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Family Transitions Following the Birth of a Sibling: An Empirical Review of Changes in the Firstborn's Adjustment

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Nearly 80% of children in the United States have at least 1 sibling, indicating that the birth of a baby sibling is a normative ecological transition for most children. Many clinicians and theoreticians believe the transition is stressful, constituting a developmental crisis for most children. Yet, a comprehensive review of the empirical literature on children's adjustment over the transition to siblinghood (TTS) has not been done for several decades. The current review summarizes research examining change in firstborns' adjustment to determine whether there is evidence that the TTS is disruptive for most children. Thirty studies addressing the TTS were found, and of those studies, the evidence did not support a crisis model of developmental transitions, nor was there overwhelming evidence of consistent changes in firstborn adjustment. Although there were decreases in children's affection and responsiveness toward mothers, the results were more equivocal for many other behaviors (e.g., sleep problems, anxiety, aggression, regression). An inspection of the scientific literature indicated there are large individual differences in children's adjustment and that the TTS can be a time of disruption, an occasion for developmental advances, or a period of quiescence with no noticeable changes. The TTS may be a developmental turning point for some children that portends future psychopathology or growth depending on the transactions between children and the changes in the ecological context over time. A developmental ecological systems framework guided the discussion of how child, parent, and contextual factors may contribute to the prediction of firstborn children's successful adaptation to the birth of a sibling.

Keywords: siblings, infants, parenting, behavior problems, birth of a sibling

It is of quite particular interest, however, to observe the behavior of small children up to the age of two or three or a little older towards their younger brothers or sisters. Here, for instance, was a child who had so far been the only one; and now he was told that the stork had brought a new baby. He looked the new arrival up and down and then declared decisively: "The stork can take him away again!" (S. Freud, 1900/1953, p. 251)

Sigmund Freud's (1900/1953) account nearly a century ago of Little Han's reaction to the news of his baby sister typifies contemporary views about the firstborn's reluctant acceptance of an infant sibling. The arrival of a baby sibling is a normative life event for most children. Consider, for example, that nearly 80% of children in the United States have at least one sibling (U.S. Census Bureau, 2009). What this simple statistic reveals is that the majority of firstborn children have experienced the arrival of a newborn sibling at least once during their childhood. Psychoanalytic

theorists such as Sigmund Freud have emphasized the stressful nature of this transition for firstborn children, often citing it as one of the most traumatic experiences of early childhood (Adler, 1957; A. Freud, 1946; Winnicott, 1964). Parental attention, once the sole province of the firstborn, must now be shared with a sibling rival. The emotional upset and disruptive behavior of firstborn children after the arrival of a new sibling is often viewed as sibling jealousy. Winnicott (1964) considered the distress of firstborns during this time to be normative: "It is so usual as to be called normal when a child is upset at a new one" (p. 133).

Mothers also express concern over the impending disruption, experience guilt and sadness over the loss of their relationship with the firstborn, and may question their ability to cope with the older children's misbehaviors once the baby has been brought home (Richardson, 1983; Walz & Rich, 1983; Young, Boyle, & Colletti, 1983). Furthermore, most firstborn children will experience the transition to siblinghood (TTS) between the ages of 2 and 3 (Baydar, Greek, & Brooks-Gunn, 1997; Eggebeen, 1992), a period considered significant for the development of young children's abilities to regulate their behavior and emotions (Thompson & Goodman, 2010), the emergence of an understanding of others' emotions and minds (Wellman, 2002), and the beginnings of young children's internalization and the development of conscience (Kochanska, 1993). Parents of toddlers may already be dismayed by the disruptive and noncompliant behavior of their children as they enter the *terrible twos* (Belsky, Woodworth, & Crnic, 1996). Adding the stress of a newborn sibling and the changes that may accompany this transition (e.g., move to a new

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home, discontinuation of day care) may be so disruptive as to interfere with young children's mastery of self-care (toileting, feeding) and self-regulation.

This normative developmental transition is considered a significant stress for young children and their parents (Dunn, 1988b; T. Moore, 1969). Parents worry about firstborn children's jealousy and the development of sibling rivalry (Affonso, Mayberry, & Sheptak, 1988; Merilo, 1988; Moss, 1981), listing it as one of their biggest childrearing concerns (McDermott, 1980; Sammons, 1985). This concern may be why so many child-rearing books offer advice for parents on how to handle sibling rivalry (see review by Kramer & Ramsburg, 2002). For instance, *Siblings Without Rivalry* (Faber & Mazlish, 1998) was a Number 1 *New York Times* best-seller, suggesting that parents are quite eager to prevent sibling rivalry. Although this transitional period is normative, is experienced by large numbers of children, is viewed as stressful by clinicians, nurses, and family physicians, is the topic of best-selling child care books, and is a significant concern for parents, a systematic review addressing the firstborn's adjustment across the TTS has not been done for some time (see Murphy, 1993; Vandell, 1988).

The major goal of the present article is to summarize extant studies examining this important developmental transition in children's lives to determine if there are changes in firstborn children's adjustment after the birth of the baby sibling and what developmental processes might explain these change patterns and predict individual differences in children's adjustment across the transition. This article focused specifically on the period following the birth of a second child because this period marks the TTS where the firstborn's role of only child is transformed into one of older brother or sister. The primary concern of this review was to ascertain whether the TTS is a developmental crisis or a disruptive force in the life of firstborn children. I start with a presentation of the different perspectives used to define and study transitions as they pertain to individual development across the life span and the family life cycle. I then summarize the empirical literature looking at changes in the firstborn's behavior before and after the birth. Once summarized, I turn to the presentation of several different models for predicting individual differences in behavioral and affective changes during an ecological transition, with a focus on child, parent, and contextual factors. Because the birth of a sibling changes the family structure, it also coincides with other family-level changes, such as changes in the parent-child and/or partner relationships, and it may be these co-occurring changes that explain individual differences in the firstborn's adjustment. As such, the final part of the review presents evidence of changes in other individual and family-level dynamics (e.g., maternal mental health, marital relationship, parental discipline) and how these might relate to or explain individual differences in change trajectories for children's adjustment across the TTS. In doing so, I also provide recommendations for future directions for research in this area.

Transitions, Crises, and Turning Points

The birth of a second child is a time of transition for firstborn children and their parents. The TTS is a normative transition because it is ubiquitous (i.e., it occurs for most families), expectable (i.e., families anticipate the occurrence at a specific point in

the family life cycle), and short-term (i.e., occurs with the birth), in contrast to nonnormative transitions, which often refer to a set of unpredictable or idiosyncratic events that are fairly traumatic (i.e., deployment during war, serious accidents or injuries; see also McCubbin & Patterson, 1983). Transitions have been defined differently across disciplines such as psychology, psychiatry, and sociology and may actually refer to very different phenomena, depending on whether the focus is the individual, the environment, or the person-environment interaction (see also P. A. Cowan, 1991, and Rutter, 1996). Therefore, I provide a brief summary of how transitions have been described and defined with different theoretical frameworks.

Family Crisis Models and Stressful Life Events

The TTS is often viewed as a stressful life event that presents challenges for children and their families (Dunn, 1988b; T. Moore, 1969). The original ABCX model of family crisis (Hill, 1949) was developed to explain how families adapted to nonnormative stressful life events and the subsequent family disruption (e.g., fathers deployed during World War II). In this formulation, A (the stressful life event) interacted with B (the family's resources), which interacted with C (how the family defined the seriousness of the event) to produce X (the crisis). Later, the model was expanded to describe normative family transitions (McCubbin & Patterson, 1983), which focused on (a) the individual, (b) the family unit, and (c) the community context when attempting to understand whether a normative life event became a crisis or an opportunity for growth. Some family researchers studying normative transitions have questioned whether a framework initially designed to understand nonnormative traumatic life events can be easily modified to explain individual and family adaptation across a normative life event (P. A. Cowan, 1991). In the family crisis model, family adaptation across a life transition represents the balance between the demands and capabilities of the individuals with the demands of the family and community contexts. Because the demands of individuals, families, and the community change over time and family crises evolve and are resolved over time, rarely do families deal with one stressful event at a time. Rather, many families experience an accumulation of demands, including the additional hardships that come along with the transition. Adaptive resources used to cope with the stress include personal resources of the individuals, such as financial, educational, health, and psychological resources, in addition to social support, in the form of emotional support (e.g., the person feels loved and cared for), esteem support (e.g., the person believes they are valued), and network support (e.g., a belief that the family belongs to a network involving mutual obligations and understanding). In general, family crisis models by design assume that family disruption is inevitable and that individuals can cope with the disruption and stress if sufficient resources are in place to prevent the transition from turning into a crisis.

Stress and coping frameworks have also been utilized to explain how stressful life events affect the individual, not just the family. The focus is usually on negative life events, which present a psychological threat to the individual and precipitate psychopathology if the individual is unable to sufficiently cope with the accompanying stress (see Rutter, 1996). Within these stress and family crisis frameworks, the TTS would be considered a stressful

and challenging period for children, provoking disordered behaviors unless psychological resources and environmental supports for coping with the stress are in place.

Developmental Transitions

When developmental scientists speak of transitions, they are often referring to the gradual processes of intraindividual development that occur over the course of maturation. As P. A. Cowan (1991) noted, there are differences in how developmental psychologists describe and use the term *transition* and how life-stage researchers examining adult development define what constitutes a transition. With respect to children's development, a developmental transition requires a reorganization of an individual's biological or psychological structures that is different from the structures or functions that existed at an earlier point in time. Previous cognitive, affective, or behavioral structures are reorganized, and new patterns emerge. From this perspective, a developmental transition involves a reorganization of biological or psychological structures, is intrinsic to the individual, and is considered normative and universal (i.e., experienced by all children; see Rutter, 1996).

In contrast, life-stage researchers looking at adult development generally focus on age periods and the external events that provoke intrapersonal change rather than internal reorganization of psychological functioning. Transitions are considered with respect to chronological age periods, such as young adulthood or midlife, or life stages, such as marriage and retirement. These periods are relatively universal and present developmental challenges (e.g., Erikson, 1950). Individuals during these periods are required to adapt to the biological, psychological, or social changes that occur with the transition. Stressful life events, such as divorce or the loss of a spouse in late life, have also defined transitional periods in adult development, with the expectation that new modes of psychological adaptation are needed in order for the individual to successfully navigate the transition. In sum, developmental models of transitions often focus on internal psychological or biological processes of the individual, are generally experienced by most individuals, and require adaptation or a reorganization of prior psychological structures for successful developmental outcomes.

Ecological Transitions

Bronfenbrenner (1979) claimed that an ecological transition occurred when an individual's position in the ecological environment was altered as a direct result of the changes in the individual's role (e.g., only child to older sibling), the ecological setting in which the individual lived (e.g., parent-child relationships change), or both. Ecological transitions are often abrupt and discontinuous and can be normative or nonnormative. Normative ecological transitions can be *turning points* in children's lives because even though they are predictable in the life course, they often represent an abrupt discontinuity in the family setting and children's place in the family, which, in turn, can dramatically alter psychological functioning. These transitions may be especially challenging for very young children to manage, but they may also be an opportunity for further growth and development.

In an effort to determine whether a normative ecological transition may be a turning point for children, either a positive or a negative one, Seidman and French (2004) recommended that re-

searchers first examine the average developmental trajectory across a sample of children and see whether there was evidence that children, on average, experienced a discontinuity (i.e., significant increase or decrease) in the behavior under investigation (e.g., sleep problems). According to Seidman and French, the discovery of a robust discontinuous pattern of change that described most individuals would support the development of universal preventive interventions because most children appeared to be affected by the transition. However, they also suggested that researchers needed to consider whether this average trajectory represented most children or could possibly obscure different pathways of individual change. If there was evidence of far more idiographic profiles representing individual trajectories and, thus, individual differences, then it is necessary not only to identify these different patterns, but also to pinpoint the developmental mechanisms that explained these individual trajectories. If individual differences were the norm, rather than the exception, then it would be far more advantageous to develop selective intervention strategies that were designed to focus on the unique needs of a particular subgroup of families and children. With respect to the TTS, examining the average developmental trajectory and individual change trajectories in firstborns' adjustment across the TTS would yield valuable information for targeting interventions designed to assist parents and their children during this period. In sum, the ecological perspective focuses on change in both the individual child as well as the ecological contexts in which the child is embedded, considers change to be abrupt and discontinuous across a transition, and focuses on explaining individual differences by examining person-context interactions.

Transitions as Turning Points

P. A. Cowan (1991) claimed that change could be referred to as a *life transition* only if there was evidence of a significant shift in an individual's view of the self and the world and if there were changes in major social relationships. If the changes that occurred did not result in developmental advances and psychological restructuring, but only led to role changes, then it did not qualify as a life transition for the individual. With such a definition, it would be unlikely that the TTS would be deemed a major life transition for firstborn children because their young age would place severe limitations on children's sense of self and their understanding of their self in relation to others in their world. On the other hand, the TTS may result in significant reorganization of young children's social relationships and psychological functioning, particularly during a developmental period in which children are highly dependent on the quality of the relationships they have with parents. For instance, a change in the security of the parent-child attachment relationship could have a profound effect on children's psychological functioning, including the mental representations they develop about relationships, the self, and their confidence in the availability of others in times of stress.

Rutter (1996) argued that there does not need to be evidence of significant changes in psychological structures in order for a transition to be a turning point in development because such an assumption misleads us into believing that life trajectories can be maintained or altered only by internal organization when, indeed, life trajectories may persist over time because of external circumstances, such as continuity in the caregiving environment. Accord-

ing to Rutter, major life experiences cannot always be equated with discontinuities in development. As noted earlier, stressful life events are often assumed to bring about developmental changes in psychological functioning, with a focus on the provocation of psychopathology. Although there is considerable evidence to suggest this may be the case (see Rutter, 1996), a developmental perspective requires that stability and continuity, as well as change, be explained. As Rutter and others have discovered (Caspi & Moffitt, 1993; P. A. Cowan, 1991; Elder & Caspi, 1988), transitions have often resulted in increased stability of behavioral and psychological outcomes. Life stressors actually accentuated the individual's pre-existing psychological tendencies before the transition (see Elder & Caspi, 1988, and the accentuation principle) and, as a result, increased the stability in the rank ordering of individuals and contributed to continuity in developmental outcomes. Those individuals with high levels of psychopathology beforehand were likely to be the same individuals experiencing significant psychological distress and disorder during and after a transition.

Rutter (1996) has also warned against trying to uncover universal experiences for individuals making significant life transitions, such as marriage, parenthood, or divorce. The experience of these events "may be positive, negative, or neutral depending on whether the experience alters the person's life in a way that matters and in a direction that runs counter to the previous life trajectory or pattern of psychological functioning" (p. 612). According to Rutter, turning points often do not involve universal experiences for all individuals but, instead, appear to involve a particular set of experiences for a certain subset of the population, sometimes a surprisingly small subset. A turning point is not simply another name for a stressful life event because in the life events framework of family stress models, negative life events are viewed as psychological threats that provoke dysfunction and psychopathology. A turning point, on the other hand, assumes a long-term effect on development or a lasting modification of an individual's life trajectory, including the potential for developmental advances and not just the provocation of pathological functioning. For a life experience to be defined as a turning point, there must first be identification of some change in the level, patterns, or type of psychological function (Rutter, 1996). Further, the change is probably manifested in only a subgroup of individuals and is not universal, so a transition may constitute a turning point for some individuals but not others. The aim of future research, then, is to identify what differs across these subgroups and to search for the explanation of change in functioning and the mechanisms underlying change.

Empirical Evidence for Children's Adjustment Following the Birth of a Sibling

With a background in the ways that transitions and life events have been viewed, I now turn to the empirical evidence on children's adjustment following the birth of a sibling with an eye to understanding which of the previous accounts best fits the data. For purposes of this review, I used several methods to collect articles and papers examining the TTS. First, I conducted computer searches of PsycINFO, the Social Sciences Citation Index, the ISI Web of Science, PubMed, Family and Society Abstracts, Google Scholar, and Dissertation Abstracts International, using the

keywords *sibling birth*, *birth of sibling*, *second pregnancy*, *birth of second child*, *infant sibling*, and *baby sibling*. I also selected options within the various databases, such as "look at related articles" or "times cited," to find articles that had cited the article being examined. I also conducted an electronic search of the MCAT database (University of Michigan's library catalogue). Second, I requested dissertations through the Interlibrary Loan Service to examine unpublished studies in the area. In the event a dissertation had been published, the findings from the published article were used. Third, I culled the reference sections of all retrieved articles, books, chapters, and dissertations and made every attempt possible to exhaust the literature examining changes in the family occurring after the birth of a sibling. Studies also had to be published in English-language journals to be included in this review.¹

I found 43 published sources addressing children's reactions to the birth of a baby sibling, and these differed immensely with respect to study design and the child outcomes chosen. Of the 43 sources, six involved clinical case studies of individual children experiencing difficulties after the birth of an infant sibling. One was a book containing the author's account of his firstborn child's reactions to the birth of the second child (Mendelson, 1990). Two books provided overall summaries of the findings from a specific study (Dunn & Kendrick, 1982; Stewart, 1990). Eleven studies consisted of either qualitative accounts obtained from parental and/or child interviews or retrospective studies that presented descriptive statistics (e.g., percentages of children who evinced certain behaviors) based on maternal reports of what had changed since the infant sibling's birth. Three reviews were also uncovered in this process, with one addressing whether popular child care books incorporated research findings of the TTS (Kramer & Ramsburg, 2002) and two providing narrative summaries of the literature to that date (Murphy, 1993; Vandell, 1988). I was specifically interested in those sources that explicitly addressed changes in firstborn

¹ The search revealed several studies addressing the TTS that were published in international journals, but the abstracts were published in English in the PsycINFO database. A French study by Bourguignon (1980–1981) used semistructured interviews with 11 middle-class mothers and fathers and reported on changes in parent and family characteristics. The abstract reported that mothers and fathers expressed sadness at the impending birth, families reported more emotional and financial difficulties after the birth, and spouses reported greater marital distance once the baby arrived. A second qualitative study conducted by Van IJzendoorn and Van Vliet-Visser (1985) with five Dutch families 2 months before and after the sibling's birth found that all five firstborn children appeared troubled by the sibling's birth and reacted aggressively to the baby. Further, greater father involvement in child care was accompanied by improvement in the firstborn's attachment relationship. A third study (Dessen & Mettel, 1984) conducted in Brazil reported on a case study of a firstborn child, noting that changes were evident in the behavior of the child in relationships with mother and father after the birth. A Brazilian study with eight families reported that changes following the birth of a baby sibling led to anxiety and instability in family relations (Piccinini, Pereira, Marin, de Cássia Sobreira Lopes, & Tudge, 2007), and a study with five families examined the firstborn's dependence behaviors during the mother's pregnancy (de Oliveira & de Cássia Sobreira Lopes, 2008). Finally, a review of the firstborn's regressive and independence behaviors after the TTS was published in Portuguese while the current article was under review (de Oliveira & de Cássia Sobreira Lopes, 2010).

children's adjustment across the TTS in an effort to discern whether the TTS is disruptive for firstborn children. I dropped the clinical case studies from consideration because these children's behaviors had to be extreme in order to be brought to the attention of a professional. I dropped the descriptive, postbirth studies and the qualitative accounts because of the potential bias of mothers' retrospective reports in noting change in disruptive behavior at a time when they were under considerable duress and fatigue caring for a newborn. To be included in the final group, actual statistical analyses testing significant change from before to after the birth or differences across groups (e.g., those children with and without a sibling) had to be conducted. This left a total of 23 publications. A surprising number of unpublished dissertations were also found, although not all of them focused on the older children's behavioral adjustment; seven unpublished dissertations were also included, resulting in 30 sources for this review.

Several preliminary remarks about the resulting sources are in order before I summarize the research findings because they lend some insight into research on the TTS. First, many of the studies were published in clinical, pediatric, or nursing journals in addition to psychological journals. Most of the unpublished dissertations were also conducted by students in clinical and counseling psychology programs or nursing programs. The preponderance of published articles and unpublished dissertations in the health-related fields attests to the clinical interest and significance of this important transition for health care professionals and practitioners. Second, there was a clear pattern in when the studies were published. Of the 23 published studies, two were published in the 1970s, 10 in the 1980s, and 10 in the 1990s (see Table 1). From 1997 until 2011, only one study addressing changes in firstborn children's behavioral adjustment following the birth of an infant sibling was published (Kojima, Irisawa, & Wakita, 2005), although several studies addressing changes in other aspects of family life were published in this time frame (e.g., Krieg, 2007). Of the seven dissertations, three were conducted in the 1980s and four in the 1990s. Despite the continued interest in the TTS by parents and practitioners, research has declined substantially over the past decade. The reasons for this noticeable absence of studies since 2000 are not entirely clear. In any event, it is a reminder of how little attention has been devoted in recent years to this significant developmental transition for many young children and their parents.

Table 1 provides information on the 30 sources, including the age of the firstborns, the research design, the sample size of each study (or group of studies by the same author), the country in which the research was conducted, the ethnicity and SES of the sample when available, the percentage of the sample that included married families or families in which the mother was living with the father, whether or not data collection included information from the fathers, and a summary of the significant changes in children's behaviors.

Several points should be underscored here based on the information in Table 1. First, with the exception of the study by Teti, Sakin, Kucera, Corns, and Eiden (1996), the majority of these studies included relatively small samples, usually between 30 to 50 families, but one with as few as eight. Many of these studies, however, relied on observational methods of the children in their homes, and the labor-intensive nature of such research often precludes the use of large samples. Second, most studies have focused

on predominantly White, middle-class samples, either in the United States or in Europe. The one exception is the work conducted by Kojima et al. (2005) in Japan. Far less is known about the TTS in other cultures or for different ethnic or racial groups. Some research indicates that the timing of the second birth may differ for European American and African American women, with African American mothers having their second children at younger ages than European American mothers. African American mothers are also more likely to have their second children within 18 months of the first birth (Wineberg, 1988; T. Yu & Volling, 2009). Among the various ethnic and racial groups of the United States, then, there may be different parental expectations about how close children should be spaced, what behaviors (e.g., clinging) might be considered acceptable or unacceptable for older siblings, and how parents may respond to observable changes in older siblings' behaviors. One recommendation for future research is the need for studies examining different racial and ethnic groups as well as other cultures.

Another point is that in nearly all studies, the vast majority of mothers, in most cases 100% of the sample, were married or living with the father. Yet, fathers were rarely included in the data collection (only six of 30, or 20%). The lack of information on fathers is particularly noteworthy given the number of child-rearing books offering advice to second-time parents about the importance of father involvement to ease the transition for firstborn children (e.g., Bartell, 2004; Legg, Sherick, & Wadland, 1974; Leonard, 2000). On the basis of the limited number of studies that have included fathers, it is difficult to know what the basis is for such recommendations and whether the fathers' involvement with firstborns is actually beneficial, even if on the surface it makes intuitive sense. Finally, many studies were conducted approximately 20 to 30 years ago and may not represent the issues and concerns faced by today's families (e.g., working mothers).

The final set of studies also used different research designs and used different methods to assess children's adjustment. These differences are important to keep in mind because they allow one to draw different conclusions about firstborn children's adjustment. One group, the *postbirth research designs*, included studies in which families were contacted at one point after the birth and asked to report on change in children's behavior. In most cases, postbirth research designs were retrospective and descriptive and were not included in the final group of studies. The one exception was the cluster analysis performed by Kojima et al. (2005; see later).

A second group of studies used *longitudinal research designs*. These studies generally recruited a sample of women expecting their second children and followed them longitudinally over time. In most cases, they included one prebirth assessment and at least one postbirth assessment, often 1 month before and 1 month after the birth. These repeated assessments allowed examination of changes in problem behavior before and after the arrival of the baby sibling and whether or not these changes were significantly different across time. These studies also allowed researchers to assess the stability of individual differences in adjustment from one time to the next. Bear in mind, however, that a simple pre- and postbirth design with two time points does not allow an adequate examination of developmental trajectories or turning point effects because multiple time points across the year following the birth

Table 1
Summary of Studies Examining Changes in Firstborn Children's Adjustment After the Sibling's Birth

Design and author	N	Country	Race/ethnicity	SES	% married	Fathers	Age of older sibling	Measurement occasions	Significant results for change in firstborn behavior
Postbirth design Kojima, Irisawa, & Wakita (2005)	47	Japan	100% Japanese	NR	100	No ^a	1.1–5.5 years (<i>M</i> = 3.0 years)	T1: 6 months postbirth	Four clusters of change in mother–firstborn dyad: Cluster 1 (46.8%); few changes in mother–firstborn interactions; Cluster 2 (21.3%); increase in conflict between mother and firstborn; Cluster 3 (25.5%); increase in maternal scolding and firstborns' disobedience; Cluster 4 (6.4%); increase in firstborns' consideration of mother and less mother–child conflict.
Longitudinal design *Armentrout (1995)	46	United States	94% EA, 6% AS	Upper middle class	100	No	3.5 to 5 years (<i>M</i> = 4.5 years)	T1: 3–4 weeks prebirth; T2: 3–4 weeks postbirth	Increase in externalizing and internalizing problem behaviors. Increase in children's perceived social acceptance.
*Bernhard (1981)	56 ^b	United States	NR	Middle class	NR	Yes ^c	3 groups: 0–35 months (<i>n</i> = 23), 36–71 months (<i>n</i> = 20), 72–144 months (<i>n</i> = 13)	T1: 1 week prebirth; T2: 2–4 weeks postbirth; T3: 2–3 months postbirth	Present at birth: T1 to T2 change: (a) 0–35 months: decrease in role reversal, (b) no change for 36–71 months, and (c) decrease in upset for 72–144 months; T1 to T3 change: (a) 0–35 months were less active, (b) 36–71 months had less positive behaviors, and (c) 72–144 months had no change; T2 to T3 change: (a) 0–35 months were less active; (b) 36–71 months had less positive peer relations; and (c) 72–144 months sought fewer interactions. Not present at birth: T1 to T2 change: 0–35 months had less upset, 36–71 and 72–144 months had no change; T1 to T3 change: 0–35 months decrease in acting out and role reversals, 36–71 months decrease in positive peer relations, 72–144 months had no change; T2 to T3 change: no change for any age group. Increase in prosocial growth (self-care, more responsible) from T1 to T2. Decreases in behavioral symptoms (argues, has temper tantrums) and somatic symptoms (picks nose, bites nails) from T1 to T2. Increase in child's verbal initiations of interaction with mother.
*Douzinas (1983)	58	United States	98% EA, 2% HS	Middle and upper middle class	100	No	25–66 months (<i>M</i> = 40 months)	T1: 1 month prebirth; T2: 1 month postbirth; T3: 3 months postbirth	
Dunn & Kendrick (1980)	41	United Kingdom	100% EA	Working and middle class	100	No	18–43 months (<i>Mdn</i> = 25 months)	T1: 1–3 months prebirth; T2: 2–3 weeks postbirth	

(table continues)

Table 1 (*continued*)

Design and author	N	Country	Race/ethnicity	SES	% married	Fathers	Age of older sibling	Measurement occasions	Significant results for change in firstborn behavior
Dunn & Kendrick (1982)	41	United Kingdom	100% EA	Working and middle class	100	No ^d	18–43 months (<i>Mdn</i> = 25 months)	T1: 1–3 months prebirth; T2: 1 month postbirth; T3: 8 months; T4: 14 months	Increase in child initiated bouts of play and joint-attention. Increase in confrontations with mother. Increase in conversations about control. Increase in child's comments. Increase in deliberate naughtiness when mother feeding/caring for baby.
Field & Reite (1984)	16	United States	100% EA	Middle class	100	Yes ^e	22–60 months (<i>M</i> = 38 months, <i>Mdn</i> = 41 months)	T1: 10 days before mother's hospitalization (mother-child play); T2: 2 days after hospitalization (father-child play); T3: 10 days after return from hospital (mother-child play)	Increase in fantasy play, fantasy talk across three waves. Increase in aggression, fussiness, activity level, and heart rate from T1 to T2, then decrease at T3. Decrease in visual orientation to parent and responsiveness to parent's suggestions for play, smiling, animation, and latency to fall asleep over time. Increase in total sleep time, no. of night wakings, night crying, and duration of deep sleep from T1 to T2, but decreased by T3.
Gottlieb & Mendelson (1990)	50	Canada	>90% EA	Working and middle class	100	Yes ^f	28–57 months (<i>M</i> = 39 months, <i>Mdn</i> = 37 months)	T1: 6–10 weeks prebirth; T2: 5–6 weeks postbirth	Firstborns' distress increased from pre- to postbirth.
Gullicks & Crase (1993)	70	United States	93% EA, 7% AA	NR	100	Yes	15–85 months (<i>M</i> = 40 months)	T1: late pregnancy; T2: 1 month postbirth	Mothers and fathers report increase in child's talking about baby and asking to hold/care for baby. Mothers report decrease in calling self <i>baby</i> and cuddling with mother, and increase in whining. Fathers report decrease in child's general happiness.
*Happ (1992)	40	United States	90% EA, 2.5% AS, 7.5% biracial	Middle and upper middle class	100	No ^g	42–67 months (<i>M</i> = 51 months)	T1: 4–10 weeks prebirth; T2: 6–12 weeks postbirth	Improvement in eating habits and dressing self. Decrease in aggression and fighting toward peers. Increase in withdrawal, crying, and argumentative behaviors.
Kendrick & Dunn (1980)	41	United Kingdom	100% EA	Working and middle class	100	No	18–43 months (<i>Mdn</i> = 25 months)	T1: 1–3 months prebirth; T2: 2–3 weeks postbirth	Decrease in joint attention and joint play comparing prebirth and postbirth/no baby sessions.
Kramer (1996)	30	United States	97% EA, 3% AS	Middle class	NR	No	3–5 years (<i>M</i> = 47 months)	T1: 3 months prebirth; T2: 1 month prebirth; T3: 1 month postbirth; T4: 3 months postbirth; T5: 6 months postbirth	Convergence ratings between fantasy play content and maternal reports of positive concerns were lower at 3 and 6 months after the birth than at 3 months and 1 month prebirth and 1 month after birth.

(*table continues*)

Table 1 (*continued*)

Design and author	N	Country	Race/ethnicity	SES	% married	Fathers	Age of older sibling months	Measurement occasions	Significant results for change in firstborn behavior
Kramer & Gottman (1992)	30	United States	97% EA, 3% AS	Middle class	100	No	3–5 years ($M = 47$ months)	Same as Kramer (1996)	No change in overall quality of play, length of fantasy play engagement, or frequency of unmanaged conflicts during friend interaction.
Kramer & Schaefer-Herman (1994)	30	United States	97% EA, 3% AS	Middle class	100	No	3–5 years ($M = 47$ months)	Same as Kramer (1996)	Length of fantasy engagement for high sibling acceptance group declined from T1 to T3, w/no change for low sibling acceptance group. Decline in positive fantasy play between T2 and T3 but increase by T4 for high sibling acceptance group and no change for low sibling acceptance group. Increase in gossip (i.e., talk about TTS) from T2 to T3. No change in nonfantasy or play not relevant to the TTS.
Stewart (1990); Stewart, Mobley, Van Tuyl, & Salvador (1987)	41	United States	NR	Middle class	100	Yes	2–5 years	T1: 1 month prebirth; T2: 1 month postbirth; T3: 4 months postbirth; T4: 8 months postbirth; T5: 12 months postbirth	Significant decline in adjustment difficulties from T1 to T3 but not from T1 to T2 or between T3, T4, and T5. Firstborn directed more verbalizations to father and less to mother from T1 to T2. Decline in anxiety and imitation from T2 to T5, with confrontations higher at T2 and T4. ^h
*Soliday (1995)	51 ⁱ	United States	100% EA	Middle class	100	Yes	31–72 months ($M = 46.8$ months)	T1: 34th week of pregnancy; T2: 1 month postbirth	No significant change in frequency or presence of problem behaviors from T1 to T2.
Taylor & Kogan (1973)	8	United States	NR	Working class	100	No	29–42 months	T1: 1–2 months prebirth; T2: 1–2 months postbirth	Decreased affection to mother. Increase in emotional neutrality or flatness.
Teti, Sakin, Kucera, Corns, & Eiden (1996)	194	United States	95% EA, 4% AA, 1% AS	Middle class	100	No	12–63 months ($M = 32$ months)	T1: 3rd trimester of pregnancy; T2: 4–8 weeks postbirth	Decrease in attachment security.
Trause (1978); Trause et al. (1981)	31 ^j	United States	NR	Middle class	NR	No	1–3.5 years	T1: 2–4 weeks before hospitalization; T2: 2 weeks after hospitalization; T3: hospital discharge	Increase in sleeping problems, behavior problems, and staying close to mother. Improvement in eating behavior.

(table continues)

Table 1 (*continued*)

Design and author	N	Country	Race/ethnicity	SES	% married	Fathers	Age of older sibling	Measurement occasions	Significant results for change in firstborn behavior
Wilford & Andrews (1986)	33	United States	NR	NR	NR	No	2-5 years	T1: Prebirth (time not specified); T2: 1 month postbirth	No changes in mother's perceptions of children's toileting, eating, sleeping, or general behavior.
Quasiexperimental design *Alter (1996)	28 ^k	United States	100% EA	Middle to upper middle class	NR	No	29-35 months (<i>M</i> = 32.3 months for sibling group, <i>M</i> = 31.9 months for no-sibling group)	T1: 1 month prebirth; T2: 1 month postbirth; T3: 6 months postbirth	Children with a sibling experienced negative change in interpersonal behavior; children in the no-sibling group experienced a positive change in interpersonal behavior.
Nadelman & Begun (1982)	53 ^l	United States	100% EA	Middle class	100	No	26-66 months (<i>Mdn</i> = 39.3 months)	T1: 3-4 weeks prebirth; T2: 3-4 weeks postbirth	No change in total behaviors from T1 to T2. Decrease in getting child to talk, playing well w/other children, following mother around house, and enjoying hearing talk about babies. Sibling group needs less help doing things w/control group needing more help.
*Rothenberg (1988)	30 ^m	United States	NR	Middle and upper middle class	NR	No	3-4 years	T1: last trimester of pregnancy; T2: 4-6 weeks postbirth	Increase in self-blame for sibling group. Controls improved in anger control; no change for sibling group. No change in emotional difficulties or behavior problems for sibling group but improvement in controls. Increase in regressive behavior for sibling group, decrease for controls. Controls less confrontational, no change for sibling group.
Touris, Kromelow, & Harding (1995)	20 ⁿ	United States	100% EA	Middle and upper middle class	100	No	Sibling group: 16.3 months at T1, 21 months at T2 Control group: 17.6 months at T1, 21.5 months at T2	T1: 2-3 months prebirth; T2: 6-10 weeks postbirth	Significant change in security to mother for sibling group (12/20) compared with control group (4/20), but no difference in direction of change from secure to insecure or insecure to secure.
Natural experiments Arcus & McCartney (1989)	31	United States	100% EA	Working and middle class	NR	No	24-33 months (<i>Mdn</i> = 30 months) at sibling birth	T1: 21 months (no sibling); T2: 35 months (12 w/sibling, 19 w/o sibling)	Decrease in inhibition (i.e., approach to unfamiliar adult) for no-sibling group from 21 to 35 months in gift-giving paradigm; no change for sibling group.
Feiring, Lewis, & Jaskir (1983)	49	United States	NR	Middle and upper middle class	NR	No	12-24 months	T1: 12 months (no sibling); T2: 24 months (9 w/sibling, 40 w/o sibling)	Firstborns w/sibling seek more help from mother and cry more during 15-min lab free play from 12 to 24 months than firstborns w/o sibling.

(*table continues*)

Table 1 (*continued*)

Design and author	N	Country	Race/ethnicity	SES	% married	Fathers	Age of older sibling	Measurement occasions	Significant results for change in firstborn behavior
Secondary data analyses									
Baydar, Greek, & Brooks-Gunn (1997)	440 ^a	United States	100% EA	16% below poverty level	84	No	1986: <i>M</i> = 14.2 months; 1988: <i>M</i> = 43 months; 1990: <i>M</i> = 68 months	NLSY time points	Increase in problematic peer relations. Increase in verbal development. Lower achievement scores for school-age children in 1990 follow-up.
Baydar, Hyle, & Brooks-Gunn (1997)	673 ^p	United States	100% EA	17% below poverty level	77	No	1986: 3 to 5 years (<i>M</i> = 52 months)	NLSY time points	Increase in behavior problems from 1986 to 1988 and 1988 to 1990 (i.e., anxious-depressed, headstrong, hyperactive, peer conflict, and dependent subscales). Decline in reading recognition from 1986 to 1988 for low-income, early school-age children. Increase in reading recognition from 1986 to 1988 for children from economically nondisadvantaged families. Decline in self-worth overall but greater decline for low-income children.

Note. Unpublished dissertations are noted with asterisks. SES = socioeconomic status; EA = European, European descent, or European American; AS = Asian or Asian American; NR = not reported; HS = Hispanic; AA = African American; T1-T5 = Time 1-Time 5; NLSY = National Longitudinal Survey of Youth. TTS = transition to siblinghood.

^a Mothers provided reports of fathers' involvement and child care. ^b Twenty-five children were present at birth and were compared with those children not present at birth. ^c Husbands and wives were interviewed as a couple; there were no separate reports for mothers and fathers. ^d Fathers may or may not have been part of the interview with mothers (fathers optional). ^e Parent gender was used as a covariate in analyses because parent-child play sessions involved mothers at the pre- and posthospital visits but involved fathers during mothers' hospitalization. ^f Father data were obtained only from phone interviews; there were no home visits of parent-child interaction. ^g Mothers provided reports of fathers' involvement and child care. ^h No prebirth assessments were available for comparisons. ⁱ There were two groups of expectant mothers: 26 who were expecting their first child and 25 who were expecting their second child. ^j There were two groups: 17 had a hospital visit, and 14 had no visit; Trause (1978) is an earlier summary of Trause et al.'s (1981) study but with no statistical tests of significance reported. The only difference across the articles is that there was an age effect for proximity to mother. There were also 37 children in the Trause (1978) report and only 31 in Trause et al. (1981). ^k There were two groups: 28 in the sibling birth group and 14 matched controls with no sibling birth. ^l There were two groups: 53 in the sibling birth group and 17 matched controls with no sibling birth. ^m There were two groups: 30 in the sibling birth group and 25 matched controls with no sibling birth. ⁿ There were two groups: 20 were pregnant with first child and 20 were control families with only child. ^o Only 50% of children with a sibling were firstborns. ^p Only 74% of children with a sibling were firstborns.

would be needed for an examination of persistent patterns of change.

A third group of studies included *quasiexperimental studies*. These studies also used a pre- and postbirth design, but in addition to the group of mothers expecting their second children, there was a matched control group where the mothers were not pregnant. Children's behaviors in both groups were then assessed twice, with the sibling group observed before and after the sibling's birth. The groups were then compared to determine if changes in the older children's behaviors were significantly different in the group experiencing a sibling's birth versus the matched control group. The benefit of this design is that it allows the researcher to address normative maturational changes that might occur during, say, toddlerhood or the preschool years that are not necessarily due to changes surrounding the TTS. Again, the single pre- and postbirth design limits from the start any examination of long-term trajectories or persistent change patterns over time.

A fourth group of studies was labeled *natural experiments* (Bronfenbrenner, 1979). In this case, an existing longitudinal study of children's development was being conducted, and as time progressed, the family structure changed such that between time points, some families had a second child (the sibling group), and the remaining families did not (the no-sibling group). Changes in children's behaviors across the two times were then compared across groups. In this case, the birth of a sibling was considered to have an effect on the older siblings' adjustment if change patterns differed significantly across the groups. One limitation here is that the timing of the birth could have occurred anywhere between assessment points (e.g., 1 month or 9 months before).

The fifth group of studies included secondary data analyses from large national data sets where a baby was born between assessment points. Children in these analyses included firstborns and later born children so the studies were not restricted to an examination of changes following the birth of a second child. The advantage of these studies is the large sample of children that was included in analyses for both comparison and control purposes. The disadvantage of such studies is that the timing of the birth is not often known, and the age and birth order of children varies. The findings from each of these five research designs are discussed in turn.

Children's Adjustment After the Birth of a Sibling

Postbirth Designs

I include only one postbirth study by Kojima et al. (2005) because of their unique methodology and analytic strategy. Six months after the births of their second children, 47 Japanese women were interviewed about changes in the mothers' (i.e., playful interactions, scolding, holding) and the firstborns' behaviors (i.e., demanding, disobedient, upset, consideration of mother). Mothers were asked to draw a line representing the change in behavior over the past 6 months beginning with the infant sibling's birth, and deviations from the prebirth score were quantified. Kojima et al. then performed a cluster analysis to identify groups of mother-child dyads and found four distinct clusters representing change in the firstborns' adjustment. The largest cluster (46.8%) revealed few changes in mother-firstborn interactions. A second cluster accounting for 25.5% of the sample showed an

increase in maternal scolding and children's disobedience after the birth. A third cluster (21.3%) reflected an increase in conflict between mothers and children, whereas the smallest cluster (6.4%) described a group in which children showed increased consideration of the mothers and there was less mother-child conflict. The unique person-centered approach of this study demonstrated the many different patterns of change in mother-child interaction and children's behavior that could occur.

These findings are reminiscent of Dunn and colleague's (Dunn, Kendrick, & MacNamee, 1981; Dunn & Kendrick, 1982) argument that there are large individual differences in children's behavior following the TTS and that no single pattern of disruption may characterize children going through the TTS. These findings would also appear to fit with the ecological and turning points frameworks where individual differences in trajectories were emphasized. Further, the largest group experienced few changes, meaning the TTS for most families was not disruptive, yet it did appear that a smaller segment of the population did have difficulties, as would be suggested by a turning points framework. Although suggestive, the postbirth design with a single measurement occasion does not allow us to address turning points and developmental trajectories. Longitudinal research designs are necessary.

Longitudinal Research Designs

Of the 30 sources, 21 (70%) involved longitudinal research designs with repeated assessments, although several of these reports are from the same study (see Table 1). Different behaviors were often examined in these studies. The findings from the longitudinal studies were easily grouped into seven general categories, which I have summarized next.

Children's verbalizations. Several studies reported significant increases in the older siblings' talking or verbal initiations to parents during parent-child interaction, usually involving mothers (Dunn & Kendrick, 1980, 1982; Field & Reite, 1984; Gullicks & Crase, 1993; Stewart, Mobley, Van Tuyl, & Salvador, 1987). Stewart et al.'s (1987) study was the only study to examine children's talk to fathers. They noted that children directed more verbalizations to fathers and less to mothers over time when both mothers and fathers were available during home-based observations. The increased talk of the older children varied across studies and involved positive comments about the baby, negative comments about the baby, disagreements with the parents, and attempts to gain attention and distract parents from the baby. Depending on which types of comments predominate parent-child conversations, predictions about how children would adjust might very well differ. Dunn and Kendrick (1982) found that many of the conversations between mothers and children after the birth focused on issues of behavioral control. More research that explores explicitly what the topics of conversation are between firstborns and their parents would offer some insights into these changes.

Children's affect. Six studies indicated significant changes in the older children's affective state (i.e., anxiety, sadness, and distress). Increases in whining/crying (Gullicks & Crase, 1993; Happ, 1992), distress (Gottlieb & Mendelson, 1990), and neutral or flat affect (Taylor & Kogan, 1973), along with a decrease in happiness (Gullick & Crase, 1993) have been noted. In only one study (Bernhard, 1981) was it reported that children generally showed no noticeable change in being upset, and when changes

were found, they often involved a decline in upset, were very specific to the age of the children, and occurred only during one period (e.g., Time 1 to Time 2). Although it does appear that children's emotional state changes from before to after the birth, with increases in negative affect and less happiness over time, there is also evidence to suggest that these changes may occur for only a subset of children, depending on the age of the children, and may be short lived rather than long term and persistent. These findings would suggest that individual differences are present and that changes may be evident for a subset of children and not universally experienced by all children; thus, these findings support an ecological systems and turning points perspective rather than a family crisis model.

Children's behavior problems. Three of the 21 (14.3%) longitudinal studies reported significant increases in children's aggression and activity level (Field & Reite, 1984) or parent-reported behavior problems (Armentrout, 1995; Trause et al., 1981) from pre- to postbirth. Yet, some reported no change in children's behavior problems (Soliday, 1995; Wilford & Andrews, 1986), and several studies actually reported a decline in problem behavior or activity level over time (Bernhard, 1981; Douzinas, 1983; Happ, 1992). The evidence on whether problem behavior increases following the birth of a baby sibling was quite inconsistent across studies. Perhaps the subtle differences across studies with respect to sample characteristics, time of measurement, and assessment used are enough to account for the inconsistencies. On the other hand, the inconsistencies could merely reflect the individual differences among firstborn children and the fact that some children may exhibit disruptive behavior whereas others do not.

Here again, we see stronger evidence in favor of an ecological and turning points framework than a family crisis or stressful life events framework, where one would expect consistent increases in problematic behaviors over the TTS. Because many of these studies did not include additional measures of individual coping or social supports, it is not possible to ascertain at this time whether some of these differences across studies might be due to differences in the resources available to families that could moderate the change patterns (e.g., more family support buffers the effects of stress on children), an important consideration in family stress models. Additional studies are needed that address the available family resources across the TTS so that specific hypotheses drawn from the tenets of ecological and family stress theories can be tested.

Affection and responsiveness to mother. The findings pertaining to the affection and responsiveness of firstborn children toward mothers were more compelling than the results discussed earlier. Field and Reite (1984) reported that children decreased their orientation toward and responsiveness to parents, smiled less, and were less animated during parent-child interaction after the infant's birth. Children also cuddled less with their mothers (Gullicks & Crase, 1993) and expressed less affection toward mothers (Taylor & Kogan, 1973) afterward. Using the Attachment Q-Sort, Teti et al. (1996) reported an overall decrease in attachment security with mothers from before to 1 month after the birth (although see age effects in Table 2). In general, the evidence presented a fairly consistent picture of significant changes in the firstborns' responsiveness and affection to their mothers.

Regressive behaviors and mastery. Three studies (1%) reported changes in mastery behaviors. Trause et al. (1981) reported

significant improvements in eating behavior from before the birth to 2 weeks after the birth, but Wilford and Andrews (1986) reported no change in toileting or eating behavior. Similarly, Douzinas (1983) and Happ (1992) reported improvements in self-care skills, such as eating habits and dressing. Because the prominent framework for examining the TTS has been one focused on stressful life events and the search for psychological disruption, the few findings on mastery and developmental advances may be a result of more clinical interest in regressive or problem behaviors and less empirical interest in mastery or improved self-care skills. As such, these behaviors may often go unmeasured in TTS studies, and it would be advisable for future research to focus on mastery as well as regressive behaviors.

Even though improvements in children's mastery have been documented, it is not clear whether this growth is inherent to children or is actually encouraged by mothers, starting before the infant's birth. Without a matched age control group, it is certainly possible that longitudinal changes in children's behavior could be due to maturation and not the birth of the infant sibling. We would expect children to become better at mastering self-help skills and to engage in less aggressive behavior over time with growth in both physical and brain maturation and with advances in the children's cognitive, language, and socioemotional development. Signs of regression may be linked to whether a skill is newly acquired or firmly established, and many of the self-help tasks of toileting, weaning, and dressing are intricately tied to children's maturational stage.

Another potential explanation for increased signs of maturation may be found in parent-child interaction. Walz and Rich (1983) noted that many mothers talked about promoting maturity in their firstborns as "a method of survival" (p. 205). Fostering independence and maturity in firstborns before the baby was born was cited by the mothers as a way for them to have the time necessary for both children and themselves after the birth. Mothers encouraged firstborn children to dress themselves before the baby was born, bought shirts with "I'm the big brother" printed on them, and pointed out all the things the older children, but not the baby, could do (e.g., eat ice cream, go swimming, ride a bike). Encouraging increased independence may be one way parents attempt to prepare firstborns and themselves for the impending arrival of a second child. The children's age and developmental level would need to be taken into consideration to determine whether attempts to promote independence and mastery are age appropriate or whether they are misguided and performed with the parents' but not the children's needs in mind.

Sleep problems. The few findings for sleep differed, in part, on the basis of the methodology used. Using parent reports, Trause et al. (1981) found an increase in sleep problems across the TTS, whereas Wilford and Andrews (1986) found no changes. Field and Reite (1984) actually used time-lapse video cameras to capture children's sleep states throughout the night before and after the mothers' hospitalization. They found changes in several indicators of children's sleep, including an increase in the time it took to fall asleep, the total amount of time children slept, the number of night wakings, and increased crying at night. Field and Reite have presented some of the strongest evidence to date that children experience disturbances in their sleep after the birth of an infant sibling, but more than this one study with a sample of 16 children is needed.

Table 2
Firstborns' Adjustment as a Function of Age and Gender

Author	Age of older sibling	Age differences	Gender differences
Alter (1996)	29–35 months ($M = 32.1$ months)	NR	NR
Arcus & McCartney (1989)	24–33 months ($Mdn = 30$ months at birth)	NS	Children in same-sex dyads (all female): negative $r(-.86)$ between 21 and 35 months for approach to experimenter but positive $r(.67)$ for opposite-sex dyads.
Armentrout (1995)	3.5–5 years ($M = 4.5$ years)	NR	NR
Baydar, Greek, & Brooks-Gunn (1997)	1986: $M = 14.2$ months 1988: $M = 43$ months 1990: $M = 68$ months	Peer problems highest for children experiencing birth between 12–24 months before the 1990 follow-up and low for those more than 24 months of age. Decline in positive mother–child interactions after birth when children spaced fewer than 30 months apart.	Girls experience increase in anxious–depressive behaviors but not boys. Older children in opposite-gender dyads have more immature dependent behaviors.
Baydar, Hyle, & Brooks-Gunn (1997)	3–5 years ($M = 52$ months)	Younger children receive fewer developmental resources.	Increase in punitive parenting toward girls from 1986 to 1988. Increase in peer conflict for boys, not girls.
Bernhard (1981)	35–144 months	72–144 months more likely to engage in shy, withdrawn behaviors, acting out, role reversal, and seeking adult interaction with 36–71 months least likely to do so.	NR
Douzinis (1983)	25–66 months ($M = 40$ months)	NR	NR
Dunn & Kendrick (1980)	18–43 months ($Mdn = 25$ months)	NR	NR
Dunn & Kendrick (1982)	18–43 months ($Mdn = 25$ months)	Younger children were more clingy.	Boys more withdrawn after birth than girls.
Dunn, Kendrick, & MacNamee (1981)	18–43 months ($Mdn = 25$ months)	Younger children showed greater increase in clinging behavior.	More increase in withdrawal for boys than girls.
Feiring, Lewis, & Jaskir (1983)	12–24 months	All children were seen at 12 and 24 months.	Firstborn girls w/sibling seek more help from mother than boys w/sibling from 12 to 24 months. Firstborn boys w/sibling cry more than girls w/sibling from 12 to 24 months and seek proximity more at 24 months than girls w/sibling. Mothers of boys w/sibling hold them more than girls w/sibling.
Field & Reite (1984)	22–60 months ($M = 38$ months)	NR	NR
Gottlieb & Mendelson (1990)	28–57 months ($M = 37$ months)	Distress increased over time for young firstborns (<37 months) but not for old firstborns.	Firstborn girls only in sample.
Gullicks & Crase (1993)	15–85 months ($M = 40$ months)	NR	NR

(table continues)

Table 2 (*continued*)

Author	Age of older sibling	Age differences	Gender differences
Happ (1992)	42–67 months ($M = 51$ months)	Older children demonstrated more positive postbirth behavior.	NR
Kendrick & Dunn (1980)	18–43 months ($Mdn = 25$ months)	Feed context: Younger children spent more time in mutual positive looking, time close to mother, joint attention, and confrontations; mother prohibits younger children more. Hold context: Younger children spent more time in joint attention, mutual positive looking, and time close to mother. Not-with-baby: Younger children spent more time wandering and were more often held by mother.	NS
Kojima, Irisawa, & Wakita (2005)	1.1–5.5 years ($M = 3.0$ years)	NS	NS
Kramer (1996)	3–5 years ($M = 47$ months)	NS	Girls expressed more excitement about baby and greater interest in social interactions than boys.
Kramer & Gottman (1992)	3–5 years ($M = 47$ months)	Older firstborns interacted more positively with infant sibling at 6 and 14 months after birth. Younger firstborns had lower levels of competency in personal care and self-control before birth.	NS
Kramer & Shaefer-Hernan (1994)	3–5 years ($M = 47$ months)	Older firstborns were more active in shared fantasy play.	Girls engaged in more transition-relevant fantasy play with enactments of baby and family themes than boys.
Nadelman & Begun (1982)	26–66 months ($Mdn = 39.3$ months)	Younger children (<40 months) used pacifier/bottle more, had more toileting accidents during day, and wet bed at night more than older children (>40 months).	Boys laid around doing nothing more, less easy to get to talk and less likely to follow mother around house than girls from T1 to T2. Girls increase use of pacifier/bottle, fuss more about going to bed, enjoy hearing about babies less, play less well with other children, and decrease baby talk more than boys from T1 to T2.
Rothenberg (1988)	3–4 years	NR	Boys decreased and girls increased in dependent behavior from T1 to T2.
Soliday (1995)	31–72 months ($M = 46.8$ months)	NS	Fathers rated boys as having more problem behaviors than girls (averaged across T1 and T2).
Stewart (1990); Stewart, Mobley, Van Tuyl, & Salvador (1987)	2–5 years	Older children more likely to use baby talk at 1 month Younger children (i.e., 2 years) had more toileting accidents at 8 months.	Same-gender dyads had more problems than mixed-gender dyads at 1 and 8 months.

(*table continues*)

Table 2 (continued)

Author	Age of older sibling	Age differences	Gender differences
Taylor & Kogan (1973)	29–42 months	NR	NR
Teti, Sakin, Kucera, Corns, & Eiden (1996)	12–63 months ($M = 32$ months)	Greater decrease in attachment security for firstborns older than 24 months than for firstborns younger than 24 months.	NS
Touris, Kromelow, & Harding (1995)	16.3 months at T1 and 21 months at T2	NR	NR
Trause (1978); Trause et al. (1981)	1–3.5 years	Younger children (<1.5 years) increased time spent near mothers more than older children (1.5–2.5 years).	Girls show greater increase in behavior problems than boys.
Wilford & Andrews (1986)	2–5 years	NR	NR

Note. NR = not reported; NS = not significant; T1–T2 = Time 1–Time 2.

Social competence and play. Kramer and colleagues' work focused specifically on assessing whether children's social competence, in the form of interaction with a friend before and after the birth, changed. Kramer and Gottman (1992) reported no change in the overall quality of play, the amount of fantasy play, or the frequency of conflicts between firstborns and their friends. Some of these aspects of play, however, did seem to change differentially on the basis of whether firstborn children were accepting of their infant siblings (i.e., interacted more positively) at 6 and 14 months after the birth (Kramer & Schaefer-Hernan, 1994). Specifically, fantasy play engagement and positive fantasy play declined significantly from 3 months prebirth to 1 month after the birth but only for children who would later be highly accepting of their younger siblings and not for children low in sibling acceptance. Fantasy play did increase to prebirth levels again 3 months after the birth for the sibling acceptance group. There was also an increase in the amount of gossip (i.e., talk about babies and siblings) between friends from 1 month before to 1 month after the birth for all children. Finally, Kramer (1996) examined whether children acted out their positive (e.g., excitement about new baby) and/or negative (e.g., dislike of baby, fear of separation from parents) concerns during fantasy play by noting whether the content of the fantasy play converged or matched the concerns described by mothers. Rates of acting out their negative concerns in fantasy play did not change over time, but children's acting out of positive concerns did change such that it was fairly high at 3 months and 1 month before the birth and 1 month after the birth but was lower by 3 and 6 months following the birth. She also found that when children acted out their positive concerns in fantasy play, they were more likely to interact with their infant siblings positively at 6 months but not at 14 months.

Three additional studies included parent reports or self-reports of children's peer relations or social acceptance, although the findings revealed both improvements in social acceptance and fighting with peers (Armentrout, 1995; Happ, 1992) and declines in positive peer relations (Bernhard, 1981). It is difficult to conclude at this time whether there are significant changes in children's social competence given the few studies addressing this area and the substantial differences in measurement and research designs across studies.

Quasiexperimental Studies

Four studies fall in the quasiexperimental category, where an experimental group of children whose mothers gave birth to a second child was compared with a matched control group of singletons. The advantage of such designs is that one can address maturation effects to determine whether both groups of children show comparable increases (e.g., improved eating) over time or whether the groups show divergent patterns of change. Nadelman and Begun (1982) included 52 children whose mothers were expecting a second child and 17 firstborn control children whose mothers were not pregnant at the time. The responses of sibling-group mothers to 26 behaviors were compared across time, and significant changes were found for only four of the 26 behaviors (e.g., decrease in playing well with others, hearing about babies; see Table 1). Far more behaviors did not differ across time, including temper tantrums, sleep problems, toileting accidents, and compliance. Nadelman and Begun also compared change scores (Time 2 – Time 1) of children's behavior across the 17 singletons in the control group and the 17 matched firstborns in the sibling group. Only one significant difference was found, although the small cell sizes may have limited the statistical power to detect differences. For the item *needing a lot of help*, firstborns improved, whereas only children actually needed more help. The problem here is that change scores do not tell us where the children started in the first place, and in Nadelman and Begun's study, there were more differences between the sibling and control groups at Time 1 (pregnancy) than at Time 2 (postbirth) on several behaviors (e.g., enjoyment of new things, talking about babies), leaving one to wonder whether changes were already apparent in the months preceding the birth.

Two particular patterns emerged from the remaining studies. The first pattern indicated that there was no change in children's adjustment for the group with infant siblings, but the matched control group often improved. For instance, Rothenberg (1988) found that children in the control group improved in anger control and emotional difficulties and showed a decrease in confrontation across the two times of measurement; there was no such change, however, in these behaviors for children with a baby sibling. The second pattern revealed no change or improvements for controls

(children without a sibling) but found evidence of decline for children with a sibling. Alter (1996), for example, reported that firstborns in the sibling group had poorer interpersonal skills during the transition period and 6 months after the birth, whereas children in the no-sibling group showed improvements in interpersonal behavior. Rothenberg also found that children with a sibling experienced an increase in regressive behaviors and self-blame as well as negative changes in interpersonal behavior.

Touris, Kromelow, and Harding (1995) looked at changes in the security of the mother–firstborn relationship over time. Twenty firstborns whose mothers were expecting a second child were compared with 20 firstborns whose mothers were not (matched on age and gender) and were also observed in the laboratory participating in the Strange Situation 2 to 3 months before the birth and again 6 to 10 weeks after the birth. Recall that Teti et al. (1996) found an overall decrease in attachment security across the TTS in their longitudinal investigation of firstborn children using the Attachment Q-Sort. Touris et al. found that significantly more children in the sibling group than in the no-sibling group changed in their secure or insecure classification after the infant's birth. There was, however, no difference in the direction of change, meaning there was no significant difference in the number of children who went from secure to insecure or insecure to secure.

Although these studies attempted to match children with and without a sibling, several issues need to be considered when interpreting these findings before making strong inferences about the effect of the birth of a sibling. First, women who have a second child differ from women who decide to have one child, particularly with respect to their work and career motivations (Callan, 1985). None of these differences between the mothers' personal, familial, or work characteristics was considered in any of these studies, and they certainly were not controlled. Any significant differences found across the groups may be due to these other extraneous factors and not necessarily to changes brought about by the birth of a second child or even maturational changes. Because circumstances (e.g., finances, employment) differ for mothers of one and two children, it may not be possible to match women on all the possible ways these groups differ as a means of control. Actually, it may be these differences across families that account for variation in the firstborns' behaviors. Rather than attempt to control such individual variation, we may want to rely on its explanatory power to predict individual differences in children's adjustment across the TTS. Certainly, additional quasiexperimental studies matching larger samples of children with and without a newborn sibling might be informative, but the current results did not provide strong support that it was the birth of a sibling that brought about significant changes in children's behavior or that maturational changes were responsible for the presence or absence of such change, although it is certainly likely that maturational changes would influence how children behave over time.

Natural Experiments

Children in these studies were participants in a longitudinal study, and at some point between two times of assessment, one group of parents decided to have a second child and the other did not. For instance, Arcus and McCartney (1989) examined change in behavioral inhibition for 19 children who did not have a baby sibling born between 21 and 35 months with 12 children who did.

The no-sibling group was actually more behaviorally inhibited at 21 months (prebirth) than the sibling group and showed a significant decline in inhibition over time, whereas the sibling group was unchanged. Feiring, Lewis, and Jaskir (1983) found that the nine children whose mothers had a sibling between the children's first and second year increased in help seeking and crying during mother–infant interaction in a laboratory free play than did the 40 children whose mothers did not give birth to a sibling. Although the findings indicated that the birth of a sibling may be responsible for changes in children's behaviors, can we attribute these differences to the birth of a second child or to other aspects of family functioning and the caregiving environment? The sibling group children in Arcus and McCartney's study spent considerably fewer hours in day care (i.e., mothers worked less) at both 21 and 35 months than did the no-sibling group of children, and in Feiring et al.'s study, mothers of the sibling group interacted differently with their 1-year-old children (e.g., more vocalization and smiling) before the birth than did mothers in the no-sibling group. Again, parents who decide to have or not have a second child differ in many respects, and it may be these differences, in addition to the arrival of the baby sibling, that account for the differences in children's behaviors across the two groups.

Secondary Data Analyses

Two articles by Baydar and her colleagues (Baydar, Greek, & Brookes-Gunn, 1997; Baydar, Hyle, & Brooks-Gunn, 1997) examined older children's psychological adjustment after the birth of a sibling by conducting secondary data analyses using the National Longitudinal Survey of Youth (NLSY). The results are also summarized in Table 1. In Baydar, Greek, and Brooks-Gunn (1997), a cohort of 440 children between the ages of 6 and 23 months ($M = 14$ months) at the 1986 measurement occasion were the source of information. Information obtained on the children at the 1988 and 1990 follow-ups was also included to detect whether there were changes in the children's adjustment. If an infant had been born at some point between each time point, these children were compared with children who had not had an infant sibling born during that same period of time. The analyses were not restricted to firstborn children but included all firstborn or later born children with an infant sibling. Thus, these analyses are not restricted to the TTS. Of course, the advantages of this approach include the large sample and the ability to track and compare families who have another child with those who do not. The authors found an increase in problematic peer relations for children with a sibling and lower achievement scores for school-age children with a sibling at the 1990 follow-up compared with those children without a sibling. They also reported that there was an increase in children's verbal development for those children with a sibling.

In the second report from the NLSY, Baydar, Hyle, and Brooks-Gunn (1997) used an older cohort of children between ages 3 and 5 years at the 1986 data collection. They also examined outcome measures of children's psychosocial development at the 1988 and 1990 follow-ups. In this case, they reported that children with a sibling showed an increase in behavior problems (e.g., anxious–depressed, hyperactive, peer conflict) from 1986 to 1988 and from 1988 to 1990. They also found that children with a sibling, in general, showed a decline in their overall self-worth but that this decline was even greater for children from low-income families.

Finally, there was a decline in reading recognition scores for low-income school-age children with siblings from 1986 to 1988 but an actual increase in reading recognition for children from less economically disadvantaged families. Because the vast majority of TTS studies have focused only on middle-class families, few studies have considered how economic circumstances might play a role in the TTS. Yet, the work of Baydar and colleagues indicated that adding another child to the family can have a profound effect on economically stressed families, although the mechanisms responsible for these changes need to be examined further.

Changes in Firstborn Behavior: Age and Sex Effects

Parents are often concerned about the best time to have their second children and how far apart they should space their children. In addition to parental concerns, examining the children's ages at the time of the TTS is important conceptually and relevant to a focus on developmental transitions. The children's developmental level at the time the transition is experienced may play a critical role in how they adapt. As noted earlier, most parents decide to have the second child when firstborns are between the ages of 2 and 3, making this period the normative time frame for the TTS. The TTS may be considered an off-time event for children substantially younger or older than this norm, and changes in children's behaviors across the transition may need to be understood within this framework. The age space between siblings, and whether children are widely or closely spaced, has also received considerable attention in sibling studies with samples of older children. In most TTS studies, the assessment points often coincide with the postbirth age of the infant so that the firstborns' ages at the time the infant was born and the age space between siblings are indistinguishable. Age differences are reported in Table 2.

Children's age. Younger firstborns did appear to have more reported problems than older firstborns in general. Younger firstborns were more likely to show increases in clinging and seeking adult attention (Bernhard, 1981; Dunn et al., 1981), more distress over time (Gottlieb & Mendelson, 1990), more time wandering (Kendrick & Dunn, 1980), more withdrawal (Bernhard, 1981), and more toileting and nighttime accidents (Nadelman & Begun, 1982; Stewart et al., 1987).

Different sampling procedures across studies, however, made it difficult to conclude how robust the age effects were. For instance, Teti et al. (1996) found differences for firstborn children who were less than or greater than 2 years of age on attachment security to their mothers; children over 2 years old had a greater decrease in attachment security than children under 2. Several other investigations have only included children over 2 years old (Gottlieb & Mendelson, 1990; Nadelman & Begun, 1982), so comparisons between children older and younger than age 2 were not possible. Kramer and Gottman (1992) included families with firstborns who were between the ages of 3 and 5 years when the infant was born, presumably because the preschool period is a relevant developmental period for studying children's friendships and whether the quality of these friendships predicted sibling relationship quality after the TTS. However, one could argue that friendships and how one defines social competence may differ substantially for children between the ages of 1 and 2 and may not have much predictive power for younger firstborns. Many of the natural experiments comparing sibling and no-sibling groups had samples of very

young toddlers. For instance, Feiring et al. (1983) compared mother-infant interaction for children who had a sibling between the 12- and 24-month time points of a longitudinal study with those children who had not had a sibling by the time they were 2 years. These very young children were all under the age of 2 years when a younger sibling was born, so the increases in help seeking and crying they found may be especially pronounced for closely spaced children under the age of 2 but not for preschoolers or older children.

Teti et al. (1996) suggested that social cognitive abilities, such as emotional perspective taking, may play a part in explaining age effects. Children younger than 2 years old are simply not socially aware of the distinction between their emotions and thoughts and those of others. Younger firstborns may not react as negatively to the infant's birth simply because they lack the social understanding that could lead to feelings of displacement.² Research with preschool siblings, for instance, indicated that children with more advanced perspective taking, false belief understanding, and emotional understanding were more likely to assist their distressed siblings, engaged in more cooperative and pretend sibling play, and used more advanced conflict resolution strategies (Garner, Jones, & Palmer, 1994; Recchia & Howe, 2009; Youngblade & Dunn, 1995). Preschool children were also very good at knowing what to do to instigate conflict and how to tease a sibling (Dunn, 1988a) so they could also be more perturbed by the presence of an infant sibling than toddler firstborns. On the other hand, young children between ages 1 and 2 are still infants in many ways, needing to seek proximity and maintain contact with a primary attachment figure. Disruption of this attachment relationship or the sight of the parent holding another infant may lead to profound emotional distress (Hart, Carrington, Tronick, & Carroll, 2004), much more than what we would expect for older children able to obtain felt security, even if the relationship with a parent is maintained mostly through distance interaction (Kojima, 1999). It would seem then that one needs to pay close attention not only to the age of the children when the infant sibling is born but also to what outcome is of interest (e.g., social competence, behavior problems, attachment security) when ascertaining what role age plays in the TTS.

Finally, timing of the TTS with respect to the developmental stage of the firstborn may be critical in understanding how age may be related to adjustment issues across the TTS. The 18-month-old is still dealing with attachment issues, the 3-year-old may be in the midst of toilet training, and the 5-year-old may be getting ready to start kindergarten. These behaviors are just a few examples of some of the significant developmental milestones of each age period. It would not be surprising, then, to learn that once the infant sibling was born, the 18-month-old started clinging to mother and protesting separation, the 3-year-old started having toileting accidents, and the 5-year-old started refusing to go to school. The importance of developmental level and the timing of the TTS for children's outcomes is exemplified by the work of Stewart et al. (1987), who looked at how different age groups, where the firstborns were 2, 3, or 4 years old when the sibling was born, differed over the TTS. Different age groups experienced different behavioral difficulties that corresponded to the children's

² I thank an anonymous reviewer for this suggestion.

developmental level. For instance, toileting accidents were most common for 2-year-olds following the birth but were not a problem for any of the 3- and 4-year-olds. On the other hand, 3- and 4-year-olds were clingier than the 2-year-olds. When interpreting age effects on children's reactions to the TTS, the developmental level of the firstborn and the corresponding milestones of the age period should be taken into consideration.

Children's sex. Sex differences in children's problematic behaviors during early childhood have been reported, with boys often more aggressive than girls and girls often more anxious than boys (Shaw, Keenan, & Vondra, 1994; Sterba, Prinstein, & Cox, 2007; Zahn-Waxler, Shirtcliff, & Marceau, 2008). Given these reported differences, girls and boys may exhibit different behavioral difficulties across the TTS. It is not surprising to see that firstborns' sex is often examined in TTS studies, and in some cases, the sex of the infant siblings is also examined (e.g., opposite- or same-sex dyads). As Table 2 indicates, the findings for sex were very inconsistent. Several studies found that firstborn boys had more problems with withdrawal (e.g., sitting around, aimless wandering) over the transition than did girls (Dunn et al., 1981; Nadelman & Begun, 1982). Baydar, Hyle, and Brooks-Gunn (1997), however, reported that girls had more anxious-depressed symptoms than boys. Girls also had more difficulties associated with dependence, such as the use of a bottle or pacifier or proximity maintenance (Nadelman & Begun, 1982), and sought more assistance from mothers (Feiring et al., 1983), yet boys cried more than girls (Feiring et al., 1983). Dunn et al. (1981) reported that firstborn children with opposite-sex infant siblings had more problems with adjustment, whereas Stewart et al. (1987) reported that firstborns in same-sex dyads had more problems initially after the birth. Others found no effects of sex on changes in attachment security following the birth (Teti et al., 1996). Given the few studies examining the TTS and the large discrepancies across studies with respect to sex differences, it is difficult to ascertain at this time whether the TTS may be more problematic for girls or boys.

TTS: Crisis or Turning Point?

To this point, I have reviewed whether there was evidence of significant discontinuity and change in firstborns' psychological functioning across the TTS, predominantly at the level of average group change. To date, a family crisis or stressful life events framework appears to be the predominant frame of reference in research describing the TTS. In reviewing the available studies, there appeared to be an underlying assumption in most instances that the transition was inherently stressful and a psychological threat to children that would lead to disruption and psychopathology unless sufficient coping resources and supports were available. The findings, however, provided a different picture in that not all children exhibited substantial changes in behavior over time, and even when changes were evident, it was not clear that these changes were reflective of psychopathology. There was a consistent pattern of change evident across studies for some behavioral categories. For instance, children were less likely to show affection and respond to their mothers over the transition. Other behaviors, such as children's sleep problems and social competence, were more dependent on the type of assessment used (e.g., parent reports vs. observations). However, there were also instances in

which the evidence was far more equivocal, as was the case for children's behavioral problems and regressive behaviors. In these areas, the evidence pointed to different, perhaps very idiosyncratic, patterns of change for subgroups of children. Overall, then, the findings across the limited number of available studies provided more support for the TTS as an ecological transition that may be a turning point for some but certainly not all children, with very little indication that the TTS is experienced as a family crisis for most children and their parents.

A developmental perspective emphasizing the TTS as a normative ecological transition or a possible turning point in the lives of young children may be more profitable in the long term when designing future TTS studies. Indeed, future research needs to address these individual differences that seem to characterize changes in children's adjustment over the TTS and to identify different subgroups of children, including those firstborns exhibiting substantial behavioral difficulties. The question arises, then, of how researchers identify those different groups of children and explain individual differences in change trajectories as children and their parents make the transition.

Understanding Behavioral Changes Across the Transition

Several models have been advanced for explaining behavioral changes across a transition period, which can include changes in mean levels of behavior, individual variability within a group of children, and the identification of different patterns and trajectories of behaviors over time (see Graber & Brooks-Gunn, 1996, for a more thorough discussion). The central purpose of each of these models is to explain individual differences in behavioral change and the Person $\times$ Context interactions that place some individuals at risk for dysfunction and provide others with an opportunity for growth. These models have been nicely elaborated in Graber and Brooks-Gunn (1996), so I provide only brief summaries here and then apply them to the TTS. In attempting to understand behavioral changes across a transition, as well as within-group variability in change patterns, Graber and Brooks-Gunn (1996) claimed researchers need to attend to (a) the timing within a transitional period; (b) the accumulation or occurrence of simultaneous events during a transition; (c) the accentuation or amplification of behavior over a transition; (d) evidence of behavioral perturbations following a transition; (e) the goodness of fit between individual and context; (f) heightened sensitivity or susceptibility during a transition; and (g) changes in the developmental course. I discuss each of these models, providing TTS examples that would substantiate each model.

Timing Within the Transition

The timing at which an ecological transition occurs in an individual's life may influence behavior observed across the TTS. Two timing models have been advanced by developmental researchers. The *stage termination hypothesis* states that children's responses to a transition are dependent on the developmental level of the individuals before the transition. Experiencing a transition earlier than other children would be a potential risk for psychological difficulties across the transition because younger children have had less time than other children to develop the necessary skills to

navigate the transition period successfully. In this case, younger children would be at a disadvantage because of their less advanced cognitive, affective, and social skills. For instance, children with limited emotional understanding and self-regulation abilities would be expected to have more difficulties understanding or coping with the changes across the TTS. The earlier description of age effects, with younger firstborns displaying more difficulties than older firstborns, would support these claims.

A *social timing* explanation has also been proposed in which the timing of the transition provides the social context for understanding whether an event is an on-time or off-time event. Individuals are considered off time when they experience an event at a different time than the majority does. These off-time individuals would be expected to have greater difficulties. For instance, children experiencing the TTS substantially earlier or later than most other children would be perceived by others as deviating from the normative timeline, which is usually when children are between the ages of 2 and 3 years. Families in which children were significantly older (7 to 9 years) or younger than this age range would be viewed as deviating from the normative timeframe for having a second child and may not receive the support offered to those families considered on time. Parents may find it difficult to find other parents whose children are the same age for the formation of informal social networks where sharing information and advice about how to prepare firstborns for the impending birth may be particularly helpful.

Cumulative or Simultaneous Events During the Transition

Here, different behavioral outcomes are due to an accumulation of multiple events simultaneously or experiencing them in close succession. Coping resources are overtaxed when several changes occur in close proximity or at the same time as the transition, a point emphasized in family stress models as well. It is the combination of the timing of each event that determines behavioral outcomes. For example, changes in day care attendance at the same time as the birth of a baby mean a change in both the children's home and day care settings. Keeping firstborns in day care, at least for a period of time after the birth, may be preferable to minimize the number of simultaneous changes that could disrupt children's daily routines.

Accentuation or Amplification During the Transition

The *accentuation principle* (Elder & Caspi, 1988) underscores how an individual's predispositions are amplified during times of transitional stress. In this case, behavioral changes, on average, may be quite extreme, but they are still a reflection of the individual's previous characteristics. For instance, those researchers examining the transition to parenthood have found that even though there were significant decreases in average levels of marital satisfaction across the transition to parenthood, the rank order of individuals remained fairly stable over time, such that those couples with marital difficulties before the birth continued to be the couples experiencing greater marital dissatisfaction after the birth (see P. A. Cowan, 1991). Prior difficulties were amplified by the transition. In the case of the TTS, children who were highly aggressive before the birth would more than likely be highly

aggressive after the birth, regardless of whether there was a mean increase in aggression over time.

Perturbation During the Transition

Clearly, the TTS must be successfully managed by most parents and their children or one would have to ask why 80% of families would continue to have two or more children. It is still possible, however, that the TTS exerts short-term behavioral perturbations after the birth that are followed by adaptation, either through children acquiring a new set of behaviors or by children resuming earlier patterns of behavior. Children's poor adaptation across the transition would be defined by a failure to return to prebirth levels and the persistence of high levels of behavioral difficulties (e.g., increasing withdrawal) beyond the first months following the birth.

Perturbations may also be seen in the parents' behaviors, thoughts, and feelings after the TTS. Self-evaluations and feelings of parental competence might change momentarily across the TTS as parents try to balance the new experience of parenting two young children. As time progresses, parents would be expected to adapt to the new demands of their parental roles, they should feel more efficacious in performing caregiving tasks, and their self-evaluations should return to prebirth levels. Poor adaptation would be evident when parents continued to have persistent feelings of parental incompetence or parenting stress that did not subside within the first months after the birth.

Goodness of Fit Between Context and Behavior

Goodness-of-fit models highlight person–environment fit to predict individual differences in behavioral changes. Changes are the direct result of whether the individual child's developmental needs or personal characteristics are being supported by the environment and whether there is a good fit between the individual and his or her environment. Goodness of fit exists when the environmental context supports the individual's behavioral characteristics. A poor fit can occur when the developmental needs of the individual child (e.g., difficulties with self-regulation in toddlerhood) or personal dispositions (e.g., temperamental reactivity) clash with the demands and expectations of the new environment brought about by the transition (e.g., parents' expectations for more mature behavior). The point here is to understand how the confluence of person characteristics and contextual changes bear on the firstborns' adjustment over the TTS.

Heightened Sensitivity During the Transition

In this model, the unique characteristics of the children interact with the environment to predict behavioral outcomes. Children may be differentially sensitive to the transition experience because of an individual's biological or psychological characteristics. Certain individual children may be more susceptible to environmental influence and stress than are others (see also Ellis, Boyce, Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2011). Firstborns high in emotional reactivity, a temperamental characteristic, may be differentially sensitive or susceptible to environmental perturbations and may react more strongly across the TTS. Environmental supports from parents and family members may be particularly important for these highly sensitive children.

Behavioral Trajectories

With the increase in the number of longitudinal studies spanning many years of an individual's life, there now exist more opportunities for modeling the developmental course of behavioral changes over extended periods of time and considering individual differences in change trajectories. Do individual children show a short-term increase in withdrawal immediately following a birth or show extended bouts of withdrawal over the 2 years following the birth? Further, do some children exhibit multiple behavioral changes or coexisting conditions (e.g., aggression and withdrawal)? If so, do children evincing an increase in withdrawal and aggression differ from children who are only withdrawn or only aggressive, and are they at greater risk for developing behavioral difficulties later? Unfortunately, few of the existing TTS studies have more than two measurement occasions, making it impossible at this time to investigate individual differences in change trajectories. To test several of the explanatory models presented (e.g., perturbations, trajectories), it will be necessary for future longitudinal TTS studies to include multiple assessment points before and after the birth of a sibling so that complex patterns of individual change trajectories can be identified. Once these patterns have been identified, the next task will be to determine what predicts these different patterns.

Identifying and Predicting Behavioral Change Trajectories

How do researchers identify which children may experience the transition as a turning point, which will find it disruptive, and which will evince no change? How do researchers explain any changes that are found and determine the mechanisms underlying changes in children's functioning? A central task for developmental researchers will be to determine the conditions under which the TTS yields developmental advances, causes psychological dysfunction, or leaves the family and the child relatively unchanged. Even if substantial changes in children's behaviors are found at the group level, there is also individual variability among children. Searching for different change trajectories in children's behavioral outcomes over a period of time will help identify subgroups of children having more or less difficulty and experiencing the TTS either as a turning point in development or as a short-term perturbation.

Finding these different groups of children and then determining how they differ has significant ramifications for understanding developmental processes accounting for change across the TTS and also for developing interventions, such as parent education or sibling preparation materials. For instance, families in which firstborns are moderately aggressive even before the birth and show increases in aggression over time are probably different from families in which children are low on aggression at all time periods. Are there family, contextual, or individual level variables that distinguish these two groups of families? Perhaps they differ on prebirth levels of marital conflict, which predicts firstborns' prebirth aggression as well as their aggressive trajectory over the course of the year after the birth. A more tailored preventive program may be needed if parents are already dealing with problematic aggressive behavior and marital issues before the infant's birth. A one-size-fits-all approach to prevention or intervention

may not serve the needs of all families experiencing the TTS so it will be essential to identify what differs across families.

The Developmental Ecological Systems (DES) Model

In an effort to identify the child, parent, and contextual factors that may predict individual differences in firstborns' adjustment trajectories over the course of the first year after the infant sibling's birth, Volling (2005) proposed the DES model. The DES is based on Bronfenbrenner's (1979) ecological systems perspective and similar ecological frameworks used to explain other developmental transitions, such as the transition to parenthood and the transition to kindergarten (see Belsky, 1984; Bronfenbrenner & Morris, 1998; P. A. Cowan, Cowan, Ablow, Johnson, & Measelle, 2005; Rimm-Kaufman & Pianta, 2000). The DES also borrows from family systems theories with a focus on the interdependent nature of family relationships (Cox & Paley, 2003) and the transactional framework (Sameroff, 2000) where the bidirectional influence of risk and protective factors are examined over time in an effort to explain the development of psychopathology.

In the DES, the firstborn is nested within a larger family system, which, in turn, is nested within larger ecological and cultural contexts (see Volling, 2005, for a more thorough discussion). Whereas many ecological frameworks focus on the individual child embedded within layers of contextual influences, the DES also emphasizes the dynamic interplay between individual children's developmental trajectories and contextual changes (e.g., family, school, community) that are simultaneously occurring in children's lives during a transition. Examining these simultaneous contextual changes is necessary to test several of the earlier behavioral change models, most notably the model underscoring the accumulation or successive timing of multiple events in explaining individual differences. Because changes in one aspect of the environment and/or individual coincide with changes in other aspects of the ecological context, changes in firstborns' adjustment may be due, in part, to the changes that are also co-occurring elsewhere in the family system, such as changes in the parent-firstborn relationship, the marital relationship, or parental depression in the postpartum period. Rather than viewing children's behavioral adjustment as a direct function of the arrival of the newborn sibling, children's behavior may be indirectly influenced by the multiple ongoing changes in other aspects of the family. The DES also emphasizes individual differences in developmental trajectories over time and identifying different patterns of change that describe various subgroups of children and their families. In the remainder of this review, *parent characteristics* (e.g., well-being, personality, child-rearing beliefs), *child characteristics* (e.g., temperament), and *contextual characteristics* (e.g., marriage, work, social support) are pinpointed for further examination because they represent the ecological settings and risk and protective factors that impinge on children's lives (see also Belsky, 1984; Volling, 2005). Discovering how these characteristics distinguish among individual trajectories helps target areas for intervention efforts.

Child, Parent, and Contextual Risks and Protective Factors

If researchers wish to identify those families whose children are most at risk for developing problematic behavior and hope to

institute preventative measures to assist these families in coping with the challenges surrounding the birth of a baby sibling, it would be instructive to examine what current TTS studies tell us about the various parent, child, and contextual characteristics included in the DES and whether there is evidence that these personal and contextual dimensions also change and help explain children's outcomes after the TTS. In the sections that follow, I focus on what is known about changes in these different areas after the birth of a second child and discuss how these changes may predict individual differences in the older siblings' adjustment to the TTS. As noted earlier, cumulative and simultaneous changes occurring during the TTS should increase the probability of maladaptive outcomes. However, these outcomes may be modified depending on the number and type of protective factors also available to parents and their children. How risk and protective factors interact to create the transactional processes that determine individual continuity or discontinuity and the stability of individual differences is key to understanding firstborns' adaptation across the TTS. In the following sections, I present evidence from studies examining child and parent characteristics across the TTS before moving to the contextual supports or stresses predicting children's developmental outcomes, including changes in the parent-child relationship in which the child plays an important role.

Child Characteristics

As noted earlier, several models of behavioral change emphasize the centrality of children's characteristics in understanding adaptive or maladaptive change processes over the transition. The TTS may amplify or accentuate children's predispositions for difficult behavior or children with specific temperamental characteristics may experience heightened sensitivity or be differentially susceptible to contextual changes. In addition, the goodness-of-fit model suggests that it is the fit between the children's characteristics and environmental changes that determines children's adjustment outcomes. One set of child characteristics was addressed earlier in the section on children's age and sex effects. Here, I examine the evidence for children's temperament and social cognition.

Children's temperament. TTS studies including information on firstborn children's temperament have been fairly straightforward. Older siblings high in negative mood, emotional reactivity, and activity level had more adjustment problems than children low in these characteristics. On the basis of maternal reports of temperament, Dunn et al. (1981) found that firstborn children high in negative mood and intensity were more likely to show increased withdrawal, increased clinginess, and more sleeping problems than those low in negative mood. Similarly, those firstborns high on unmalleability and intensity were much less likely to ignore and more likely to protest their mothers' involvement with the younger siblings 14 months after the birth. As Thomas, Birch, Chess, and Robbins (1961) summarized,

[There is] a definite relationship between characteristics of primary reactivity in the child and the type of response to the birth of a sibling. Those children who from early infancy on showed mild positive regular responses with quick adaptability to new stimuli, such as the bath, change in sleep schedule and the introduction of new foods,

manifested a similar pattern with the new baby. In this group, disturbances were minimal or nonexistent. (p. 801)

These studies would appear to support the accentuation principle by underscoring that certain prebirth characteristics—in this case, emotional reactivity—increased the likelihood that children would experience certain types of difficulties after the birth. The children's temperament seems to be a critical factor in understanding which children may have difficulties across the TTS, and more studies examining different dimensions of children's temperament would help substantiate these findings.

Children's social understanding. As noted previously, firstborn age does appear to predict some children's reactions after the TTS, yet none of the studies has focused on firstborn children's social-cognitive understanding and what role it plays in easing the transitional stress. We can only speculate at this point that when children have more advanced social understanding, this allows parents to explain the impending birth and to prepare firstborn children for the sibling's arrival in a manner that may facilitate these children's acceptance of the infant sibling. Dunn and Kendrick (1982) found that when mothers had talked to older siblings about their infant siblings as separate persons with feelings before the birth, these children developed especially close sibling relationships 14 months after the birth. The implications here were that children with greater social understanding were in a better position to understand the changes that were occurring, were able to reflect on the reasons why parents were spending more time with the infant than with them, and had learned to accept the infant as a separate little being.

Parent Characteristics

The TTS is a transition for parents as well as for their children. Parents are actually responsible for the TTS because they either voluntarily, or in some cases unexpectedly, make the decision to have a second child. The transition brings about changes in the parental role and a reorganization of family relationships, including relationships with the firstborn, the partner, and the new baby (Kreppner, 1988). Changes in these roles could lead to initial periods of feeling ill-prepared for the demands of caring for two children, which may influence parental mental health and psychological well-being.

Parent mental health. Significant changes in maternal mental health or emotional well-being can be seen before and after the birth of an infant. Indeed, maternal postpartum depression is one of the most common complications of pregnancy and childbirth (Flynn, 2010) and can be a significant risk factor for maladjustment of both the newborn and the firstborn (S. H. Goodman, 2007). Studies of community samples of women have found that approximately 8% to 15% of women experience depressive symptoms severe enough to warrant a psychiatric diagnosis of major depression in the first 6 months after giving birth (O'Hara, 1997; O'Hara & Swain, 1996). Many more women, perhaps 40%, experience postpartum depressive symptoms not quite severe enough to warrant such a diagnosis (O'Hara, 1997).

When parent characteristics have been examined in TTS studies, most studies focused on maternal psychopathology and only examined changes over a short period of time. Teti et al. (1996) examined maternal symptomatology (i.e., a composite of depres-

sion, anxiety, hostility) approximately one month before and one month after the sibling's birth. Mothers showed increased symptomatology over the transition period overall, but mothers whose firstborns were low in attachment security at both the pre- and postbirth visits had the most extreme symptomatology compared with other mothers in the study (e.g., those with children high in attachment security across both time points or with high prenatal and low postnatal attachment). Further, more psychiatric symptoms after the birth predicted lower maternal attachment security scores for firstborn children after the birth. This study nicely demonstrated how the average pattern of change may not characterize all mothers and how personal characteristics and the quality of family relationships may serve as moderators of specific patterns of change (i.e., Person $\times$ Environment interactions).

Changes in the mothers' emotional states after the infant's birth may be responsible for the changes seen in the firstborns' adjustment. Firstborns were more withdrawn after the sibling's birth when mothers were more depressed and fatigued, and this was especially problematic for young boys (Dunn et al., 1981). The fact that the firstborns' initial withdrawal after the birth predicted poor sibling relationships approximately a year later when infants were 14 months old (Kendrick & Dunn, 1982) suggests that the mothers' initial emotional state may pose a risk for the development of persistent adjustment difficulties for firstborn children.

A recent meta-analysis estimated that approximately 10.4% of men were also depressed during the prenatal and postpartum period and that rates of paternal depression increased from 3 to 6 months postpartum to around 25.6% (Paulson & Bazemore, 2010). Condon and Esuvaranathan (1990) examined new and experienced fathers' emotional well-being during their wives' pregnancies, but no study has done so across the TTS. These authors found that second-time fathers had more symptoms of psychological stress (e.g., depression, anger, tension, fatigue) than first-time fathers during the pregnancy period.

Not only do some fathers become depressed in the postpartum period, but it is also quite possible that fathers' depression contributes to the firstborns' problem behaviors across the TTS. If fathers are essential in helping firstborns adjust after the TTS, as Kreppner (1988) and others (e.g., Legg et al., 1974) have proposed, having a depressed father may be particularly detrimental for firstborn children. Additional research into the TTS, particularly in samples of two-parent families, may need to attend to parental psychopathology in both mothers and fathers to accurately gauge the short-term and long-term adjustment of firstborns.

Parental competence and self-efficacy. Parental self-efficacy beliefs or the parents' sense of competence may also play a role in how firstborns adjust. Mercer and Ferketich (1995) followed 136 experienced mothers (i.e., had one or more children) and 166 inexperienced mothers (i.e., expecting their first child) across three postnatal time points (birth in hospital and 1 and 4 months postpartum) and found no differences in experienced and inexperienced mothers' competence in caring for an infant.

Walz and Rich (1983) in their qualitative study of 106 mothers during the pregnancy of their second child found that women did not focus on their abilities to care for the infant, having already raised their first child, but were more likely to question their ability to love and nurture two young children fairly and impartially. Indeed, Walz and Rich found that when queried about their concerns in being a mother the second time around, mothers focused

predominantly on their relationships with their first children and on promoting firstborns' acceptance of the new baby. Mothers expended a considerable amount of energy monitoring the firstborns during the first hospital visit to see the children's initial reactions to the baby and many reported that they were physically and emotionally depleted afterward. Mothers also reported experiencing sadness or grief regarding the loss of their exclusive relationship with their first children and felt guilty because they feared they were ruining their firstborn child's life (Richardson, 1983; Walz & Rich, 1983; Young et al., 1983). Young et al. (1983) claimed that mothers often questioned their own abilities to handle the older children's misbehaviors once the baby was born. Most studies do not distinguish between first-time parents or second-time parents, yet the parental concerns for these two groups may be quite different. In sum, research examining both maternal and paternal characteristics following the birth of a sibling and the manner in which the parents' emotional state and/or parental beliefs contribute to change trajectories in family and child functioning over time would bring a new perspective to this area.

Parent-Child Relationships and the Immediate Home Environment

In this section, I explore the different ecological levels of contextual factors outlined in the DES that may impinge on the firstborns' development during the TTS. An ecological perspective underscores the imbeddedness of children within multiple contextual levels, starting with the parent-child relationship and the immediate home environment, and moving ever more distant to the community and societal level. Although many might argue that children's adjustment, particularly adjustment for children of very young ages, cannot be divorced from the parent-child relationship, changes in the mother-child and father-child relationships are presented here in a separate section because, in most cases, TTS studies assessed parenting and/or parent-child relations and children's outcomes separately and rarely looked at children's adjustment as part of the parent-child relationship.

Mother-child relationships. The birth of a second child has the potential to change other aspects of family life, such as the relationships firstborns have with their mothers and fathers. In addition to a focus on the older siblings' adjustment, several investigators have documented changes in the mother-firstborn relationship from before to after the infant sibling's birth, including decreases in maternal attention and joint play between mothers and their firstborns (Dunn & Kendrick, 1980, 1982), decreases in positive affection (Baydar, Greek, & Brooks-Gunn, 1997; Baydar, Hyle, & Brooks-Gunn, 1977; Dunn & Kendrick, 1980, 1982; Taylor & Kogan, 1973), decreases in attachment security with mothers (Teti et al., 1996), and increases in maternal control, prohibitions, stern commands, and confrontations with older children (Baydar, Greek, & Brooks-Gunn, 1997; Dunn & Kendrick, 1980, 1982; Trause, 1978). Other findings indicated that mothers decreased the overall attentiveness and responsiveness to the firstborn children as well as their initiation of play and verbalizations (Dunn & Kendrick, 1980, 1982; Field & Reite, 1984; Kendrick & Dunn, 1980; Stewart et al., 1987). Field and Reite (1984), however, noted that mothers also increased their use of constructive play and talk across the TTS.

Baldwin (1947) examined changes in mothers' behaviors toward children when a younger sibling was born using parent reports from 46 mothers from the original Fels Longitudinal Study. He examined changes in 30 different parenting scales from records available 1 year before the pregnancy (Time 1), during the pregnancy (Time 2), and the year following the pregnancy and birth (Time 3). There were significant declines from Time 1 to Time 3 in all the warmth scales examined (i.e., child centeredness, approval, acceptance, affection, and rapport) as well as in the duration and intensity of contact with children and mothers' reports of indulging children. There was a corresponding increase in mothers' reports of restrictiveness, coerciveness, and the severity of discipline used with older siblings.

The findings from these various studies present a fairly consistent picture of decreases in maternal warmth and affection and a corresponding increase in punitive and restrictive discipline directed at older siblings after the birth of another child. These changes in maternal behavior may explain why some firstborn children appear to have difficulties after the birth of an infant sibling. Baydar, Greek, and Brooks-Gunn (1997) found that the birth of the sibling did not have a direct effect on the older siblings' behavior problems but was *mediated* through changes in the mother-child relationship, particularly through increases in the mothers' use of physical discipline across the transition. What still remains unclear from the TTS studies is whether increases in children's behavior problems across the TTS are due to increases in harsh discipline, whether increases in harsh discipline are due to increases in children's behavior problems, or whether increases in both could be related to changes in other family dynamics (e.g., marital conflict and daily stress).

Father-child relationships. Few researchers have actually interviewed or observed fathers interacting with their children over this transition, yet many sources underscore the important role of fathers for firstborns during the TTS (Kreppner, 1988; Kreppner, Paulsen, & Schuetze, 1982; Legg et al., 1974). Griffin and De LaTorre (1985) recommended that one successful strategy parents could use to limit the older siblings' jealousy was for fathers to assume a "heightened nurturing role during this time" (p. 116). In their interview study, Legg et al. (1974) reported that children with warm, empathic, and understanding fathers managed the stress following the birth better than those with uninvolved fathers. Kreppner et al. (1982) also described three different strategies that family members used when adjusting to their new family roles following the infant sibling's birth, all of which involved fathers in some manner. These included (a) both parents working interchangeably to do household and child care tasks, often doubling each other's activities; (b) fathers looking after the firstborns more regularly than before so mothers could establish an intimate relationship with the baby; or (c) fathers taking more responsibility for household tasks while mothers took primary responsibility for both children. While observing parent-child interactions in 16 families after the TTS, Kreppner (1988) found that fathers initiated more interactions with the firstborns than with the infant siblings the year following the infants' births, but from 16 to 24 months, fathers decreased the number of initiations toward older siblings while increasing their initiations of interaction with the younger, toddler siblings.

By far, the most telling results regarding father involvement over the TTS were found in the work of Stewart (1990; Stewart et

al., 1987). This was the only study to date to observe fathers interacting with their firstborn children before the sibling birth and throughout the first year following the birth (i.e., 1, 4, 8, and 12 months postpartum). Consequently, this is the only study that could look at changes in the father-child relationship across the first year after the birth and changes in firstborn children's adjustment. Different patterns of mother and father behaviors were found over this time. Stewart reported that mothers' talk to the older siblings decreased significantly from prenatal to 1 month postpartum, similar to many other studies, and remained relatively low throughout the remaining months. A similar decline in fathers' behaviors was not found. Instead, fathers' talk to the firstborns over the TTS remained fairly stable with an eventual decrease in paternal talk from 8 to 12 months. Furthermore, the older children's talk to mother and father mirrored these changes in parental behavior. Specifically, children's talk to mothers showed the biggest decline from the prenatal to 1-month postpartum time point with gradual increases over time. However, children's talk with fathers remained relatively stable and unchanged over the five time points. An examination of changes in the mother-firstborn relationship over this period, although quite dramatic, did not reflect the changes or lack of changes characteristic of the father-firstborn relationship.

If we are to understand which factors might help firstborn children adjust to the arrival of a sibling, these individual differences in the change patterns of father-firstborn interaction need to be examined and related to patterns of change in firstborn children's adjustment. One way to accomplish this would be to interview and observe fathers interacting with their firstborns at multiple time points, beginning prenatally and again several times in the year following the birth. In an effort to determine whether the firstborns' adjustment to the birth of a sibling was influenced by parental support from mothers and fathers before and after the birth, Gottlieb and Mendelson (1990) conducted telephone interviews with 50 mothers and fathers of firstborn girls approximately 6 weeks before and 6 weeks after the sibling's birth. Children's prenatal distress (i.e., anxiety, withdrawal, hostility, and dependence) interacted with levels of maternal and paternal postnatal support to predict the firstborns' postnatal distress. Specifically, firstborn girls high in prenatal distress whose fathers were low in support after the birth were the most distressed postnatally. Firstborns low in prenatal distress and high in paternal support were less distressed afterward. Furthermore, firstborn girls were more nurturant and initiated more positive social bids to the baby after the birth when fathers were more nurturant prenatally. Although these pre- and postbirth findings are suggestive, repeated assessments across a wider time span are still needed for a full examination of individual trajectories of change and to determine the transition process models that are the best predictors of these changes.

Family and home environment. A series of studies have examined how other aspects of the home environment change after the birth of a sibling (Barber & East, 2009; Baydar, Greek, & Brooks-Gunn, 1997; Baydar, Hyle, & Brooks-Gunn, 1997; Kowaleski-Jones & Dunifon, 2004; Menaghan & Parcel, 1995). These studies all involved secondary data analyses from the NLSY. They varied in which measurement occasions were chosen, the final sample sizes, and the ages of the parents and children chosen for analyses. Also, these analyses included children of

different birth order and included the birth of any additional children at some point during the study so findings from some of these studies were not directly targeting the transition from one child to two. Of course, one of the strengths of this work was the large representative samples, but they were also limited by the lack of direct information available on other aspects of family relationships, including mother–child interactions and fathers' involvement. In all instances, the measure examined was the Home Observation for Measurement of the Environment (HOME; Caldwell & Bradley, 1984), whether this included total HOME scores or the Emotional Support and Cognitive Stimulation subscales. The emotional support and cognitive stimulation captured in the HOME scales were no doubt provided by parents, and it is for this reason that these studies are summarized in this section on parenting.

In most instances, there was a decrease in the quality of the home environment after the birth of another child. For instance, Kowaleski-Jones and Dunifon (2004) noted a significant decline in the emotional support the older siblings' received in the period following the birth of another child and, for boys only, a significant decline in cognitive stimulation following the birth. According to this study and others, the effect of an infant's birth on the home environment was as strong as the effect of a divorce (Kowaleski-Jones & Dunifon, 2004; Menaghan & Parcel, 1995), indicating that the magnitude of the change after an infant sibling's birth can be considerable. Kowaleski-Jones and Dunifon also studied change in the HOME in the periods before (2 years before birth), during (concurrent with birth), and after the birth. Even though there was a decrease in emotional support following the birth, there was an actual increase in emotional support preceding the birth. These findings suggested that parents increased their emotional support of older siblings before the birth, possibly anticipating the inevitable disruption of the mother–child relationship once the baby was born and perhaps attempting to compensate beforehand, a point that was emphasized by several mothers in the qualitative research of Richardson (1983).

Barber and East's (2009) analysis of the NLSY data took a unique perspective by looking at whether the pregnancy of the younger sibling was intended or unintended. The latter category included births that were mistimed (i.e., women wanted another baby but had not planned to have it at that particular time) or unwanted (i.e., women did not plan or want another child). There was a significant decrease in the emotional support of older siblings when the pregnancy was unintended and particularly when it was mistimed, not when it was unwanted. The decrease in emotional support following mistimed pregnancies may indicate that although parents may want two (or more children), the transition and the changes in the home environment were more disruptive when the arrival of another child was not planned and parents were not prepared psychologically or financially for the transition. In line with the social timing hypothesis, these findings underscored how behavioral outcomes varied as a function of the timing of the TTS. Children in two-parent families, families owning their own home, and families with more educated mothers actually experienced increased emotional support following the sibling birth, indicating that stable, financially secure family situations may help ease disruptions in the household.

Despite the consistency in findings across the NLSY analyses, it is still the case that the data are from one large data set, and each

study may actually represent variations on the same set of findings. If such consistency in changes in the home environment could be demonstrated in other large-scale, nationally representative studies, then the findings would be far more impressive. Certainly there are a number of ongoing large-scale survey studies that have very detailed information on parenting and partner relationships, including impressive observational records of mother–child and father–child interaction (e.g., National Institute of Child Health and Human Development Study of Early Child Care, Early Childhood Longitudinal Study). These studies offer a gold mine of opportunity to address the TTS using large samples and highly regarded developmental assessments of parenting and children's developmental outcomes. Interested researchers would be well advised to examine the TTS using these well-regarded studies of children's development.

Contextual Characteristics and Children's Ecological World

Partner and marital relationships. Significant changes occur in marital relationship quality with the arrival of the first child (Lawrence, Rothman, Cobb, & Bradbury, 2010). As a matter of fact, marital relationship change is the primary focus in studies of the transition to parenthood because the arrival of an infant changes the marital dyad into a family triad. Changes in marital functioning across the transition to parenthood predicted the quality of mother–child and father–child interactions as well as children's socioemotional development 3 years later (Belsky, Youngblade, Rovine, & Volling, 1991). Even though marital change over the transition to parenthood has been the primary focus of many studies (e.g., C. P. Cowan & Cowan, 1992; Lawrence, Rothman, Cobb, Rothman, & Bradbury, 2008; Michaels & Goldberg, 1988; Twenge, Campbell, & Foster, 2003), this has not been the case for the TTS. Because an extensive body of literature has linked marital and partner relationship functioning to children's emotional and behavioral adjustment (e.g., Cummings, Davies, & Campbell, 2000; K. Moore, Kinghorn, & Bandy, 2011), marital changes occurring after the birth of a second child may play a role in any changes observed in the older siblings' disruptive behaviors over this transition.

In an interview study of 600 physicians, Pietropinto (1985) reported that respondents were equally divided on the question, "Do husbands feel emotionally closer or more distant from their wives following the birth of a baby sibling?" Forty-three percent said that husbands felt closer, whereas 44% claimed husbands and wives became more distant. Although conflict may arise with the arrival of the first child "most parents claim that the time immediately following the birth of the second child was the most difficult period of their marriage" (Pietropinto, 1985, p. 163). Belsky, Spanier, and Rovine (1983) examined marital change for first- and second-time parents from prenatal to 9 months following the birth and found significant parity effects on four out of five of the marital scales from the Dyadic Adjustment Scale. Even though there was a general decline in marital satisfaction after the birth of an infant for the sample as a whole (including both first-time and second-time parents), primiparous couples had overall higher scores on marital satisfaction, cohesion, affectional expression, and the total adjustment score than did multiparous couples. During home observations of marital interaction, first-time parents had

higher overall engagement scores, expressed more shared pleasure in the baby, more joint attention, and had more baby-related interaction than multiparous couples. Furthermore, first-time parents were more likely to characterize their marriage as a romance, whereas second-time parents were more likely to see their marriage as a partnership. Couples bearing their first child also reported more time for joint leisure activities (i.e., going out to movies and spending time together). In general, "it appears that while marital quality declines following the transition to parenthood, this decline continues as additional children are added to the family" (Belsky et al., 1983, p. 576).

Several other studies indicated similar marital changes. For instance, Wilkinson (1995) followed 116 couples expecting either their first child or a later born child across three time points (second trimester, third trimester, 3 months postpartum) in an effort to examine whether primiparous couples experienced more marital decline after the birth of an infant compared with multiparous couples. Multiparous spouses reported more marital dissatisfaction than primiparous couples during the second and third trimesters. Whereas the primiparous couples reported a significant increase in marital dissatisfaction from the prenatal to postnatal time points, this was not the case for the multiparous couples. Krieg (2007) compared 40 mothers expecting their first child with 42 mothers expecting their second child on changes in marital relationship functioning from the last trimester of pregnancy to 1 month postpartum. After controlling for the length of the marriage, first-time mothers reported their marriages to be more positive and less negative than second-time mothers. Further, second-time mothers reported more dissatisfaction with the division of labor in the family (i.e., who does household chores, child care, and decision making) prenatally than first-time mothers. Because dissatisfaction with the division of labor was related to marital decline after the transition to parenthood (Belsky & Hsieh, 1998; Belsky, Lang, & Huston, 1986; MacDermid, Huston, & McHale, 1990; Ruble, Fleming, Hackel, & Stangor, 1988), greater marital dissatisfaction for second-time mothers may be due to the imbalance in the division of labor between spouses or because there are simply two children now requiring care.

Several studies have now compared couples having their first or second children, but examining group differences may not provide the most accurate picture of marital changes across the TTS. Focusing only on average group change may mask the individual differences that no doubt exist. Again, some couples may experience the transition as problematic, whereas other couples may not. In fact, Belsky et al. (1983) reported significant stability in the rank ordering of couples' marital quality over the prenatal, 3 month, and 9 month time points in their longitudinal study, even in the presence of significant decline in marital quality, on average. Those couples high on marital satisfaction before the birth remained fairly high after the birth. These findings would support the accentuation principle because marital dissatisfaction appeared to be exacerbated during the transition. Thus, firstborn children in families with marital conflict may be at particular risk because they would be exposed to more marital decline during the transition but would also be exposed to higher levels of marital distress even before the birth.

One might argue that second-time parents have already been through the transition to parenthood and now know what to expect with the birth of an infant. As such, marital disruption should be

limited. In contrast, it may not be prior infant experience that is critical for understanding how couples adapt but the added burdens of now caring for two young children as opposed to one. Teti et al. (1996) assessed marital harmony approximately 1 month before and 1 month after the sibling birth, and although they found no change in marital relationship quality over this short period for the sample as a whole, they did report a significant decline in marital harmony over time for mothers whose children had low attachment security scores before and after the birth, in contrast to mothers whose children had high attachment security scores at both time points or mothers whose children had high scores before the birth but lower scores after the birth. Similarly, Kramer and Gottman (1992) asked mothers to report on their marriages 3 months before and 6 and 14 months after the birth. They did not analyze change in marital adjustment over time but did find that marital satisfaction was positively correlated with positive sibling relationship quality 6 months after the birth. The link between marital conflict and sibling conflict is now well established and is often mediated by parenting practices and parental discipline (e.g., Brody, Stoneman, & Burke, 1987; Richmond & Stocker, 2008; Stocker & Youngblade, 1999; Volling & Belsky, 1992; J. Yu & Gamble, 2008). Should marital conflict increase and marital satisfaction plummet over the TTS, firstborn children exposed to greater marital conflict and harsh parental discipline may be at greater risk for developing externalizing and internalizing symptomatology, which may very well be acted out during the initial interactions with their infant siblings. Neither of these studies collected marital assessments from the husbands, and neither addressed the individual variability across couples with the goal of detecting which couples were struggling and which couples were not.

Social support. Instrumental and emotional support to parents from significant others during this transition period should be associated with better family functioning, better parental mental health, and better child adjustment, just as it is in studies that have examined support factors across the transition to parenthood (e.g., Cutrona, 1984; Levy-Shiff, Dimitrovsky, Shulman, & Har-Even, 1998). Indeed, Gottlieb and Mendelson (1995) found that second-time mothers were less depressed, anxious, angry, and fatigued when they were satisfied with the support they received from their spouses and their social network. Jordan (1990) interviewed 48 couples expecting their second children during the pregnancy and at 6 weeks and 6 months postpartum and reported that parents found material support (e.g., help with child care, babysitting, household chores) the most helpful, followed by emotional support, then informational support on dealing with sibling rivalry and the older siblings' needs.

Despite the benefits of social support, Mercer and Ferketich (1995), in their longitudinal study of experienced and inexperienced mothers in the postpartum period, found that experienced mothers with two or more children reported less social support from family at all three time points of the study (in the hospital and at 1 and 4 months after the birth) than inexperienced mothers. This difference may be due to a common belief among health care professionals and others, including family, that second-time mothers no longer need assistance and support in infant care because they are experienced mothers (Mercer, 1979). They found no differences in spousal support for the two groups of mothers.

Even though second-time mothers may receive less social support, Krieg (2007) found no differences in first-time mothers' and

second time mothers' perceived parental stress from pregnancy to 1 month after birth, underscoring that having a second child is as stressful as having a first child, even though the reasons for the stress may differ. For second-time parents, it may be the support they receive in the care of their firstborn child, not the infant, which is critical for personal and family functioning. Fathers often accompany the mothers to the hospital and provide birthing support, which may mean that finding care for firstborn children during the hospitalization is a concern. Many contemporary families may no longer live in neighborhoods with extended family and kin networks. Parents with a large extended network of family and kin, as well as contact with other parents with young children, would be expected to have access to more sources of emotional, financial, and instrumental support that may result in better mental health, less marital conflict, and the use of less harsh discipline. Similarly, firstborn children should manage the transition better when grandparents and other family members are available to help care for children and provide some relief of child care responsibilities for the parents, who, in turn, will be less fatigued and irritable (Graudins & Harris, 1985).

In addition to the support parents receive, firstborns may also benefit from participating in a wider social world outside the family and by the supportive relationships they form with peers or teachers. Kramer and Gottman (1992), for instance, found that the firstborns' relationships with a close friend prenatally predicted observed sibling interactions 6 and 14 months after the birth; specifically, positive peer play, fewer unmanaged conflicts with the friend, and the extent of fantasy play with a friend predicted the firstborns' positive sibling interactions at 14 months after the birth. School-age children, who are substantially older at the time the infant is born, may not only have the cognitive wherewithal to understand conception, pregnancy, and birth but may also be able to talk about these changes with their classmates. Further, difficulties at school and bullying by peers may adversely affect children's emotional state and actually exacerbate the stresses across the TTS.

Work and family linkages. Parents and children also participate in a wider social world outside the family and the climate and job satisfaction of the parents' workplace serves as a exosystem influence on children. Dissatisfaction at work may alter the parents' well-being, which, in turn, affects their interactions with children and partners/spouses. It is also the case that additional children require more financial resources. Only one study has actually considered economic or work-related factors surrounding the TTS. Using data from 673 families with 3- to 5-year-old children of the NLSY, Baydar, Greek, and Brooks-Gunn (1997) found that women giving birth to another child were more likely to decrease their work hours over the 2- and 4-year period following the birth, whereas women not having another child were more likely to increase their work hours. As a result, children with a newborn sibling were less likely to attend group day care because mothers were now providing care at home. Not surprisingly, there was also a decline in the income-to-needs ratio because of the decrease in maternal work hours and the corresponding increase in the number of dependent children. These economic changes associated with maternal work status had repercussions for the family and the older children's adjustment over time. Four years after the birth, those children with younger siblings from lower income families had fewer opportunities for skill development (i.e., fewer

learning materials in the home, fewer opportunities for extracurricular activities) and, as they entered school, had significant declines in their reading recognition scores than children with siblings from less economically disadvantaged families.

Krieg (2007) also found a discrepancy in the work hours for first- and second-time mothers. The majority (87.5%) of first-time mothers was employed, whereas only 57% of second-time mothers were working. Callan (1985) also found that women wanting one child by choice were more likely to be working full- or part-time (73%) than women wanting a second child (30%). Women wanting a second child, therefore, may have different career aspirations and motivations than women planning on having only one child. Nearly 45% of women with two children reported that they had decided to have their second children even before they had their first children (Knox & Wilson, 1978). If second-time mothers in two-parent families are less likely to work and more likely to stay home caring for both children, household income is no doubt more dependent on the partners' income.

To the extent that income and maternal employment hours seem to be significant in determining changes in family life as well as the children's adjustment following the birth of a sibling, it is noteworthy that no study has examined these issues with respect to men's employment. Men often view their role as a provider and breadwinner as a central component of their identity as a father (Helms, Walls, Crouter, & McHale, 2010). It should come as no surprise, then, to learn that Stewart (1990) reported that many men increased their employment hours and commitment to work following the TTS in an effort to compensate for the increasing financial demands of a new baby. Further, the stresses experienced by fathers at their workplace can spill over to affect their relationships with both the spouse or partner and their children (Crouter, Bumpus, Head, & McHale, 2001; W. B. Goodman, Crouter, Lanza, Cox, & Family Life Project Key Investigators, 2008). Additional studies would help in understanding how changes in economic factors, maternal and paternal work hours, and work-family spillover play out in the family and affect the firstborns' behaviors over this transition.

Concluding Remarks and Future Directions

What can we conclude from the literature addressing the transition period surrounding the birth of a second child? The current review did not find strong support for the notion that firstborn children consistently display clear increases in disruptive behavior and adjustment difficulties after the birth of an infant sibling. Instead, there was evidence of some disruption, some growth, and no change at all in children's adjustment across the TTS. Children vary widely in whether they are or are not distressed by the arrival of a newborn sibling. As such, describing the TTS universally as a period of crisis for firstborn children is no doubt an overstatement. As a matter of fact, mothers have commented that the firstborns' behaviors were often not as problematic as they had expected (Lynch, 1982). Gullicks and Crase (1993) actually asked mothers and fathers before the birth to rate how difficult they expected firstborn children to be and then after the birth to rate how difficult the children actually were. Both mothers and fathers had expected their children's behaviors to be far worse than they actually were, and in most cases, the children's behaviors were actually more positive than they had expected before the birth.

This does not mean that some children do not display disruptive behavior, become extremely jealous, have temper tantrums, or, indeed, experience acute distress. Clearly, some children do. Other children, though, may react quite differently, embracing the new-comer, offering to help, and kissing the new infant affectionately. Indeed, most children probably display a bit of both. One of the challenges for the future will be designing TTS studies that attempt to explain this individual variability in firstborns' adjustment over the early months and the ensuing year.

If the ultimate goal of TTS studies is to identify subgroups of children having more or less difficulty in an effort to provide assistance to families and recommendations for prevention, it will be far more beneficial if researchers focus on specific behaviors (e.g., sleep problems, noncompliance, aggression, withdrawal and anxiety, eating difficulties, somatic complaints) than to utilize broadband assessments of internalizing and externalizing symptoms. Parents often come to health care providers with very specific concerns pertaining to their children's behaviors, and as psychologists, we need to be able to offer very specific recommendations that address these concerns. Dealing with noncompliance and defiance, sleep problems, or increased anxiety and withdrawal require finite and different solutions. Current sibling preparation classes often take young children on a hospital tour of the birthing area, have them diaper and feed lifelike dolls to familiarize them with newborns, and tell them stories about being a big brother or sister, but these classes provide little preparation for parents on how to manage the transition and what to expect from their firstborn children.

What is clear from the research is that there were significant changes in the mother–firstborn relationship, with mothers dispensing more discipline and decreasing the amount of warmth and affection to the firstborn after the birth and with children experiencing greater declines in attachment security to mothers. Firstborns also consistently displayed less affection, were less responsive to their mothers, and expressed less positive and more negative affect during mother–child interactions. Therefore, targeting parent–child relationships for prevention opportunities may assist firstborn children and their parents as they make the transition. The mother–child relationship might be the prime target for prevention, and programs could be designed to help children and parents cope with the inevitable changes that are about to occur. Another possibility would be to consider alternate support systems, whether with the father, the grandparents, or neighbors, that could help offset the disruption of the mother–child relationship.

The picture pertaining to disruptive problem behaviors was far less clear, and the findings across studies were quite disparate. There was not a universal pattern of change that described all children, but instead, the research suggested that there may be a small subgroup of children affected. Additional research will need to take a person-centered approach in an attempt to identify these children and then examine how they may differ from other children with respect to family and background characteristics. In many cases, there were just too few studies available to draw any strong conclusions about other behavioral indicators, such as regressive behaviors, social competence, sleep problems, and anxiety or withdrawal.

The age and developmental level of firstborns were relevant for understanding children's adjustment across the TTS. Younger children appeared to experience greater difficulties on a number of

the affective and behavioral dimensions examined, but additional research examining the interaction of age with other child and contextual variables will help refine the understanding of how children's developmental level contributes to psychological adjustment across the TTS. In general, we should not expect all children of all ages to show regression in critical self-help skills or setbacks in developmental milestones. Similarly, developmental advances and opportunities for personal growth may be seen by some children, depending on how well they have already mastered a specific skill, such as toilet training or weaning from a bottle. When these skills have been newly acquired only weeks or months before the TTS, regression and developmental breakdown may result. We would not expect a similar regressive pattern for behaviors that are well established and routinely executed by children over long spans of time.

Because those parents deciding to have a second child differed significantly from those parents who did not, differences on background characteristics (e.g., career aspirations, social support) create serious confounds for the few available quasiexperimental studies and natural experiments. Any differences in the firstborns' adjustment across groups with or without an infant sibling may be explained by a host of other differences characterizing families with one or two children and are probably not a direct result of the birth of an infant sibling.

In contrast to a stressful life events or family crisis model, an ecological framework may be more fruitful for understanding changes in children's adjustment and family relationships across normative ecological transitions such as the TTS. In addition, multiple postbirth assessments in the year following the birth are needed to observe the multitude of ways in which children's behavior may change over the course of a year and to address the mechanisms underlying these changes. These multiple assessments are critical for finding children experiencing short-term perturbations in behavior that dissipate over time or more long-lasting changes predictive of psychopathology as well as uncovering the contextual changes that may be co-occurring in the family and elsewhere in children's lives.

Questions still remain in developmental science at large about how best to analyze intraindividual change patterns (e.g., sudden and short-term change) that may be indicative of the abrupt and discontinuous changes that Bronfenbrenner (1979) claimed characterized normative ecological transitions. Current analytic techniques addressing gradual and linear changes (i.e., slope) or even curvilinear changes using a quadratic polynomial do not adequately represent transitional disruptions that may occur suddenly in a child's life. Advancing statistical methods to test these sudden, discontinuous patterns of change in development are necessary if psychologists ever wish to understand adequately the TTS and other normative ecological transitions (see, e.g., Doss, Rhoades, Stanley, & Markman, 2009). Advances in latent class growth analysis and growth mixture modeling allow researchers to take a person-centered approach with longitudinal data that captures the heterogeneity in developmental trajectories (Nagin, 1999; Muthén & Muthén, 2000). The goal of these approaches is to group individual children into groups or latent classes, each of which includes individuals who are similar to one another, yet different from individuals from other classes. In this way, diverging and converging trajectories that describe children starting at similar points but reaching different developmental outcomes (i.e., multi-

finality) and those children reaching a given outcome through any number of different paths (i.e., equifinality) can be identified and compared on individual background and contextual characteristics. These techniques would also allow an identification of specific subgroups of children varying with respect to short-term and long-term behavioral change. For instance, one class of children may start out low on aggression and remain low with no evidence of change. Another class may also start out fairly low on aggression but show relatively steep increases in this behavior over the course of a year. Still a third class may be moderately high on aggression but show a sudden increase immediately after the birth with a subsequent decrease months later (e.g., perturbation model). Each of these patterns of change is possible, and because they represent different pathways, each may have different predictors. The goal of future research will be to utilize longitudinal research designs with multiple follow-ups in an effort to address these long-term developmental trajectories, to document the variability in these change trajectories, and to determine which contextual and individual characteristics distinguish children with observable patterns of growth versus trajectories indicative of poor adaptation.

One way to maximize our understanding of intraindividual variability across the TTS is through the use of measurement-burst designs within a longitudinal framework (Nesselroade, 1991; Sliwinski, 2008). The measurement-burst design generally consists of multiple time scales. One level might consist of a longitudinal research design that follows children each year for 5 years. Within each of those 5-year time periods, there is then another level of microburst measurement that might consist of repeated assessments of individual behaviors over days or weeks. One can then address intraindividual variability (i.e., short-term changes and variability in how the individual behaves over the course of the week) and intraindividual change (i.e., more enduring changes that are characteristic of development over a longer period of a year). Measurement burst designs might be one way to address the sudden, discontinuous changes of a transition such as the TTS. For instance, a microburst of observations (e.g., daily parent reports of firstborn behaviors) could be collected over a 2-week period before the birth with another microburst occurring over a 2-week period after the birth. If children experienced sudden fluctuations of dysregulated behavior after the birth, one would expect greater variance in the microburst observations of behaviors after the birth compared with before the birth. Although plausible, it should also be noted that measurement-burst studies within a longitudinal framework are very labor intensive, require significant amounts of funding over extended periods of time, place additional data collection burden on families (while they go through a stressful transition), which increases sample attrition, and require sophisticated multilevel modeling techniques to capture the multidimensional time scales used in these designs. Nonetheless, they are one creative means for addressing sudden fluctuations in disruptive behaviors over the TTS.

Final Comments on the TTS

Most children in the United States and elsewhere grow up with at least one brother or sister. Our siblings travel the life course with us. They can be our best friends or our worst enemies. The sibling relationship begins from the moment the infant sibling is intro-

duced to the older brother or sister. The initial reaction of older siblings to their baby siblings is a good indicator of what will transpire between siblings a year later and may even set the course for a lifelong path of cooperation or hostility between siblings (Dunn & Kendrick, 1982; Dunn, Slomkowski, & Beardsall, 1994; Stillwell & Dunn, 1985). No wonder parents are concerned about how their firstborn children will accept the newcomer (Walz & Rich, 1983). If we wish to help parents prepare their firstborn children for the arrival of a baby sibling, professional recommendations need to be based on well-designed, developmental studies that track children's adjustment over time (see also Kramer & Ramsburg, 2002). Should parents tell their children right away about the pregnancy or wait? How far apart should parents space their children? Should they read books and talk to their children about the baby? Should fathers take over the care of older siblings while mothers care for the infant? Should parents try to toilet train older children before the baby arrives? These questions and more surface repeatedly on Internet websites targeting parents, pregnancy, and birth. Yet, psychologists have few well-designed, long-term longitudinal studies with large, ethnically diverse samples from different socioeconomic and cultural backgrounds to answer such questions.

As already noted, the arrival of a newborn sibling is a normative life event for many children. The period surrounding this transition may be stressful for some children and their parents. Yet, individual differences seem to dominate the older siblings' reactions to the birth of their baby siblings. Because familial, individual, and contextual changes co-occur with the arrival of an infant sibling, it will be important for future studies to address how these changes are interrelated over time, what influences the firstborns' acceptance of their newborn siblings, and what parents can do to facilitate the development of a healthy sibling relationship—one of the longest lasting relationships of an individual's life.

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