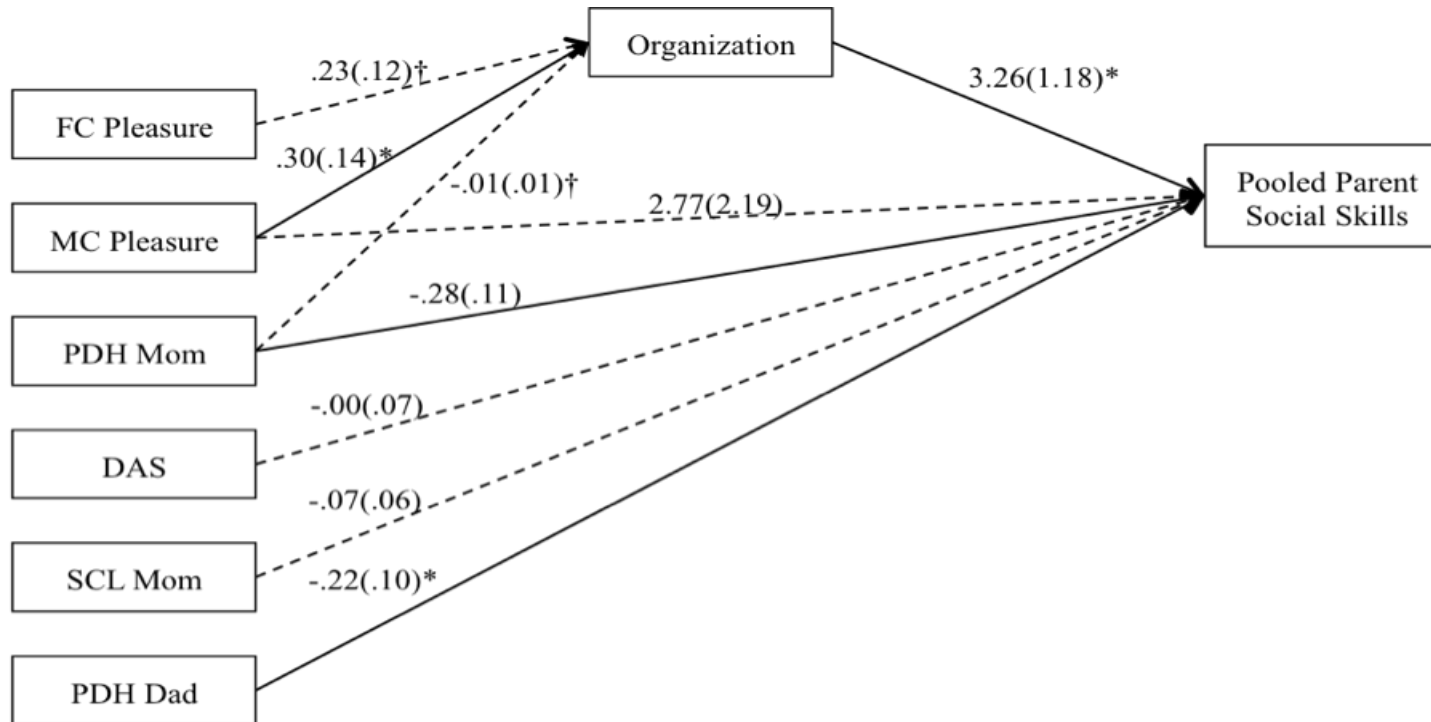
$X^2(2)=.390$ $p=.823$
CFI=1.00
RMSEA=.000
SRMR=.016
95% CI from SCL Mom→Control→Teacher Social Skills [.003, .071]

Figure 13. Final model predicting teacher reports of social skills for TD children (n=144). Model is controlling for socioeconomic status in the outcome. †=p<.08 *=p<.05, **=p<.001

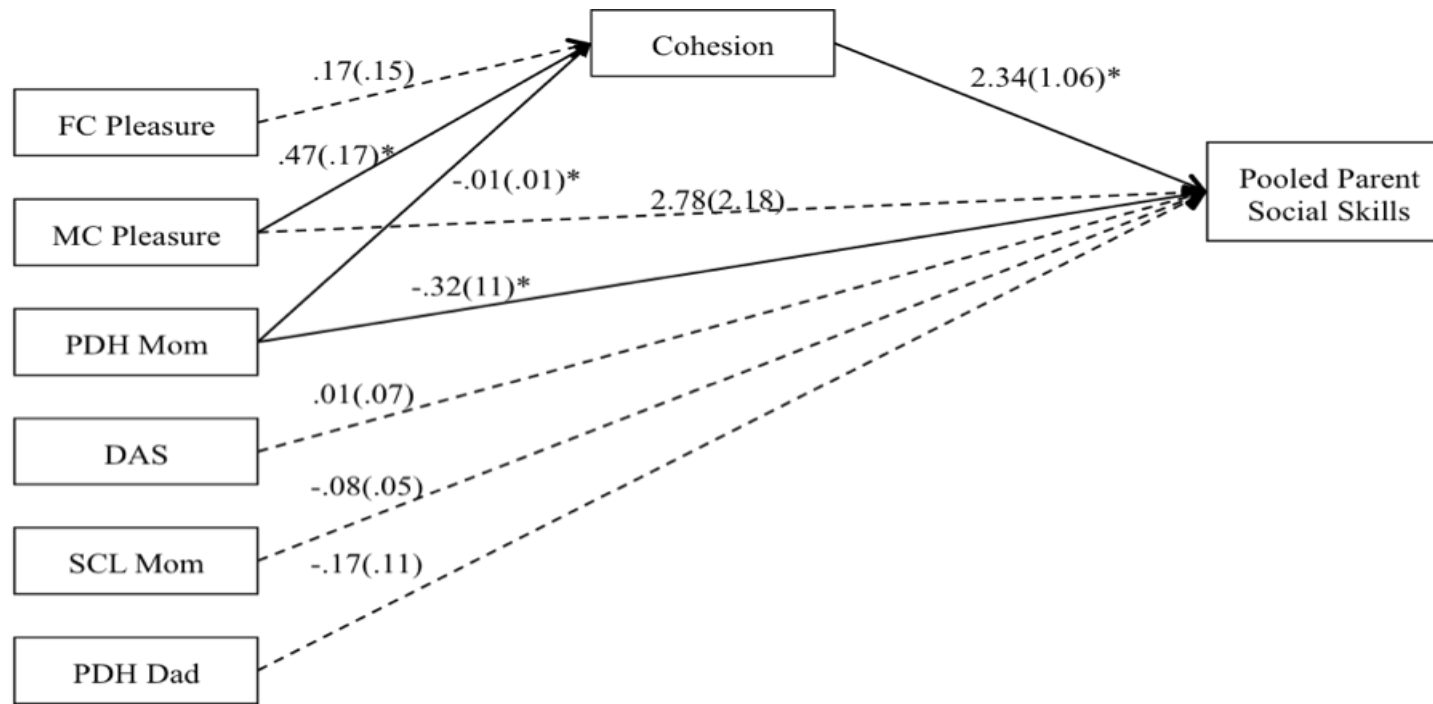|	
95% CI from MC Pleasure→Organization→ Social Skills [.105, 2.747]	$X^2(6)= 3.437$ $p=.752$
95% CI from FC Pleasure→Organization→ Social Skills [.025, 2.131]	CFI=1.00
95% CI from PDH Mom→Organization→ Social Skills [-.099, -.003]	RMSEA=.000
	SRMR=.017

Figure 14. Model predicting parent reports of social skills for the combined sample using only organization as a mediator. (n=242). Model is controlling for socioeconomic status in the outcome, and presence of a father in the mediator. †=p<.08 *=p<.05, **=p<.001

95% CI from MC Pleasure→Cohesion→Social Skills [.178, 2.666]
95% CI from FC Pleasure→Cohesion→ Social Skills [-.138, 1.684]
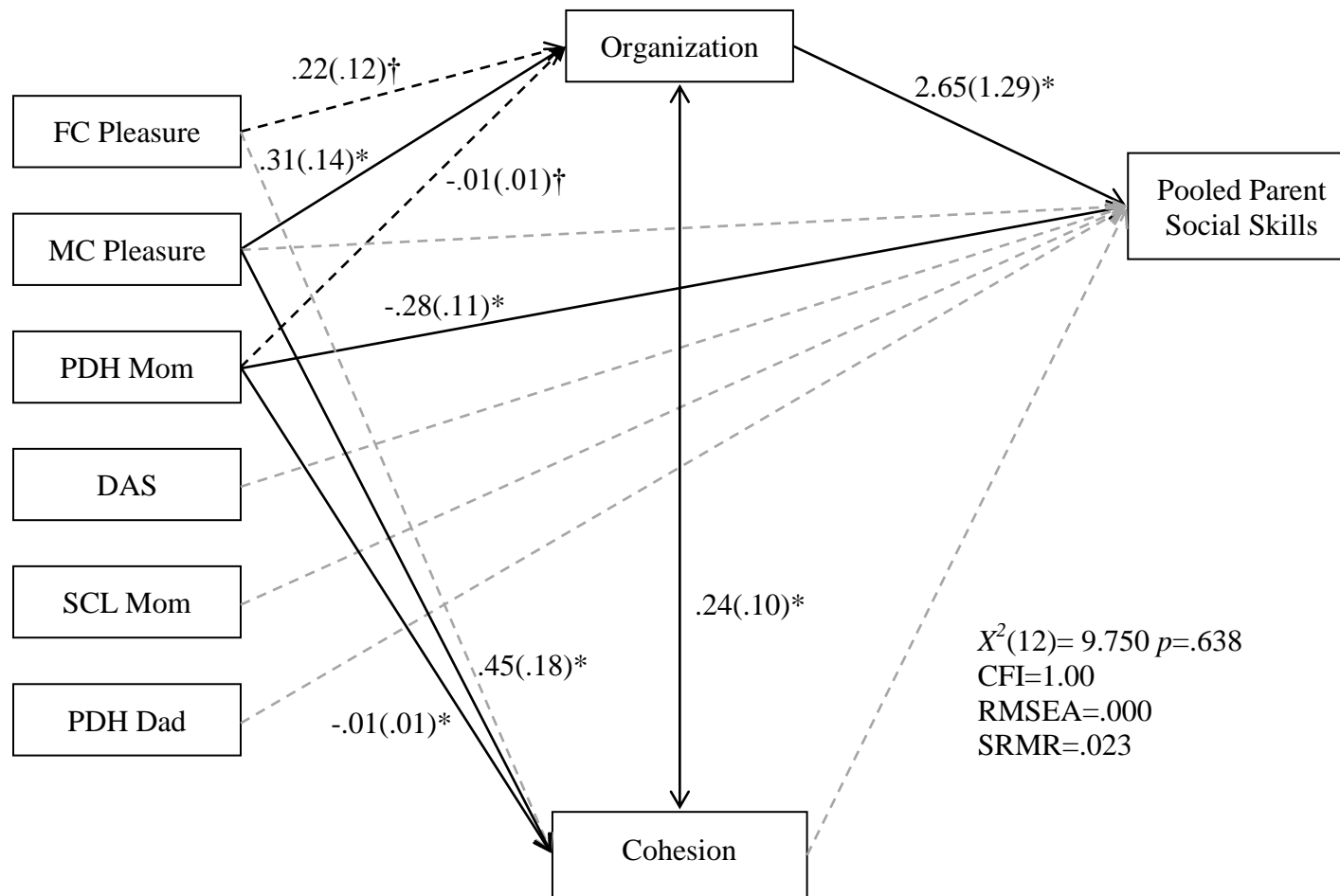95% CI from PDH Mom→Cohesion→ Social Skills [-.084, -.001]

$X^2(5)= 2.259$ *p*=.812
CFI=1.00
RMSEA=.000
SRMR=.016

Figure 15. Model predicting parent reports of social skills for the combined sample using only cohesion as a mediator (n=242). Model is controlling for socioeconomic status in the mediator and outcome, and gender in the mediator. †=p<.08 *=p<.05, **=p<.001

95% CI from MC Pleasure→Organization→ Social Skills [.020, 2.597]

Figure 16. Model predicting parent reports of social skills for the combined sample using both cohesion and organization as mediators (n=242). Model is controlling for socioeconomic status in cohesion and outcome, gender in cohesion, and presence of a father in organization. †=p<.08 *=p<.05, **=p<.001

APPENDIX A

OBSERVATIONAL ASSESSMENT OF FAMILY SYSTEMS CODING MANUAL

Observational Assessment of Family Systems
72 months

I.   **Overview**

The purpose of this coding system is to describe the interactive patterns of the family while they are playing an enjoyable, yet potentially competitive board game. The coding system will assess five systemic family constructs observable across a 10 minute game task.

The five systemic family constructs are: 1) Cohesion 2) Warmth 3) Conflict 4) Organization 5) Control. These constructs were chosen to reflect more general approaches to understanding family functioning through other measurement paradigms (e.g. self report instruments, interviews, etc.)

II.   **Coding Guidelines**

1) **Participant Selection:** The order in which participants' videotapes are coded is predetermined by the coding supervisor and listed in each coding team's coding folder. The white coding binder to the right of the microwave should be referred to in order to determine which tape a number contains a particular participant's lab visit. Tapes are stored in numerical order on the shelf that corresponds to the site (PSU or UCLA) and the assessment period (e.g. 36, 48, 60, 72 months) of interest. If your team finishes all tapes within your time period, continue on to the next tape on the list of unfinished tapes.

2) **Coding Times:** The length of time each segment is coded may vary by participant. The family game task should be 10 minutes long, but may be cut short in certain tapes. 72 month data collection tasks are recorded in "real time" so coders need to be aware of the exact begin time as well as the exact end time. Coders should obtain the coding times for a participant from the white coding binder marked "Coding Times and Progress" and record them in the appropriate place on the coding sheet prior to beginning coding. The participant number, coder's initials, and date should also be recorded on the coding sheet.

3) **Videotape Viewing—<u>Each family game should be watched by a coding team a minimum of two times.</u>**

i.   Coders should watch the family game once through for initial impressions.

ii.   Coders should then view the family game a second time and **<u>independently record</u>** their codes. Do not discuss your codes with your coding partners before completing the full coding sequence.

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iii. At completion of the full episode, and once each coders' ratings have been made, coders should then discuss their ratings, and watch the tape a third time to come to a consensus on any places where their codes differ from one another. Consensus codes should be based on re-watching the relevant portions of the family game, consulting the coding manual, and deciding together which code is most appropriate **not** on subjective impressions, talking someone into agreeing with you, or a desire to move on without properly coding a segment.

4) **Rating Scale:** All rating categories are scored on a five-point scale, from 1-5. There must be a rating for every category.

5) **Recording Codes:** Each coder should have their own coding sheet, and initial codes should be recorded in pencil on their own coding sheet under "**individual code**." After consensus is reached, each coder will record consensus codes in red on the box of the coding sheet labeled "**consensus code.**" *Original codes should never be erased or altered, but should remain on the coding sheet in legible format.*

6) **Other Coding Details:**

   i. Coders should use their manuals **every** time they code, even when they feel familiar with the codes. Coders are encouraged to write notes on their coding sheets to facilitate discussion of ratings with other coders.

   ii. **Not every behavior observed is necessarily codeable.** Even though the categories presented here are rather broad, they may not capture a certain behavior. Indeed not all behaviors are reflective of the five constructs of interest. If the consensus is that a behavior or statement is not codeable, it should not be recorded on the coding sheet.

   iii. **These are *family*-level codes**. Individual parents and children may behave in interesting ways, but it is the degree to which it affects the family as a whole unit that determines the level of the code. Furthermore, coders should consider the **developmental level** of the child when determining what their involvement could be.

III. Family System Constructs

A) Cohesion

In general, cohesion is defined by the degree of unity and closeness within the family. The degree to which all family members are collectively focused and interacting with one another should be strongly considered. Families with high cohesion will all be engaged together in the task (reading aloud, following one another) while families that separately engage in conversations, do not talk as a family, or do not involve all family members should be considered as having low cohesion. Furthermore, coders should look toward the feel of the family interaction. Low cohesion scores will be marked by interpersonal distance, awkwardness, stiffness, and a lack of unity.

The following examples are included as reference points, but are not an exclusive list. The scores of two are four are between these detailed ratings:

1= There is a little interaction outside of moving the pieces and the talking about the basics of the game. Individuals may be disengaged from the task, and the family is not often involved in conversations as a whole family. Members are either not speaking entirely, or engaged in multiple separate conversations. Members seem not to pay attention to what the others are engaged in. The interaction that does exist appears *awkward and stiff*. The family does not appear to be close-knit unit.

3=For the most part, family members are paying attention to each other and watching the progress of the game, even when it is not their turn, but this alone does not warrant a 3. The family appears generally comfortable with one another and there is some degree of closeness and unity, but there may not be high levels of talking and interacting. There may be one or two members that are less engaged in the task (i.e. mother and infant, older teenager), or the task may break into two groups for a small portion, but not for a long length of time.

5=Family members are all actively engaged in the game. The members of the family appear closely connected, united and are playing collectively. All members are paying attention when other members are taking their turns, and there is a high degree of interaction and talking. Individuals may be reading the cards out loud and engaging in conversation about what cards they receive. The interactions occur with the whole family; there are not separate conversations pulling apart certain members. Members appear comfortable with another, and conversation flows easily.

B) Warmth

Warmth is characterized by the degree to which families are nurturing, affectionate, caring and responsive in warm ways with one another. It is also defined by the level of positive emotional tone present in the family and shared positivity between the family members. It is Warmth can be assessed by tone of voice, facial expressions, level of enjoyment, and body language. It also measured by the degree of affective sharing, including shared smiles, praise, laughter, high fives, hugs, and pats on the back. The degree to which all members are engaged in warm behaviors will also shape the score.

1=The affective tone is predominantly neutral/flat or not positive. Members are not smiling with one another. There is almost no praise among family members, aside from technical help. Members are not engaged in affective sharing, and may not seem to enjoy playing the game.

3=The family demonstrates warmth with one another, but either with more subtle expressions, or not consistently across time. One example would be when there is praise and enjoyment in the game, and families do smile and have good tone with one another, but there are less laughter, fewer high-fives, hugs, and signs of strong warmth. The family may be positive for a portion of the game, and be neutral at other times. The interactions may not be consistently warm, or the family may not be collectively warm. It may be the case where certain members are exhibiting warmth, while others appear to be more neutral and not as positively engaged with the rest of the family. It also may be where families express warmth in one modality.

5=The tone of the game is predominantly warm and positive for the entire family. Family members are smiling and laughing with one another. There is praise, shared hugs or high fives when individual members do well. The entire family appears to enjoy playing the game.

**Note: Teasing among family members can be considered high warmth if all family members seem to enjoy it and are laughing. If members are upset by teasing and it not done in a friendly way, it should be coded under conflict.

C) Conflict

Conflict is defined by the overall negative tone, anger, and tension within the family. Conflict includes expressions of tension, frustration, anger, irritation, and hostility. It may include threats, put-downs, fighting and arguing, and raised voices. However, it can also include more subtle signs, including negative/annoyed tones of voice, frustration evident in body language, impatience, and abruptness.

1=No conflict is apparent. There may be an individual child who becomes upset when the cards do not go their way, but unless it affects the mood of multiple members or creates conflict, sadness is not in and of itself conflict.

2=There is one incident of conflict, or there is a sense of sense of tension and frustration between family members through a small portion of the game.

3=There are a few indications of frustration, irritation, and negativity. It may be that there are mean looks, annoyed tones of voices, and shortness of speech. There are a couple moments of conflict between the family. It has to involve at least two members of the family.

5=Multiple family members may have hostile tones, and there may be multiple disagreements among family members. There must be multiple incidents, or an overall feeling of negativity and tension present throughout multiple family members. There does NOT have to be screaming and yelling for a family to get a 5, nor does the *entire* sequence need to be hostile.

D) Organization

Organization is the degree to which both the family, their roles, and the family game are approached in structured ways. Given that the game already has instructions, higher levels of organization require that all members of the family understand and follow the game. Parents elaborate on rules, help younger children to play (reading aloud, counting spaces), and help everyone know when it is their turn and what to do. Adjustments can be made to the game or its rules if parents want to improve organization (i.e. allow getting out of seat to move pieces if can't reach).

However, organization is more than simply following the rules to the game. It is also the way in which the family is structured and how they work together. High levels of organization are also present when parents split up roles in order to make sure children are taken care of. For example, one parent may take care of 2 older children while the other is in charge of the youngest, or one parent may always be helping with the reading of cards. It may also be within children, where the oldest child is responsible for reading the cards of a younger one who cannot yet read. In low organization families, these distinct roles cannot be seen, or are seen but do not function successfully. Overall, the degree to which the family appears chaotic or orderly impacts the organization score.

1= Multiple mistakes are made in playing that are generally not caught by the family (skipping turns, going twice, putting pieces in the wrong place). Explanations given about the game are not understood by family members, and multiple members appear to be confused (***not because of developmental level, but because of unclear explanations or insufficient help***). Additionally, family roles seem to not be clearly defined, and it is unclear what role parents or children play in the family. For example, no one seems to be in charge of making sure rules are successfully followed. In general, the game feels chaotic, and it seems as if no one quite understands what is going on.

3=There may be a few mistakes in playing that are not caught in family and the family may appear to get off-track at one point. It may that the family as a whole has a little trouble in the beginning understanding and figuring out how to play, but it appears to get more structured as time goes on. The game may be chaotic at one point, but seems more orderly and structured at others.

5=The game and the family seem orderly and structured. All members of the family seem to understand the game (up to their developmental level), and are given appropriate assistance and technical help as needed. The family structure is apparent, and appears to be functioning well (i.e. one can see that Dad is always helping with pieces, and Mom is the one who praises).

**Understanding developmental level is important in organization. A member may need to constantly help a child with the rules, counting and reading. The fact that the child does not understand is not poor organization, but the overall help provided by other members does count toward the score. Having a person whose role it is to help that child may lead to more structure and order, and thus a high organization score.

E) Control

Control is the degree to which members of the family attempt to dictate the behavior of other family members, **over and above** what is necessary. Family members may insert more rules than necessary to keep the game going or make unnecessary demands. There is little flexibility, and parents may leave little or no latitude for changes. Although any member of a family can be controlling, the point is that control affects the entire family. Similarly, control may primarily be seen as a top-down, from parents, type of behavior. However, it could also come from the children, where the children seek control above and beyond what is necessary for the family. Control, similar to organization, is a feeling of restriction and over-demanding that is felt throughout the family.

1=No clear elements on control are seen.

3=A few controlling moments can be seen. A Mom may be giving more directions and make families stick to the directions more than necessary, or demands specific behaviors more than necessary. It does not matter whether the kids are fighting the control, or submissive to it, as long as the person is attempting to be controlling. There may be a controlled, restricted feeling for a small portion of the game, but not for the majority.

5=There are a number of controlling moments. They can be from one person, or multiple people attempting to take control. Overall, a large portion of the tape has the feeling of control and restriction.

Last Updated: 8/5/2009