Positive Indicators of Sibling Relationship Quality: Psychometric Analyses of The Sibling Inventory of Behavior (SIB)

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Introduction

Most people grow up in a family with at least one brother or sister. The relationship between siblings can be marked with rivalry and conflict, but can also be one of the closest and intimate relationships a person has in childhood, adolescence, and adulthood (Buhrmester & Furman, 1990; Volling, 2003). Unlike parent-child relationships and children's peer relationships, there is far less empirical research devoted to the study of sibling relationships, which is very surprising given that it is the longest lasting relationship of an individual's life. The sibling relationships exists long before one has met their spouse and long after one's parents have died. There has been considerably more research on children's sibling relationships over the last decade (see Brody, 1998, for a review). Warm, nurturant, and close sibling relationships play an important role in the development of children's social competence with peers, their ability to resolve conflicts in a constructive manner, and their social and emotional understanding (Dunn & Munn, 1985; Howe, 1991; Herrera & Dunn, 1997).

The current paper begins with a brief overview of the literature describing the various dimensions of sibling relationship quality and the research supporting the link between positive indicators of sibling relationship quality and children's developmental outcomes, most notably, their social competence with peers and their psychological adjustment. Further, we examine the various means of measuring sibling relationship quality and summarize some of these measurement approaches before focusing specifically on the history and development of the Sibling Inventory of Behavior (SIB: Schaefer & Edgerton, 1981). It should be noted from the start that the paucity of research on sibling relationships means that no large-scale survey data base currently exists that includes a measure of sibling relationship quality, making it impossible to examine the psychometric properties of *any* measure of sibling relationship quality using a large, nationally representative sample. Therefore, the main goal of this paper is to provide both a background and some descriptive evidence of the utility of one widely-used measure of sibling relationship quality based on smaller scale studies where the instrument has been used. In so doing, we review findings from various small-scale studies using the measure across different ages and respondents.

This discussion will include a summary of the psychometric properties of the instrument as reported by those researchers who have modified and used the instrument over the last decade with samples of preadolescents and adolescents. We will then present analyses of the psychometric properties of the positive involvement scale of the SIB using data from a small longitudinal investigation of preschool children before closing with a summary and discussion of the utility of this measure for inclusion in large-scale survey data sets.

Sibling Relationship Quality and Children's Developmental Outcomes

Several investigators have now identified four dimensions of children's sibling relationships that appear to emerge reliably across studies: (1) warmth/closeness; (2) conflict; (3) rivalry, and (4) status/power. These dimensions have been reported consistently in studies using self-reports of sibling relationship quality from children and adolescents (Furman & Buhrmester; 1985; Hetherington & Clingempeel, 1992; Stocker & McHale, 1992), parent reports of young children's sibling relationships (Kramer & Baron, 1995; Volling & Elins, 1998) and more recently, with self-reports of adult sibling relationship quality (Cole & Kearns, 2001; Graham-Bermann & Cutler, 1994; Stocker, Lanthier, & Furman, 1997).

Social competence with peers. Several bodies of research now indicate that the quality of the sibling relationship is related to several indicators of children's social development and psychological well-being. Whether or not the relationship between siblings is described as nurturant, warm, supportive, and emotionally close or is deemed aggressive, conflictual, and hostile appears to have important implications for the two children involved. Most notable in this regard are the links between sibling relationship quality and the child's social competence, or ability to manage and sustain relationships with peers. Herrera & Dunn (1997), for instance, reported that young children using constructive conflict-resolution strategies, such as mitigating a conflict or conciliating, were more likely to use similar conflict resolution strategies with a friend several years later. Mendelson, Aboud, & Lanthier (1997) examined kindergarten children and found that companionship and identification with an older sibling was related to

the younger sibling's popularity with peers. Seginer (1998) also found that warmth in adolescents' sibling relationships predicted adolescents' perceptions of the emotional support they received from peers and school-related support, in general. Older adolescents with warm and supportive sibling relationships during childhood reported higher self-esteem, greater perceived competence in their abilities and social competence with peers than those adolescents with little sibling support. (Caya & Liem, 1998).

Although there are clear links between the positive involvement a child enjoys with a sibling and peer competence, it is also the case that sibling relationships can contribute to the development of peer aggression and rejection by one's peers. Patterson (1981) has actually claimed that aggressive interaction between siblings in the home "trains" children to be aggressive, which they then use more frequently in other settings, such as school. Several studies have found relations between the aggression, hostility, and coercive interaction between siblings and the children's use of aggression with peers and peer rejection (e.g., MacKinnon-Lewis, Starnes, Volling, & Johnson, 1997; Stormshak, Bellanti, Bierman, & the Conduct Problems Prevention Research Group, 1996). In a study of 6- to 8-year-old aggressive children, Stormshak et al. (1996) found that those children with warm and close sibling relationships received higher scores on emotional control and those children reporting high levels of sibling conflict at home were actually more aggressive and less socially competent at school. More importantly, however, it was the children experiencing both high warmth *and* a moderate degree of conflict with their siblings who were more socially competent with their peers, more emotionally controlled, and more attentive at school. Children with sibling relationships characterized by high conflict and low warmth tended to use more peer aggression. The important point to be gleaned from the Stormshak et al. work is that both the supportive and conflictual dimensions of sibling relationship quality really need to be considered together in order to understand the full effect of sibling relationships for children's social development. Children need to be exposed to some degree of conflict in order to learn effective conflict resolution strategies and it appears that when conflict between siblings is of a moderate level and occurs in the context of a warm and close sibling relationship, there are clear advantages for children, even children identified as at-risk

for the development of conduct problems. Sibling conflict occurring in the absence of sibling warmth forecasts a very different outcome for children, one that places the child at risk for subsequent difficulties with their peers.

Psychological adjustment. In addition to the child's social competence, other research reveals associations between the quality of the sibling relationship and children's psychological adjustment. In a sample of 7th graders, Conger, Conger, & Scaramella (1997) reported that manipulative and excessive control by a sibling was detrimental to the child's self confidence and predicted increases in both externalizing and internalizing behavior problems 2 years later. Widmer and Weiss (2000) examined whether a caring and supportive sibling relationship with an older brother or sister would protect a younger sibling from the deleterious effects of living in a high-risk neighborhood and experiencing adjustment problems. When the younger sibling perceived their older adolescent sibling as successful and supportive, these children had fewer depressive symptoms, lower delinquent attitudes, and reported more school engagement. Moveover, 9- to 11-year-old African-American children were more self-regulated if their sibling relationships were described as harmonious and involving little conflict (Brody, Stoneman, Smith, & Gibson, 1999). Destructive sibling conflict involving anger and aggression has also been linked to 5- and 6-year-olds' conduct problems (Garcia, Shaw, Winslow, & Yaggi, 2000). Even as toddlers, physical aggression by an older sibling directed toward an 18-month-old younger sibling predicted the use of physical aggression by the younger sibling 6 months later (Dunn & Munn, 1986).

Social cognition. A final line of research indicates that a warm, intimate relationship with one's sibling is related to children's social and emotional understanding, both in early childhood (Dunn Brown, & Beardsall, 1989; Youngblade & Dunn, 1995) and middle childhood (Howe, Aquan-Assee, Bukowski, Lehoux, & Rinaldi, 2001). Preschool children were more likely to use internal state language (i.e., use words such as "think" and "feel") during interactions with family members when the sibling relationship was described as warm and positive (Dunn, Brown, & Beardsall, 1989, Howe, 1991; Howe & Ross, 1990). Howe and her colleagues reported that preschoolers' use of internal state language with a toddler

sibling was related to the child's comforting, helping, and confiding four years later, as well as to warmth in the sibling relationship years later (Howe, Aquan-Assee, & Bukowski, 1995). Similarly, Howe, et al (2001) found that sibling relationship warmth was related to 5th and 6th grade children's emotional understanding and self-disclosure with their sibling. Finally, the extent to which young siblings were engaged in pretend play, a mature form of play wherein children share imaginary roles, was associated with the young child's emotional understanding, that is, their ability to recognize emotional states and understand the emotions of others (Youngblade & Dunn, 1995).

In sum, the research to date shows quite clearly that the quality of the sibling relationship can have both detrimental as well as beneficial effects on the social and emotional development of children in early and middle childhood, as well as in adolescence. Emotional closeness and warmth in children's sibling relationships contributes to the development of children's prosocial behaviors and social understanding, whereas aggression and hostility between siblings predicts children's use of such behavior with their peers and future behavior problems. Not only do warm sibling relationships contribute to children's social and emotional development directly, but it may also act as a protective factor for high-risk children by buffering them from the effects of adverse life events.

Developmental differences in children's sibling relationships

Sibling relationship quality does appear to change over time. Cross-sectional research indicates that sibling relationships become less emotionally intense across middle childhood and adolescence, with less warmth and conflict reported by older adolescents than elementary-school children (Cole & Kearns, 2001; Furman & Buhrmester, 1985). Longitudinal research, however, by Brody et al., (1994) revealed increases in conflict and decreases in positive sibling involvement over the period from middle childhood into adolescence. Even though age differences are noted across developmental periods with respect to positive and negative dimensions of sibling relationship quality, the emotional closeness and support in sibling relationships remains stable over time. Indeed, positive sibling relationship quality remained stable from infancy into preschool (Stillwell & Dunn, 1985) and from preschool through adolescence

(Dunn et al., 1994), with some evidence indicating that positive indicators (e.g., nurturance, admiration, intimacy) of sibling relationship quality were even more stable over time than negative indicators (e.g., aggression, hostility) of sibling relationship quality (Dunn et al., 1994).

Measures of Sibling Relationship Quality

Observational methods and questionnaire methods are the two most prominent measurement sources for assessing the quality of the sibling relationship. Various observational paradigms have been developed to assess conflict and hostility between siblings as well as the extent to which siblings cooperate, share, help, and play with one another. Observational paradigms are common in the period of early childhood because of the limited utility in collecting self-reports or interview data from such young children (e.g., Dunn & Kendrick, 1982; Kramer & Gottman, 1992; Volling & Belsky, 1992; Volling, McElwain, & Miller, 2002), although observational assessments of sibling relationships are also common place in many studies examining sibling relationships in middle childhood and adolescence (e.g., Brody et al., 1992; Hetherington & Clingempeel, 1992). Parent reports of sibling relationship quality are also a common means of assessing sibling relationships in early childhood (e.g., Volling & Elins, 1998; Mendelson, Aboud, & Lanthier, 1994), but are also used along with children's self-reports in samples of older children and adolescents (e.g., Hetherington, Henderson, & Reiss, 1999; Stocker & McHale, 1992).

Because of increased interest in the sibling relationship and its effects on developmental outcomes in childhood and adolescence, there are now several different questionnaires available to assess sibling relationship quality, a full listing and description of which are beyond the goals of this paper. Nevertheless, the Sibling Relationship Questionnaire (SRQ: Furman & Buhrmester, 1985), the Sibling Relationship Inventory (SRI: Stocker & McHale, 1992), and the Sibling Qualities Scale (SQS: Cole & Kearns, 2001) have been used predominantly with children in elementary school and the period of adolescence. Parents have also completed the Sibling Relationships in Early Childhood questionnaire

(SREC: Volling & Elins, 1998), Parental Expectations and Perceptions of Children's Sibling Relationships questionnaire (PEPC-SRQ: Kramer & Baron, 1995) and the Sibling Behaviors and Feelings questionnaire (SBFQ: Mendelson, Aboud, & Lanthier, 1994) to assess very young children's sibling relationships in the toddler and preschool years. More recently, the Adult Sibling Relationship Questionnaire (ASRQ: Stocker, Lanthier, & Furman, 1997); The Lifespan Sibling Relationship Scale (LSRS: Riggio, 2000) and the Brother-Sister Questionnaire (Graham-Bermann & Cutler, 1994) have been developed to assess sibling relationships in late adolescence and early adulthood. Some of these questionnaires have been used more often than others in research, and therefore, have a more extensive data base on the reliability and validity of the insturment. References are provided so that survey researchers interested in examining sibling relationships can make their own assessment of the various instruments. The current paper focuses specifically on the Sibling Inventory of Behavior (SIB) developed originally by Schaefer and Edgerton (1981), given that it is one of the earliest inventories to have been developed to assess sibling relationship quality and has as a result, a longer history of use and psychometric testing.

History and Development of the Sibling Inventory of Behavior (SIB)

The SIB was originally developed by Schaefer and Edgerton (1981) to assess sibling relationships in families with and without a handicapped child. It was developed using mothers' and fathers' reports in a sample of 52 maritally-intact families (39 with a handicapped child), with children ranging from 3 to 8 years. The SIB consisted of 28 items that assessed one siblings' behavior toward the other and was designed to measure eight dimensions of sibling behavior. This included four 4-item scales assessing empathy and concern (α = .81), kindness (α = .74), leadership and involvement (α = .80), and acceptance (α = .78), in addition to four 3-item scales assessing anger (α = .75), unkindness and teasing (α = .79), avoidance (α = .64) and embarrassment (α = .89). As for reliability, the alpha coefficients indicated the scales were internally consistent and correlations between mothers' and fathers' reports ranged from .33

(avoidance) to .80 (empathy/concern), with a median of .64 (see Schaefer & Edgerton, 1981). Validity of the SIB scales was examined by correlating the scales with teacher's ratings of the children's classroom behavior. Parent ratings of empathy/concern ($r = .45$, $p < .01$), kindness ($r = .37$, $p < .05$) and leadership/involvement ($r = .30$, $p < .05$) were significantly correlated with teacher ratings of the older siblings' considerateness of others in the classroom.

Hetherington and Clingempeel (1992) modified and expanded the SIB by adding 21 additional items for use in their study of marital transitions following divorce by studying sibling relationships in married, divorced single-mother families, and stepfamilies where the mother remarried. The sample originally consisted of 202 families, with 75 married, 69 divorced, and 58 remarried stepfamilies, although this was reduced to 164 families by wave 3 of the data collection. At the start of the study, a target child between the ages of 9 and 13 years was identified, along with a closest age sibling. Siblings were all full biological siblings from the original marriage and were, on average, 10 years, 10 months of age, with a range of 4 years, 7 months to 17 years, 4 months. Both parents completed questionnaires and children were interviewed about their sibling relationships. Factor analyses of the 49 items resulted in six sibling relationship scales that closely resembled the original eight reported by Schaefer and Edgerton (1981): (a) involvement/companionship, (b) empathy/concern, (c) rivalry, (d) avoidance, (e) aggression, and (f) teaching/directiveness. Hetherington et al. (1992) reported that alpha coefficients of parents' and children's reports across the 3 waves of data collection ranged from .86 to .93 ($M = .91$) for involvement/companionship, .64 to .89 ($M = .78$) for empathy/concern, from .61 to .89 ($M = .78$) for rivalry, from .75 to .88 ($M = .81$) for avoidance, from .77 to .90 ($M = .86$) for aggression, and from .60 to .81 ($M = .73$) for teaching/directiveness. Composites of *positivity* (sum of empathy/concern, involvement/companionship, and teaching/directiveness/guidance) and *negativity* (sum of aggression, rivalry, and avoidance) in the sibling relationship were created from mothers', fathers', and children's reports. Intercorrelations between parents' and children's reports across family type and the 3 waves of data collection were significant, from .45 to .69 for positivity and from .32 to .56 for negativity (see Table

39 in Hetherington & Clingempeel, 1992). Correlations across the three waves of data indicated remarkable stability in mothers', fathers', and children's reports of positivity and negativity in sibling relationship quality across time (see Table 45 in Hetherington & Cingempeel, 1992).

The SIB was revised and shortened again by Hetherington and her colleagues for use in the Nonshared Environment of Adolescent Development (NEAD) study (Hetherington, Henderson, & Reiss, 1999), a longitudinal study designed to examine family relationship functioning across diverse family forms, including nonstepfamilies and stepfamilies, with both full and half siblings (see Hetherington et al., 1999, for a complete description of the sample). The study included two waves of data collection separated by approximately 3 years. Initially, there were 516 families at the wave 1 data collection, but this decreased to 259 by wave 2, which was due mostly to older siblings leaving and making the transition to college. All sibling pairs were of the same gender and between 10 and 18 years of age and no more than 4 years apart in age. The mean age of the older siblings at wave 1 was 14.5 years (*sd*= 2.2) and the mean age of the younger sibling was 12.4 years (*sd* = 2.2). The 49 items of the SIB were shortened to 32 and principal components analyses confirmed a 6-scale structure using mothers', fathers', and both siblings' self reports on the SIB. This included (a) a 5-item empathy/concern scale, (b) 6-item companionship/involvement scale, (c) 6-item rivalry scale, (d) a 5-item conflict/aggression scale; (e) a 5-item avoidance scale, and (f) a 4-item teach/directiveness scale. Alphas across scales were acceptable for empathy (median α = .88), rivalry (median α = .77), aggression (median α = .80), avoidance (median α = .85), teaching/directiveness (median α = .67) and companionship/involvement (median α = .88). Again a factor analysis indicated that the scales formed two larger factors, *positivity* (sum of teaching, companionship, and empathy) and *negativity* (sum of aggression, avoidance, and rivalry). Cross-time correlations from wave 1 and wave 2 indicated relatively high stability in individual differences over time, with correlations ranging from .59 for companionship and .72 for rivalry and empathy (see Hetherington et al., 1999). Intercorrelations of the older and younger siblings' reports were also quite high for rivalry (*r* = .81), aggression (*r* = .89), companionship (*r* = .90), empathy (*r* = .79), avoidance (*r* = .54)

and teaching (r = .34), with inter-sibling correlations of .56 for the positivity composite and .91 for the negativity composite.

Cut-off Points forScales

Because the subscales of the SIB are continuous measures and used most frequently to assess individual differences in sibling relationship quality, there is no clear cut-off point where one can say scores above this point are optimal and scores below this point are problematic. What several researchers have done with sibling relationship scales is to use both the positivity and negativity scales and then make groups high and low on these dimensions using median splits. Thus, those scores above the median are considered "high" and those scores below are considered "low". When these two high and low groups are created, one can also cross-tabulate the high and low negative groups with the high and low positive groups to create 4 different sibling relationship groups. Those that are high on positivity and low on negativity (companionate), those high on negativity and low on positivity (conflicted), those high on both negativity and positivity (ambivalent) and those low on both negativity and positivity (uninvolved). Once these groups are created, researchers can examine whether they differ with respect to a host of different outcomes and address issues of risk and protective factors. For instance, one might expect positive sibling relationship quality to be a protective factor that would buffer children from risky outcomes such as problem behaviors, peer rejection or even juvenile delinquency. In that case, one would expect children in the ambivalent sibling relationships (high positive *and* high negative) to have lower scores on these problematic outcomes than those children in conflicted sibling relationships (high negative, but low positive).

In sum, this brief presentation of the modifications and changes made to the SIB over time demonstrates quite nicely the psychometric properties of the instrument in samples of predominantly preadolescent and adolescent siblings. In general, the 6 scales from the SIB emerge reliably across studies and show adequate internal consistency and cross-time correlations, as well as impressive associations across respondents (e.g, parents, siblings). The research conducted by Hetherington and her colleagues

has focused predominantly on samples of preadolescents and adolescents, demonstrating the utility of this measure for this age group, using both parent reports and children's self-reports. The remainder of this report continues along the lines of these earlier analyses by demonstrating the psychometric properties of the 32-item SIB measure based on both mothers' and fathers' reports of young children's sibling relationships in the preschool years.

Methods

Database

As noted earlier, because there are so few studies examining the quality of sibling relationships, there is *no nationally representative data* set to my knowledge that presently includes a psychometrically sound measure of sibling relationship quality. The data used in this report come from a sample of 60 families involved in a longitudinal study of parent-child and sibling relationships in early childhood (see Volling, McElwain, & Miller, 2002, for a detailed description of the research design). Because the study was intended to capture parent-child and sibling interaction with young children, laboratory observations were the main, and preferred, means to gather information on the quality of these relationships. Observational studies involve long hours of collecting and coding videotapes of family interaction and as a result, they generally involve smaller samples than those studies using predominantly self-report measures. The sample to be discussed is small, white and middle-class and includes 60 families at the initial timepoint, but only 37 in the longitudinal follow-up. Because of the limitations this places on the power of our statistical analyses, caution is prudent in interpreting the findings and generalizing them to more ethnically and socio-economically diverse families (a topic to be picked up later in the Discussion). Nonetheless, the intent here is to demonstrate the psychometric properties of the measure in another age group of children using parent-reports from multiple informants, in this case, both mothers and fathers. Given the interest in children's positive outcomes, the remainder of this report will focus only on the three SIB scales, empathy, companionship, and teaching, which assess positive sibling relationship quality.

Sample

The study participants included mothers, fathers, and sibling pairs from 60 maritally-intact families participating in a short-term longitudinal study of parent-child and sibling relationships in early childhood. Families were initially recruited from birth announcements, local day care centers, and through referrals from participating families. Families were required to meet three criteria in order to be eligible for the study: (1) intact marital status, (2) participation from both mothers and fathers, and (3) at least two children in the family, with the youngest child nearing 12 months of age and the older sibling between the ages of 2 and 6 years. Of the total families meeting study criteria, 69% agreed to participate. All parents were the biological mothers and fathers of the two children. Participating families were primarily European-American (n = 56), with one Native-American couple and three interracial couples. Parents had been married for an average of 7 years (range = 3 - 16 years). On average, fathers were 35.6 years old and had completed 17.4 years of education, whereas mothers were, on average, 33.2 years old and had completed 16.5 years of education. The mean family income was $73,607 (SD = $41,791). The age of the younger sibling (toddler) in all families was 16 months, the mean age of the older sibling was 50 months (range = 2 - 6 years), and the average age space between siblings was 35 months (range = 11 - 68 months). Most of the toddlers in the study were second born (n = 44) and the remaining 16 toddlers were third through fifth born. For families with more than two children, the older sibling closest in age to the 16-month-old was asked to participate. The sample included 20 girl/girl dyads (younger/older), 14 boy/boy dyads, 10 girl/boy dyads, and 16 boy/girl dyads.

Approximately 3 years later when the younger sibling was now 4 years old, 37 of the initial families returned for a follow-up visit to assess sibling and friend relationships. An additional 21 families were recruited at this time to increase the sample size to 58. Younger children, at this time, ranged in age from 46 to 60 months (SD = 3.29 months) and their older siblings ranged in age from 5 to 10 years (SD = 7.3 years). The average age space between siblings was approximately 3 years (range: 1 year to 6 years).

Design and Procedure

Families were initially recruited when their younger child was approaching 12 months of age and were observed in a series of observational paradigms designed to assess parent-child and sibling interaction when the younger child was 12-, 13-, and 16-months of age. At the 16-month assessment point, both mothers and fathers completed the 32-item Sibling Inventory of Behavior to assess the *older siblings'* behavior toward the younger sibling. Several of the SIB items are more applicable to older children (e.g., babysits, teaches, shares secrets) than to preschool children. However, for present purposes, we included all 32 items when creating scales in order to maintain measurement equivalence so findings could be compared across studies.[1] Three years later when the younger child was now 4 years of age (i.e., 4-year timepoint), both older and younger siblings were invited to participate in a laboratory visit designed to assess the quality of sibling interaction. Again, mothers and fathers completed the 32-item SIB, but this time they completed it with respect to the older siblings' behavior directed to the younger sibling *and* the younger siblings' behavior directed to the older sibling. At the 4-year visit, sibling dyads were also videotaped in two interactive sessions: (a) a 20-minute free-play session and (b) a 5-minute sharing task. During the free play session, both children were free to explore and play with any toys available in the laboratory playroom. During the more structured, sharing task, children were seated at a table and introduced to a new toy (e.g., Play-doh camera) and instructed to play with the toy until the experimenter returned. The purpose of this situation was to see how children handled a situation involving limited resources. Videotapes of free-play and sharing task interaction were reliably coded for the following individual and dyadic behaviors: (a) *manage/teach* (child indirectly attempts to control and teach the other child by using suggestions or requests; (b) *affection* (child demonstrates affectionate behavior toward the other sibling); (c) *social play sophistication* (the complexity of the children's play interactions, with low scores indicating solitary play and high scores more complex levels of social pretend play); and (d) *shared positive affect* (children engage in mutual joy or pleasure). A more detailed account of coding and reliability assessments of videotaped interaction can be found in McElwain &

Volling (2002). Composites for each of the 4 interactive codes were created by averaging scores across the free play and sharing task. For present purposes, we used the observations of sibling interaction as a means of examining the construct validity of the SIB scales by correlating the parents' reports of positive sibling relationship quality at both 16 months and 4 years, with actual sibling *behavior* observed during the 4-year laboratory visit.

At the 4-year time point, both mothers and fathers completed the aggressive behavior scale from Achenbach's (1991) Child Behavior Checklist, a well-standardized measure of children's behavior problems. Internal consistency for mothers' reports was .83 and .87 for younger and older siblings', respectively and for fathers' reports, .80 and .83 for younger and older siblings', respectively.

Measure of Sibling Relationship Quality

Table 1 provides the 32 items that comprise the Sibling Inventory of Behavior and denotes which items correspond to the 6 scales. Each item is answered on a 5-point Likert scale, ranging from 1 (never) to 5 (always). For this report, we will focus on the 6-item *companionship* scale, the 5-item *empathy* scale, and the 4-item *teaching/directiveness* scale. These three subscales can be summed together to form one 15-item *positive involvement* scale. When describing the properties and psychometrics of these scales, we will present results using the 3 subscales along with the composite scale of positive involvement. Data are available for 60 mothers and fathers at 16 months and for 57 mothers and 52 fathers at 4 years.

Table 2 provides the descriptives of the scales for both mothers' and fathers' reports at both the 16-month and 4-year timepoints for the older siblings' behavior and the mothers' and fathers' reports of the younger siblings' behavior at 4 years. Means and standard deviations along with the range of scores are provided. An examination of Table 2 indicates substantial variation in the distribution of the scores for both mothers and fathers across both time points and for both siblings.

Reliability. We examined the internal consistency of the items comprising the various scales using Cronbach's alpha. The alpha coefficients for the scales as completed by mothers and fathers for both older and younger siblings across time are presented in Table 3. Internal consistency for all scales,

with the exception of the teaching scale, is over .70. The alpha for the teaching/directiveness scale would be expected to be lower, in general, given that there are fewer items on this scale. Also, teaching is not necessarily descriptive of the typical interaction characterizing preschool siblings and may be better at describing the transactions occurring between siblings in the period of middle childhood or adolescence. In this case, we might anticipate the internal consistency of this scale to reach the levels reported earlier by Hetherington and her colleagues Our observations of preschoolers indicated, however, that they were quite capable of directing or managing the interaction, even if it did not involve sophisticated teaching techniques.

In addition to examining the internal consistency of the scales, we also examined consistency in scale scores by correlating mothers' and fathers' reports at 16 months and then again at 4 years. Table 4 summarizes the inter-parent correlations for each of the scales at both time points. The correlations across parents are moderately high, ranging from .26 to .65, indicating considerable consistency in parents' reports of the siblings' behavior toward the other sibling. The lower correlations between mothers' and fathers' reports for the teaching scale may again be due to the fact that teaching interactions are more characteristic of sibling relationships in middle childhood and adolescence than they are of preschool sibling relationships.

Finally, we examined the cross-time correlations between mothers' and father's reports of the older siblings' behavior toward the younger sibling at 16 months, and the parents' reports of the older siblings' behavior at 4 years to determine whether there was any consistency in scores over time. Bear in mind that this represents only the subsample of 37 families that were seen at both time points, and therefore, there are clear limitations with respect to the statistical power of our analyses. But again, these data are intended to provide only preliminary analyses describing the psychometric properties of the SIB on a younger age sample of children, with the hope that either the SIB or some other scale measuring sibling relationship quality will be included in larger survey research data sets in the future. At that point, analyses can be conducted on larger samples of more diverse families. Table 5 presents the cross-time

correlations for mothers' and fathers' reports. There is more consistency over time in fathers' reports of sibling relationship quality than mothers' reports. Companionship is the only scale where there does not appear to be stable individual differences across either mothers' or fathers' reports for either sibling.

Validity. In order to examine the concurrent validity of the scales, we correlated mothers' and fathers' reports of the sibling relationship at 4 years with actual sibling behaviors (e.g., manage/teach, shared positive affect) observed during videotaped observations at the 4-year visit. Although there were no significant relations between mothers' reports of the older or younger siblings' behaviors at 4 years and the observed sibling behaviors, several associations were significant or reached significance when examining the fathers' reports of sibling relationship quality. Fathers' reports of the older siblings' empathy were modestly related ($r = .27$, $p < .07$) and their reports of the older siblings' teaching ($r = .32$, $p < .05$) were significantly correlated with the shared positive affect expressed in the sibling dyad. The overall positive involvement score was also modestly correlated with the extent of shared positive affect expressed between siblings during the sibling interaction tasks ($r = .26$, $p < .08$). Similarly, fathers' reports of the older siblings' teaching ($r = .29$, $p < .05$) and the overall positive involvement score ($r = .27$, $p < .07$) were correlated with the older siblings' managing and teaching behavior during sibling interaction with their younger sibling. Similarly, fathers' reports of the younger siblings' companionship were significantly correlated with the extent of shared positive affect expressed in the sibling dyad ($r = .39$, $p <.01$) and the younger siblings' attempts to manage the sibling interaction ($r = .37$, $p < .01$). The overall positive involvement score for fathers' reports of the younger sibling showed similar relations to positive affect shared between siblings ($r = .39$, $p < .01$) and the younger sibling's attempts to manage and "teach" their older sibling ($r = .37$, $p < .01$).

In an effort to examine the predictive validity of parents' reports of the sibling relationship, correlations were also run between mothers' and fathers' reports at 16 months of the older siblings' behavior and observed sibling interaction at 4 years during the laboratory visit. Again, it should be kept in mind that these analyses only include a subsample of the families who remained in the follow-up study (*n*

= 37). Mother's reports of the older siblings' companionship (r = .36, p < .05) and overall positive involvement (r =.35, p < .05) at 16 months was significantly related to the amount of affection the older sibling showed toward the younger sibling approximately 3 years later at the 4 year follow-up visit. Similarly, mothers' reports of the older siblings' teaching of the younger sibling at 16 months (r = .31, p < .08), as well as her reports of overall positive involvement (r = .32, p < .08) were modestly related to the complexity of sibling play, indicating that sibling play was more sophisticated and involved more joint pretend at 4 years when older siblings had been more directive and managed sibling interaction with their younger siblings at 16 months. In the case of fathers' reports, fathers' reports of the older siblings' empathy (r = .44, p < .01), companionship (r = .29, p < .10), and teaching (r = .31, p < .07), as well as overall positive involvement with their younger sibling (r = .40, p < .05) were related to the older siblings' manage and teach behaviors toward their younger siblings during the 4-year laboratory visit.

Links to children's well-being. We also examined both the concurrent relations between parent's reports on the SIB at 4 years with parents' reports of children's behavior problems at 4 years, along with the predictive relations between the parents' reports of the older siblings' SIB scores at the 16-month timepoint and their problematic behaviors at the 4-year timepoint. We specifically chose to look at the children's aggressive behavior problems given the significance of aggression for children' social competence and its role in the coercive, destructive sibling conflicts noted by others (e.g., Garcia et al., 1999). We would expect there to be inverse associations between the positive indicators of sibling relationship quality and children's aggression. Tables 6 and 7 summarize the correlations between mothers' and father's reports of the older and younger siblings' aggressive behavior problems at 4 years and their reports on the positive relationship indicators of sibling relationship quality. Although several of the correlations are marginal, particularly with respect to the younger siblings' behavior, there appears to be a consistent pattern among the correlations, in general, indicating that children with aggressive behavior problems are less likely to develop sibling relationships involving high levels of positive involvement, companionship, empathy, and teaching.

One final means of addressing the predictive validity of the SIB scales was to correlate mothers' and fathers' reports of the older siblings' behaviors toward their 16-month old toddlers with parents' reports of the older siblings' aggressive behavior problems approximately 3 years later, when the younger sibling was 4 years of age. Table 6 indicates that although there is only one marginal relation between mothers' reports of the older siblings' teaching of the toddler at 16 months and the older siblings' aggressive behavior problems three years later, correlations between the older siblings' aggressive behavior problems at the 4-year assessment and the fathers' reports of the older siblings' overall positive involvement, companionship, and empathy were significant. The correlation between the older siblings' aggression at the 4-year timepoint and fathers' earlier reports of this child's teaching of the younger toddler was marginally significant.

Gender and age differences

In an effort to examine whether or not the positive dimensions of sibling relationship quality differed for boys and girls, we ran 2 (older sibling gender) x 2(younger sibling gender) ANOVAs on mothers' and fathers' reports of sibling relationship quality at both 16 months and again at 4 years. Because Hetherington and her colleagues (Hetherington & Clingempeel, 1992; Hetherington et al., 1999) found in two separate investigations that sibling dyads involving girls were more likely to differ from sibling dyads involving boys on the positive dimensions of sibling relationship quality, we also examined whether gender differences would be apparent for these younger children. Gender differences, however, may not be so evident for these younger children as they were for the adolescent samples examined by Hetherington and her group, given that gender role development is not yet fully consolidated at this age. At 16 months, several main effects for the older child's gender were found. For mothers' reports, this included the overall positive involvement scale, F (1, 60) = 4.20, $p < .05$, companionship, F (1, 57) = 4.12, $p < .05$, and teaching, F (1, 60) = 5.33, $p < .05$. In all cases, older female siblings were more positively involved (Ms = 52.5 and 48.0 for females and males, respectively), experienced more companionship (Ms = 19.9 and 17.0), and did more teaching (Ms = 13.4 and 11.7) of their younger

siblings than did older male siblings. Similar gender effects were found when examining the fathers' reports of the older siblings' behavior at the 16-month timepoint. Significant main effects for the older sibling's gender were found for fathers' reports of overall positive involvement, F (1, 59) = 4.15, $p < .05$, and empathy, F (1, 59) = 4.93, $p < .05$. The main effect for the older siblings' gender for fathers' reports of older sibling companionship was marginally significant, F (1, 59) = 3.64, $p = .06$. Older female siblings were judged by their fathers to be more positively involved (*Ms* = 50.7 and 46.1 for females and males, respectively), more empathic (*Ms* = 19.1 and 17.1), and expressed more companionship (*Ms* = 19.4 and 17.6) in their relationships with a younger sibling than did older male siblings. There were no significant main effects for the younger siblings' gender or significant older sibling by younger sibling interactions for either mothers' or fathers' reports of the older siblings' behavior to their 16-month-old toddler sibling, indicating that older sisters' behaviors did not differ depending on whether they had a younger brother or a younger sister at 16-months.

The 2(older sibling gender) x 2 (younger sibling gender) ANOVAs conducted with the 4-year data revealed a very different picture. There were no significant main effects or interactions involving either siblings' gender when we examined mothers' reports of the older and younger siblings' behaviors at 4 years, and fathers' reports of the younger siblings' behavior at the 4 year timepoint. Only one statistically significant interaction was found for fathers' reports of the older siblings' teaching, F (1, 51) = 6.95, p < .01. The means from this interaction can be found in Table 8. As one might expect, older sisters were far more likely to teach their younger sisters, with older brothers far less likely to teach their younger sisters. Younger brothers, on the other hand, were just as likely to be taught by their older brothers as their older sisters. However, given that only one interaction was found to be significant, caution needs to be exercised in interpreting gender differences in sibling interaction at this age.

Summary and Discussion

Based on the earlier review of studies using the SIB in relatively modest samples of adolescents and children in middle childhood, the scales of the Sibling Inventory of Behavior (SIB) appear to be

psychometrically sound. The SIB is perhaps the oldest of the sibling relationship questionnaires currently available and has been used quite extensively by researchers interested in obtaining both children's self-reports and parents' reports of sibling relationship quality. The vast majority of research using this instrument has been conducted on preadolescents and adolescents and this earlier research finds these scales are internally consistent for both parent and child reports, and have fairly high correlations across respondents in the family, as well as over time, in many cases, several years later.

The SIB or any of the many sibling relationship questionnaires are currently not found in nationally representative data sets, which precluded the possibility of analyzing the psychometric properties of any sibling relationship inventory using large survey data. As a result, the current analyses were conducted on a smaller, local data set, that had information on the SIB from multiple respondents (both the mother and the father) on two children (both the younger and the older sibling) in the family and across two timepoints (both toddlerhood and preschool). This allowed us to examine whether the internal consistency of the scales was acceptable across multiple respondents for two different age children at two different timepoints. All the scales, with the exception of the teaching scale, showed adequate internal consistency across parents' reports, across the siblings and across both timepoints. In no case, did the internal consistency appear to be affected by how old the child was, which child was being assessed, or which parent was completing the items. In general, then, the reliability of these scales is robust with respect to Cronbach's alpha estimates, and the results presented here on parents' reports of younger children mirror those results reported by others using adolescent samples.

In the present paper, we analyzed only the positive dimensions of sibling relationship quality by including the empathy, companionship, and teaching scales, along with creating a composite of positive sibling involvement. The teaching scale was the only scale where the internal consistency was lower than .70, but this is most likely due to the fact that this scale has fewer items than the others and because teaching is not as typical of sibling interactions in early childhood as it is in the later years of childhood and adolescence. Although the focus of this paper was on the positive indicators of sibling relationship

quality, we also provided the entire 32 items that comprise the SIB. Recall that from the research reviewed earlier that conflict and warmth in the sibling relationship may need to be examined together in order to get the most complete picture of the manner in which sibling relationship quality will affect children's outcomes. It is unrealistic to think that siblings will never argue or fight with one another. Indeed, the research suggests that being able to resolve sibling conflict constructively might actually enhance children's social competence and their abilities to interact successfully with their school-age peers. Some level of conflict is needed perhaps in order for children to learn how to handle conflict and what better place to learn how to resolve childhood conflicts than through interactions with a sibling. Sibling conflict bodes poorly for children when it involves aggression, hostility, and coercive control, and there is little warmth expressed between siblings. Perhaps the best advice for those interested in studying sibling relationships in childhood and adolescence is to suggest that both positive indicators such as companionship and empathy be included along with indicators of sibling conflict and rivalry, and that these be examined together (e.g., high companionship and moderate conflict) and not be treated as separate independent dimensions of the sibling relationship.

Limitations and Future Directions

Because we were analyzing data from a much smaller data set, we were confronted with serious issues concerning the statistical power and hence significance levels of some of our analyses. This was a particular concern whenever we presented findings using the longitudinal data where we were now only able to include the 37 families with data at both timepoints. For this reason, many of the reported associations only reached significance. However, we did have actual observations of the children's behavior when interacting with their siblings during a laboratory session to which parental reports could be related. All associations found, whether significant or marginally significant, were in the expected direction and all provided evidence that parents' reports of positive indicators of sibling relationship quality were correlated with positive indicators of *actual observed sibling behavior* during a laboratory

session and inversely related to the parents' reports of children's aggressive behavior problems at the 4-year timepoint.

Because of the small sample size and the fact that these were all families with toddler and preschool children when the study started and because the sample is relatively homogenous with respect to ethnicity and socioeconomic status, we did not include many control variables in our analyses. The few gender effects indicated that parents reported older female siblings to be more companionate, express more empathy, teach and overall be more positively involved with their younger 16-month-old toddler siblings than did older male siblings. By 4 years, however, the only significant finding with respect to gender was an interaction between the gender of the older and younger sibling for the older siblings' teaching. Older sisters were much more likely, according to their fathers, to teach their younger sisters than were older brothers, whereas younger brothers appeared to be taught equally by their older brothers and older sisters.

The fact that the majority of these families (over 95%) were white and middle-class did not allow us to address diversity with respect to ethnicity or to examine children from different socioeconomic backgrounds. This is a rather unfortunate drawback not only of the current research, but most of the research that currently exists with respect to children's and adolescents' sibling relationships. Brody and his colleagues (Brody, Murry, 2001; Brody et al., 1999) are one of the few groups of investigators to examine children's sibling relationships in African-American families. Although these investigators did not use the SIB, they did use another well-respected measure of sibling relationship quality, the Sibling Relationship Questionnaire (Furman & Buhrmester, 1985), and reported good internal consistency (alphas at .80 or above) on the prosocial and antagonistc scales of this measure. Moreover, the quality of the sibling relationship was related to African-American children's social and emotional outcomes, indicating that sibling relationship quality is an important contributor to the development of self-regulation and behavior problems in these families as well. Indeed, the role of siblings may be even more relevant for children in low income, single-mother, ethnically-diverse families than in middle-class, white families.

Some have argued (e.g., Taylor, Chatters, & Mays, 1988) that African-American families rely more on siblings as sources of support. Given recent changes in welfare reform, it may indeed be an older sibling, not a paid child-care provider, who is caring for younger children in the family when low-income mothers are entering the work force. In many cases, older children in the family may be the only consistently reliable means of child care on which these mothers can rely. Whether sibling caregiving has negative effects or possible benefits for children living in different family circumstances cannot be adequately addressed at this time because of the exclusion of these constructs in existing data bases. Any large-scale study examining children always has at least one, if not many, measures of mothering, but rarely, if ever, considers the possibility that fathers, the children's older siblings, grandparents, or even the siblings of the parents themselves (i.e., aunts, uncles) could and probably do care for and "parent" these children. Whether this is due to lack of research funding or a theoretical bias where mothers are viewed as the only legitimate caregivers of children, the fact still remains that we cannot know the effects of these other caregivers unless investigators actually include measures that allow us to do so.

Even though the sibling relationship is one of the longest lasting relationships an individual will have, we still know far too little about the development of sibling relationships throughout childhood, adolescence, and adulthood. Only when survey researchers begin to include measures of sibling relationship quality as consistently as they now do mother-child relationship quality, will we have a nationally representative data base allowing researchers to address the contributions of siblings to children's developmental outcomes. Ideally, researchers from various disciplines would then have access to larger samples of ethnically-diverse families from different socioeconomic backgrounds and the effects of sibling relationship quality on children's development could then be examined in the detail it so rightfully deserves.

Footnote

[1] For the current research, we used the same wording as the original SIB items, but explained to parents how to interpret them in line with the developmental age of their children. All words such as "teaches", "babysits" or "shares secrets" were placed in quotes to indicate that parents needed to think about these terms in relation to the age of their child. The researchers provided examples of behavior that would be considered relevant and parents then completed the questions based on this information. For instance, "babysitting" referred to the older sibling looking out for or watching over the younger one, or showing some concern about the toddler's whereabouts, even if the parent were nearby providing care. "Teaches" referred to any behavior or activity where the older tried to show the younger how to work something such as a toy, or directed and managed the interaction in some way (e.g., "let's play with the car"). "Sharing secrets" referred to behaviors the older sibling used that indicated they had shared information with the younger sibling or formed an alliance with the younger sibling while keeping something from their parents (e.g., "don't tell mommy we ate those cookies").

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Table 1

Sibling Inventory of Behavior Items

Scale Items	Com.	Emp.	Tch.	Riv.	Agg.	Avo.
Accepts (Child 1) as a playmate	X					
Gets ideas for things they can do together	X					
Has fun at home with (Child 1)	X					
Treats (Child 1) as a good friend	X					
Makes plans that include (Child 1)	X					
Shares secrets with (Child 1)	X					
Is pleased by progress (Child 1) makes		X				
Wants (Child 1) to succeed		X				
Shows sympathy when things are hard for (Child 1)		X				
Is concerned for (Child 1's) welfare and happiness		X				
Tries to comfort (Child 1) when (s/he) is unhappy or upset		X				
Teaches (Child 1) new skills			X			
Helps (Child 1) adjust to a new situation			X			
Babysits and cares for (Child 1)			X			
Tries to teach (Child 1) how to behave			X			
Tattles on (Child 1)				X		
Is jealous of (Child 1)				X		
Is nosey and has to know everything about (Child1)				X		
Takes advantage of (Child 1)				X		
Blames (Child 1) when something goes wrong				X		
Is very competitive against (Child 1)				X		
Resents (Child 1)				X		
Teases or annoys (Child 1)					X	
Gets angry with (Child 1)					X	
Fusses and argues with (Child 1)					X	
Hurts (Child 1's) feelings					X	
Has physical fights with (Child 1) (not just for fun)					X	
Is embarrassed to be with (Child 1) in public						X
Stays away from (Child 1) if possible						X
Acts ashamed of (Child 1)						X
Frowns or pouts when (Child 1) has to be with (him/her)						X
Tries to avoid being seen with (Child 1)						X

Note: Com = Companionship, Emp = Empathy, Tch = Teach/Manage, Riv = Rivalry, Agg = Aggression/Conflict, Avo = Avoidance.

Table 2

Descriptive Statistics for the Sibling Inventory of Behavior

	Range	Mean	SD	Skewness	Kurtosis
		16-month Parent Reports			
Older Sibling					
Mother					
Positive Involvement Scale	28-74	50.84	8.40	-.15	.38
Involvement	11-29	19.12	3.59	-.04	.08
Empathy	11-25	19.08	2.87	-.26	.34
Teaching	6-20	12.69	2.78	-.07	-.30
Father					
Positive Involvement Scale	25-64	48.93	8.49	-.54	-.05
Involvement	9-26	18.72	3.51	-.47	-.05
Empathy	10-24	18.30	3.44	-.55	-.10
Teaching	6-17	11.92	2.48	-.21	-.56
		4-year Parent Reports			
Younger Sibling					
Mother					
Positive Involvement Scale	36-71	52.04	6.79	-.07	.90
Involvement	17-30	22.93	2.95	-.14	-.21
Empathy	13-25	18.82	2.80	-.13	-.18
Teaching	4-15	9.32	2.45	.18	.25
Father					
Positive Involvement Scale	37-71	51.55	6.69	.68	1.46
Involvement	16-30	22.89	2.79	.16	.67
Empathy	9-25	17.94	3.22	.22	.48
Teaching	4-17	8.87	2.48	.46	1.26
Older Sibling					
Mother					
Positive Involvement Scale	36-64	52.61	6.48	-.47	.06
Involvement	13-28	21.25	2.92	-.73	.76
Empathy	12-24	18.49	2.89	-.02	-.75
Teaching	9-16	12.88	2.02	-.14	-.81
Father					
Positive Involvement Scale	36-71	52.04	6.79	-.07	.90
Involvement	14-30	21.79	3.16	-.11	.28
Empathy	13-25	17.89	3.05	.29	-.49
Teaching	8-17	12.37	2.23	.02	-.06

Table 3

Sibling Inventory of Behavior Positive Involvement Scale and Subscales: Psychometric Properties

Scales	Older Sibling		Younger Sibling	
	Mother	Father	Mother	Father
16-month Parent Report				
Positive Involvement Scale	.92	.91		
Involvement	.86	.82		
Empathy	.78	.85		
Teaching	.75	.61		
4-year Parent Report				
Positive Involvement Scale	.86	.88	.85	.85
Involvement	.80	.86	.79	.78
Empathy	.79	.84	.76	.80
Teaching	.54	.69	.70	.67

Note: Cronbach's alphas are presented.

Table 4.

Cross-Parent Correlations for 16 month and 4 year Positive Involvement.

SIB Scales	Mother-Father Correlation
16 Months	
Older Sibling	
Positive Involvement	.65**
Companionship	.59**
Empathy	.53**
Teaching	.53**
4 Years	
Younger Sibling	
Positive Involvement	.53**
Companionship	.43**
Empathy	.54**
Teaching	.26
Older Sibling	
Positive Involvement	.47**
Companionship	.52**
Empathy	.49**
Teaching	.26

Note: * $p < .05$. ** $p < .01$.

Table 5

Cross-time Correlations for Mothers' and Fathers' Reports of the Older Siblings'

Behavior at 16 Months and 4-Year Timepoints (n=37).

Sibling Relationship	Mother	Father
Positive Involvement	.29^{+}	.50**
Companionship	.23	.24
Empathy	.34*	.42*
Teaching	.25	.47**

Note: These analyses were conducted using the smaller subsample of families having two-timepoints of measurement (n = 37).

$^{+}$ $p < .10$. * $p < .05$. ** $p < .01$.

Table 6

Correlations of Older Sibling SIB Scale Scores with Aggressive Behavior Problems at 4 years (n= 54)

SIB Scales	Aggressive BP
16 Month	
Mother	
Positive Involvement	-.28
Companionship	-.20
Empathy	-.27
Teaching	-.29+
Father	
Positive Involvement	-.37*
Companionship	-.34*
Empathy	-.30+
Teaching	-.36*
4 Year	
Mother	
Positive Involvement	-.18
Companionship	-.02
Empathy	-.25+
Teaching	-.18
Father	
Positive Involvement	-.31*
Companionship	-.13
Empathy	-.30*
Teaching	-.34*

Note: + p < .10. * p < .05. ** p < .01.

Table 7

Correlations of Younger Sibling SIB Scale Scores with Aggressive Behavior Problems at 4 years (n = 54)

SIB Scales	Aggressive BP
4 Year	
Mother	
Positive Involvement	-.21
Companionship	-.19
Empathy	-.25+
Teaching	-.06
Father	
Positive Involvement	-.24+
Companionship	-.27*
Empathy	-.21
Teaching	.06

Note: + p < .10. * p < .05. ** p < .01.

Table 8

Means and Standard Deviations of Sibling by Gender Interaction.

	OS Gender			
	Male		Female	
YS Gender	M	SD	M	SD
Male	12.87	2.30	12.08	2.23
Female	10.68	1.80	13.06	2.02

Note: OS = Older sibling, YS = Younger sibling.