The Association of the Birth of a Sibling with the Older Child's Externalizing Behaviors

by

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STATEMENT OF AUTHORSHIP

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Signed Fatma Dilan Çeviker

ABSTRACT

The research indicates that there is an association between the birth of a sibling and externalizing behaviors of the older children. In this association, two aspects of the parent-child relationship: (i) the parental resources that are provided to the older child, (ii) the characteristics of the real time interactions between the mother and the older child, and maternal depression might play a role. In the current study, this association was tested. The data from the Study of Early Childhood Developmental Ecologies in Turkey (ECDET) was used. In Study 1, quantitative data was used (N = 560) while in Study 2 qualitative data was used (N = 101). Current research investigated that whether there was association between (a) sibling birth and parental resources, (b) sibling birth and real time interactions, (c) sibling birth and maternal depression, and (d) sibling birth and externalizing behaviors of the older children. Also, parental resources and real time interactions were taken as possible mediators for the association of sibling birth with externalizing behaviors of the older children. Last, the association of sibling birth with parental resources and with children's externalizing behaviors was investigated for participants of Study 1 who were at high risk for being influenced by sibling birth.

Results showed that (1) there was an association of sibling birth with developmental resources; (2) sibling birth predicted mother behaviors and child behaviors during real time interactions at post-birth interview; (3) variety of experiences was found as a mediator of the association of the sibling birth with externalizing behaviors of older children; (4) in all high risk subgroups, externalizing behaviors of older children were predicted by harsh discipline at post-birth interview.

Keywords: sibling birth, parental resources, real time interactions, developmental resources, maternal depression, externalizing behaviors.

ÖZET

Araştırmalar kardeş doğumu ile evdeki büyük çocuğun dışsallaştırma davranışları arasında bir ilişki olduğunu gösteriyor. Bu ilişkide ebeveyn-çocuk ilişkisindeki iki durum: (i) büyük çocuğa sağlanan ebeveyn kaynakları ve (ii) anne-çocuk arasındaki gerçek zamanlı etkileşimin özellikleri ve anne depresyonu rol oynayabilir. Bu çalışmada bu ilişki test edilmiştir. Türkiye'de Erken Çocukluk Gelişim Ekolojileri Araştırması'ndaki (TEÇGE) verileri bu çalışmada kullanılmıştır. Çalışma 1'de nicel veriler kullanılırken (N = 560), Çalışma 2'de nitel veriler kullanılmıştır. Bu çalışma aşağıda sıralanan ilişkilerin olup olmadığını incelemiştir: (a) kardeş doğumu ile ebeveyn kaynakları arasındaki ilişki, (b) kardeş doğumu ile gerçek zamanlı etkileşimler arasındaki ilişki, (c) kardeş doğumu ile anne depresyonu arasındaki ilişki ve (d) kardeş doğumu ile evdeki büyük çocuğun dışsallaştırma davranışları arasındaki ilişki. Ayrıca, ebeveyn kaynakları ve gerçek zamanlı etkileşimlerin kardeş doğumu ile büyük çocuğun dışsallaştırma davranışları arasındaki ilişkide aracı rolünde olup olmadıkları test edilmiştir. Son olarak, kardeş doğumu ile ebeveyn kaynakları ve dışsallaştırma davranışları arasındaki ilişki Çalışma 1'de kardeş doğumundan daha çok etkilenebilecek risk grubunda bulunan katılımcılar açısından incelenmiştir.

Sonuçlar gösteriyor ki; (1) kardeş doğumu ile gelişimsel kaynaklar arasında bir ilişki bulunuyor, (2) kardeş doğumu, doğum sonrası gerçek zamanlı etkileşimlerdeki anne ve çocuk davranışlarını tahmin ediyor, (3) deneyimsel çeşitlilik kardeş doğumu ile dışsallaştırma davranışları arasındaki ilişkide aracı rolünü üstleniyor ve (4) yüksek riskli tüm alt gruplarda, doğum sonrası sert disiplin evdeki büyük çocuğun dışsallaştırma davranışlarını tahmin ediyor.

Anahtar Sözcükler: kardeş doğumu, ebeveyn kaynakları, gerçek zamanlı etkileşimler, gelişimsel kaynaklar, anne depresyonu, dışsallaştırma davranışları.

DEDICATION

To my family and my beloved husband

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Chapter 1

INTRODUCTION

The birth of a sibling is an important life event for the older child. The impact of this event is expected to be evident on the developmental resources that are provided to the older child. Previous studies have found that the sibling birth can lead to a decline in developmental resources such as a decline in the frequency of talk (Downey, 1995), a decline in joint play between the mother and the firstborn, and a decline in mothers' initiation of play and verbalizations (Dunn & Kendrick, 1980). The birth of a sibling may also influence the real time interactions between the mother and the older child. Researchers have found a decline in positive interactions between the mother and the older child after the birth of a sibling (Baydar, Greek, & Brooks-Gunn, 1997; Dunn & Kendrick, 1980; Stewart, Mobley, Van Tuyl, & Salvador, 1987).

The sibling birth may be associated with the older child's externalizing behaviors both directly and indirectly. Although the birth of a sibling is a typical experience, it may be the first crisis in a child's life (Smith, 2013) and it might cause the older child to feel frustrated and angry (Sawicki, 1996). Kolak and Volling (2013) suggested that after the birth of a sibling the older children's externalizing behaviors increased because they might have been jealous of the attention their mothers showed to their siblings. Studies showed that an emotionally warm home and close relationships with the father and extended family eased the adjustment of the older child to the birth of a sibling (Volling, 2012). In addition, a supportive and nurturing environment that was provided by parents could reduce the feelings of jealousy towards the younger sibling (Sawicki, 1996).

The change in the older child's externalizing behaviors after the birth of a sibling can also be due to the changes in the level of parental resources that is provided and the changes in the characteristics of the real time interactions between the mother and the older child. A decline in positive interactions between the mother and the older child, a decline in the quality of verbal input, and an increase in controlling parenting behaviors after the birth of a sibling can negatively affect the behavioral outcomes of the older child (Baydar, Greek, Brooks-Gunn, 1997). There can also be an increase in the behavior problems of the older child after the birth of a sibling (Dunn, Kendrick, MacNamee, 1981) due to an increase in the confrontations between the mother and the older child (Kendrick & Dunn, 1980).

This study is unique because of three reasons. First, in this study both quantitative (interview) and qualitative (observational) data were used. Second, in this study both a natural experimental design and a longitudinal correlational design were used. Third, this study was conducted using the data from the study of Early Childhood Developmental Ecologies in Turkey (ECDET; Baydar, Küntay, Gökşen, Yağmurlu, & Cemalcılar, 2010). This is a 5 year longitudinal study from a representative sample from Turkey which includes mother-child dyads from a different socio-cultural context than in previous studies which were conducted in the U.S., e.g. the National Longitudinal Survey of Youth (NLSY).

There are two reasons why it is important that the data are from Turkey. First, it was estimated that 80-85% of children in Turkey have at least one brother or sister (UNICEF, 2011). The Turkish total fertility rate is 2.07 (TurkStat, 2013), however one-child families are a minority in Turkey. The percentage of mothers with 1, 2, and 3+ children in Turkey are 14.9%, 34.2%, and 50.9% respectively (OECD, 2010). Furthermore, the birth interval in more than one-fifth of births in Turkey is regarded as short, i.e. 24-35 months (Hacettepe University Institute of Population Studies, 2009). Hence, the older child is often in early childhood when the sibling is born. Second, the mother-child relationship is a particularly salient source of

influence for children in Turkey because very few children receive non-maternal care or preschool education. In early childhood, peer influences are also minimal. A vast majority of children are at home with their mothers and a deterioration of mother-child relationship cannot be compensated in other early childhood ecologies such as the preschool. According to the data from TurkStat (2012), 89.6% of mothers care for their children at home and 2.4% of children go to preschool between the ages of 0 and 5.

Chapter 2

LITERATURE REVIEW

This section starts with the theoretical background that underlies this study. Second, the definition of developmental resources is given and the previous studies about the association of the birth of a sibling with developmental resources are examined. Third, the studies on the association of the birth of a sibling with externalizing behaviors of the older child are examined. Fourth, direct and mediated effects of sibling birth are provided. Fifth, the moderating role of older child's characteristics on older child externalizing behaviors after sibling birth is given. Last, the presentation of the current study is provided.

2.1 Theoretical background

This study relies on two theories: The Resource Dilution Theory and The Ecological Systems Theory. Having a child is a choice because of widespread availability of contraceptives. Therefore, there is a self-selection effect that may confound the effects of the birth of a sibling. The influence of the birth of a sibling on the older child may depend on (1) self-selection; (2) the older child's characteristics; and, (3) changes in the family environment (resources). Blake (1981) stated that the influence of the increase in family size on children was mainly due to parents' decisions about family size. That is, if people choose to have more children, at the same time they make choices about the quality of their child-rearing. Downey (2001) indicated that parental characteristics also have an important role in determining the outcome of increase in the family size on children. He proposed that some parents might choose to have small families to invest more in their children's success and consequently,

children in those families might be more successful than children from other families. The important thing here is the reason behind the choice of having or not having another child. I used a longitudinal design in this study; therefore I was able to partially control for the self-selection effect because the study participants experienced the birth of a sibling at different ages during the study period after an initial assessment was conducted.

The leading proponent of the resource dilution framework, Blake (1981) stated that there are three types of finite parental resources: (i) environments and settings (types of homes, necessities of life, and cultural objects like books, pictures, and music), (ii) opportunities (chances to engage the outside world), and (iii) treatments (personal attention, intervention, and teaching). According to the resource dilution model the parental resources are limited and therefore, the portion of parental resources potentially available for each child decreases as the number of children in the family increases (Downey, 2001).

Even though a key resource, parental time, is not listed in this model it decreases as the number of siblings in the family increases (Hill & Stafford, 1974). Some parental resources listed in these categories such as parental attention depends on the availability of parental time. Therefore, it is possible that parental time is also a resource that parents provide to their children, and declines after the birth of a sibling. However, it may not be time that matters for the children; rather, time invested in certain joint activities maybe important for children. This is what I examined in this study.

In this study, I conceptualized parental resources and real time interactions as developmental resources. This concept includes emotional, cognitive, and regulatory resources. What Blake indicated as personal attention and intervention in parental resources share similarity with regulatory resources, and cultural objects and teaching share similarity

with cognitive resources in this study. Emotional resources were not considered by Blake (1981).

Previous studies found empirical evidence for resource dilution. For example, cultural objects such as books were less available for children as the number of children in the family increased (Blake, 1981). Downey (1995) found that the parental resources such as frequency of talk, educational objects in the home or cultural activities were more available to the children with few siblings than the children with many siblings.

In this thesis, I also used the Ecological Systems Theory (Bronfenbrenner, 1979) to formulate hypotheses on the effects of birth of a sibling on the older child's externalizing behaviors. Bronfenbrenner (1994) stated that understanding human development can be done by considering the entire ecological system in which the development occurs. According to this theory, while the system in which the children live influences them, they influence their environment as well. There are five subsystems in this theory: microsystem, mesosystem, exosystem, macrosystem, and chronosystem. In this study, the focus is on the microsystem and the chronosystem. The microsystem was defined as the complex of the relations between the developing person and environment in a setting which includes that person such as home (Bronfenbrenner, 1977). The chronosystem was defined as the transitions, environmental events and shifts in one's life. The birth of a sibling is a transition that older children went through in their lives and in this thesis the influence of this transition on older children's externalizing behaviors was examined.

From the components of Bronfenbrenner's formulation of theory (1977), The Process-Person-Context-Time (or PPCT) Model (Bronfenbrenner, 2005) emerged. The process involves merged and dynamic relation of the individual and the context. Person stands for relatively unchanging individual characteristics such as biological, cognitive, emotional, and

behavioral. Context comprises the merged systems of the ecology of human development. Lastly, time involves multiple dimensions of temporality such as family developmental time, real time and child's age.

Bronfenbrenner and Morris (as cited in Bronfenbrenner, 2005) proposed that the power of the process to influence development differs as a function of the characteristics of the developing person, immediate environment (i.e., context), and the time in which the processes occur. I used the role of the person, context, and time in the strength of the process to influence the development in this study. I examined the association between the birth of a sibling and older child's externalizing behaviors in the current study and while doing that I took into account the older child's characteristics (person), parental resources and real time interactions (process), maternal characteristics and family economic well-being (context), and the differences in externalizing behaviors of the older child before and after the birth of a sibling (time).

2.2 Developmental resources after sibling birth

The developmental resources in this study comprise three types of resources: emotional resources, cognitive resources, and regulatory resources. After the birth of a sibling, mothers may have less time for play, less money to buy new materials for their children, less energy to do activities with them, and they may show less empathy and less patience towards their children. These changes in mothers' behaviors are examples for changes in developmental resources after the birth of a sibling.

2.2.1 Emotional resources

The positive mother-child interaction and warm/nurturing parenting are examples for emotional resources (Barber & East, 2009). In this study, mothers' positive affect (warmth)

was used as emotional resource that is provided to the older child. It is expected that after the birth of a sibling emotional resources decrease.

Taylor and Kogan (1973) investigated the interactions of mothers and their firstborn children and found that after the birth of a sibling the mothers and the firstborn children exhibited less warmth to each other during interactions compared to before the birth of a sibling. Similar to this study, Baydar, Greek, and Brooks-Gunn (1997) investigated the changes in the family environment after the birth of a sibling. They found that the sibling birth influenced the positive interactions between the mother and the older child negatively.

A longitudinal study conducted in Brazil examined the preschool children's home environment from birth to their fourth year of life (Anselmi, Piccinini, Barros, & Lopes, 2004). The results showed that as the number of children in the family increased, the positive affective interactions provided to the older child diminished.

Kowaleski-Jones and Dunifon (2004) investigated the influence of the birth of a sibling on emotional support that was provided to the older children in the family. The results of their study showed that during the pregnancy, the emotional support provided to the older child was higher but after the birth of a sibling it decreased.

2.2.2 Cognitive resources

Learning materials and opportunities for skill development in the home are examples of cognitive resources that are provided to the children (Barber & East, 2009). In this study, verbalizations of mothers and materials at home were used as cognitive resources and are expected to decline after the birth of a sibling.

Menaghan and Parcel (1995) investigated the effect of the birth of an additional child on the older child's home environment. The quality of the home environment was measured

by the shortened version of the HOME scales (HOME; Caldwell & Bradley, 1984) which included maternal report items to assess the stimulation provided to the target child and interviewer observation items to observe the interaction between the target child and the mother. They found that the stimulation provided to the older child decreased after the birth of an additional child.

Kowaleski-Jones and Dunifon (2004) examined how the birth of a sibling influenced the cognitive stimulation that was provided to the older children in the family. They measured the developmental resources before, during, and after the birth of a sibling. Contrary to the findings of decreased stimulation (Menaghan & Parcel, 1995) and no change in the opportunities for skill development in the short term (Baydar, Greek, & Brooks-Gunn, 1997), they found that the cognitive stimulation provided to the older child increased after the birth of a sibling.

The discrepancy between these results might be related to the age of the older children in these studies. Cognitive stimulation provided to a child increases as the child grows up. Especially when a child starts school, an increase is predicted for the learning materials provided to the child. Therefore, families may have compensated for the decrease in their emotional support to their children by providing an enriching environment in the study of Kowaleski-Jones and Dunifon (2004) because these children were either going to school or had started school during the study. On the other hand, in the study of Menaghan and Parcel (1995) the children were between the ages of 3 and 6. The socioeconomic status of the samples might also account for the differences in findings. Although the samples of three studies (Baydar, Greek, et al., 1997; Kowaleski-Jones & Dunifon, 2004; Menaghan & Parcel, 1995) were U.S. national samples, the incomes of the families differed from each other. As a result, the materials that parents could provide to their children for their cognitive stimulation such as toys, books or computers might differ due to the differences in economic status.

2.2.3 Regulatory resources

Parents can teach their children to regulate emotions, behaviors, and focus attention to help them achieve their goals. They can provide these resources by encouraging them, being attentive, and following their lead during play. In this study, I considered mothers' positive control (e.g. use of praise), negative control (e.g. use of physical control), and responsiveness as regulatory resources.

Dunn and Kendrick (1980) found that after the arrival of a sibling maternal playful attention declined. When compared to pre-sib-birth observations, they found out that maternal giving, showing or pointing out objects, helping the child, or making suggestions decreased after the birth of a sibling. They also found that while maternal control episodes increased, positive comment on child action decreased at post-sib-birth observations. Stewart and his colleagues (1987) investigated familial interaction patterns after the birth of a sibling. They observed family members in a semi-structured play session to get information about changes in these patterns. Their results showed that after the sibling birth, parents gave less prescriptive and proscriptive commands to the older child compared to before the sibling birth.

2.3 Externalizing behaviors of the older child after sibling birth

Sibling birth is an important experience for the older children in the family because this experience can result in remarkable changes in the behavior of the older children (Dunn, Kendrick, & MacNamee 1981; Kendrick & Dunn, 1980; Stewart, Mobley, Van Tuyl, & Salvador, 1987). Some children might react to this transition by exhibiting externalizing behavior problems such as aggression, noncompliance, and defiance.

The changes that the older children experience after the birth of a sibling can result in increases in their behavior problems (Dunn, Kendrick, & MacNamee, 1981). Baydar, Hyle,

and Brooks-Gunn (1997) investigated the effects of the birth of a sibling on the older child during preschool and early grade school years. They found that the behavior problems of older children significantly increased after the birth of a sibling. The causes for this increase might be a decline in positive interactions with the mother, an increase in punitive parenting by the mother, a decline in opportunities for skill development, or a decline in economic well-being. Kolak and Volling (2013) examined the firstborn's adjustment after the birth of a sibling. They looked at the behavior problems of firstborns before and after the sibling birth. The age range of the firstborns was from 12 months to 69 months at the sibling's birth. The results showed that pre- to post-birth, externalizing problems of children showed a significant increase.

2.4 Direct versus mediated effects of the birth of a sibling

The sibling birth might influence the behavioral adjustment of the older children directly in that the disturbance and negative behaviors to the mother in firstborn children increase after the birth of a sibling (Dunn & Kendrick, 1980). This increase might be due to their unfulfilled requests like staying close to the mother or spending more time with the mother. Stewart and his colleagues (1987) found that following the sibling birth, older children's confrontations and aggression increased. Similarly, Dunn and her colleagues (1981) found that according to mother reports, negative behaviors toward the mother increased after the birth of a sibling. However, rather than seeing the behavioral differences of the older children as a direct function of the birth of a sibling, I also see the indirect influences of multiple changes in other aspects of the family on behavioral adjustment of the older children.

Bradley (1993) demonstrated the importance of children's home environment in shaping their development. Other researchers also showed that children may exhibit

behavioral problems if their parents do not provide them with adequate age-appropriate learning materials or the experience of social interaction in the family context (Baydar et al., 2010; Bradley, 1993; Rijlaardsam et al., 2013). The input of the parents will not be sufficient unless they provide a secure emotional environment to their children. The changes in the developmental resources provided to the older child after the sibling birth might be responsible for the changes in the older children's behavioral adjustment (Volling, 2005). Three developmental resources were used in this study (emotional, cognitive, and regulatory) and were expected to mediate the influence of the birth of a sibling on older child's externalizing behaviors.

Studies have shown that emotional resources provided to the older child decreased after the birth of a sibling (Kowaleski-Jones & Dunifon 2004; Taylor & Kogan, 1973). On the other hand, low maternal warmth (Miller et al., 1993) and high maternal negativity (Rubin et al., 2003) was found to be negatively related to higher rates of externalizing behaviors in children. Therefore, it is expected that the change in emotional resources might mediate the influence of the sibling birth on externalizing behaviors.

In this study, verbalizations of mothers and materials at home are determined as cognitive resources. After the birth of a sibling, cognitive resources such as stimulation with play (Anselmi et al., 2004), cognitive stimulation (Menaghan & Parcel, 1995), frequency of talk (Downey, 1995), and initiation of play and verbalizations (Dunn & Kendrick, 1980) declined. Egeland and his colleagues (1990) found that less cognitive and language stimulation at home was associated with emergent behavior problems of children. These differences in cognitive resources showed that the change in externalizing behaviors of children after the birth of a sibling might be mediated by the change in cognitive resources.

Regulatory resources in this study are positive and negative behavioral control and responsiveness of the mothers. Studies have shown that mothers' attentiveness and responsiveness to the firstborn children decreased after the birth of a sibling (Dunn & Kendrick, 1980; Kendrick & Dunn, 1980). Rothbaum and Weisz (1994) found that caregiving variables such as approval, guidance, and motivational strategies were negatively associated with externalizing behavior in children. In addition, while high and low levels of maternal behavioral control can predict high levels of externalizing behaviors in children (Akcinar & Baydar, 2014), positive controlling and responsive parenting might prevent the child from developing externalizing behavior problems (Karreman et al., 2009). Baydar, Greek, and Brooks-Gunn (1997) found that experiencing the birth of a sibling did not significantly affect the children's scores on the behavior problem index. However, they found that the number of behavior problems in children increased when there was an increment in physically punitive parenting behaviors.

Studies have indicated that after the birth of a sibling the interaction between the mother and the older child changes. That is, there was a decrease in interactions (Baydar, Greek, & Brooks-Gunn, 1997; Stewart et al., 1987) and an increase in confrontations (Dunn, Kendrick, & MacNamee, 1981). These changes in interactions after sibling birth might predict the changes in externalizing behaviors of children.

Research has suggested that while some parenting dimensions such as warmth, responsiveness, teaching, and stimulation play an important role in the development of socially competent behavior in children, an absence of these parenting qualities or negative control are likely to be related to behavior problems in children (Campbell, 1994).

In addition to the mediational role of changes in parental resources and real time interactions, the changes in mothers' emotional states might mediate the influence of the

sibling birth on externalizing behaviors and be responsible for the changes in the older child's adjustment (Volling, 2012). Maternal postpartum depression can be an important risk factor for maladjustment of firstborn children after the birth of a sibling (Goodman, 2007) because it is one of the most common complications that affect women after childbirth (Horowitz & Goodman, 2004). Research has shown that parental depression was related to externalizing behaviors in children (Fisher et al., 2015) and more behavior problems have been found in children with depressed mothers (Campbell et al., 2007). Therefore, maternal depression might have a mediator role in the association of the birth of a sibling on the older child's externalizing behaviors.

2.5 Moderating role of older child's characteristics

The patterns of adaptation following the first year after the birth of a sibling can show different trajectories for children. Some children might have no traces of disruption during this year, some children's initial upset might result in a decline sooner or later, and some children might show persistent and salient problem behaviors (Volling, 2005). The older child's characteristics such as age and temperament might be the key factors for how they will handle the birth of a sibling. Research has shown that more problems were reported among younger firstborns compared to older firstborns after the birth of a sibling (Dunn, Kendrick, & MacNamee, 1981; Volling, 2012). Difficult temperamental characteristics might complicate the children's transition to siblinghood. Higher negative mood, emotional reactivity, and activity level in older siblings resulted in having more adjustment problems following the birth of a sibling compared with older siblings who were low in those characteristics (Volling, 2012).

The developmental resources that are provided to the older child are expected to show some changes after the birth of a sibling; these changes might be moderated by the older

child's gender. Kowaleski-Jones and Dunifon (2004) found that cognitive stimulation that is provided to the older children at home showed significant decline for boys if there was an impending birth of a sibling. Similarly, Barber and East (2009) found that after a sibling birth cognitive support from parents to the children showed a significantly larger decline for male children compared to female children. These two studies indicated that cognitive stimulation provided to the male children started to decline during the pregnancy and continued to decline after the birth of a sibling. Kowaleski-Jones and Dunifon (2004) claimed that this decline might be related to parents' reallocation of resources even prior to the birth.

2.6 Objectives of the study

This thesis has five main objectives. First, using maternally reported and observational data, the parental resources provided to the older child at pre- and post-birth interviews are examined. Second, using observational data, the real time interactions that were recorded at pre- and post-birth interviews are examined. Third, using longitudinal maternal interview data, the older children's externalizing behaviors at pre- and post-birth interviews are compared. Fourth, the mediational role of developmental resources in the link between the sibling birth and the older child's externalizing behaviors is examined. Fifth, the role of older child's and family's characteristics in the association of the changes in parental resources with the change in older child's externalizing behaviors after the birth of a sibling is investigated.

2.7 Hypotheses

1. It was expected that sibling birth would predict developmental resources that parents provided after the birth of a sibling. That is there would be a decrease in some developmental resources (e.g. mother's positive affect) while there would be an increase in some developmental resources (e.g. mother's negative control) for children who experienced the sibling birth.

2. It was expected that sibling birth would predict maternal depression after the birth of a sibling that an increase was expected in post-birth maternal depression.
3. Sibling birth was expected to predict externalizing behaviors of older children such that an increase in externalizing behaviors was predicted for children who experienced the sibling birth.
4. It was expected that there would be a change in developmental resources and maternal depression after sibling birth. Therefore, it was predicted that the developmental resources and maternal depression at post-birth interview would mediate the link between the birth of a sibling and older child's externalizing behaviors.
5. It was suggested that some children might be at risk for being influenced more from the birth of a sibling. Therefore, it was predicted that there would be an association between sibling birth and parental resources with child externalizing behaviors for children who were highly reactive, lived in a family with lower economic well-being, younger or provided low parental resources at pre-birth interview.

Chapter 3

METHOD

3.1 The structure of the data

The data were taken from the study of Early Childhood Developmental Ecologies in Turkey (ECDET; Baydar, Küntay, Gökşen, Yağmurlu, & Cemalcılar, 2010) which is a 5 year longitudinal study with a nationally representative sample. The sample of the ECDET study was composed of 1,052 children (aged 36-47 months at the 1st wave) and their mothers. The data used in the present study were obtained from the five waves of the ECDET study which included interviews with the mothers and observations by trained interviewers in the home of participants. There were two kinds of observations: HOME observations (quantitative) and intensive (qualitative) observations. HOME observations were coded live by the interviewers for all participants and the intensive observations were video recorded and coded later and were implemented only with a sub-sample of the participants (123 children and their mothers from the four metropolitan areas in Turkey) that participated in an observation protocol during the five-year data collection. Due to the high cost, the observation protocol could not be implemented with the larger sample.

3.1.1 Defining pre- and post-birth interviews

In the present study, I wanted to reveal the association between the birth of a sibling and developmental resources, and externalizing behaviors of the focal child. In order to examine

this association, first, the children who had no younger siblings at the ECDET study's first wave data collection and experienced a sibling birth during the five-year survey were determined (N = 253, 24 %). During data collection, the change in the number of children at home was tracked starting from wave 2 by asking mothers "Since our last interview, did a new child join your family or did you give birth to a child?" during interviews. Thus, the time points when the focal children experienced a sibling birth during the study were observed.

There were five time points of observation in this study, and I used two of them: pre-birth and post-birth. Pre-birth time point refers to the interview immediately before the birth of a sibling. Post-birth time point refers to the interview immediately after the birth of a sibling. For instance, if the focal child experienced the birth of a sibling between the second and third waves of the study, the pre-birth interview of the focal child was wave 2 and the post-birth interview was wave 3. In order to examine the effect of the birth of a sibling, each participant's data from pre- and post-birth interviews were used.

3.1.2 Identifying matched controls

After determining the children who experienced a sibling birth during the study, children who did not experience a sibling birth during the study were identified in order to select matched controls among them for the focal group. I used matched controls for the analyses because they served as a baseline to control for maturational changes of children. From here on, I refer to the group of children who experienced a sibling birth during the study as the focal group and their matched controls as the matched control group. Two different data (quantitative and qualitative) were used in this study, thus the matching procedures were different from each other. I explain each matching procedures separately below.

Procedures to identify matched controls for Study 1

For Study 1, first I determined two prerequisite variables for the procedure: the focal child's sex and the province that focal child lives in. Then, from the sample, possible matched cases which were matched with cases in the focal group by focal child's sex and the province the focal child lives in were determined. Next, I selected the following variables that were used to further refine the matching: economic well-being, parity *(ranging between 1 to 9),* number of children at home *(ranging between 1 to 4),* education of mother *(ranging between 1-not graduated from primary school to 5-graduated from university or a college)*, education of father *(ranging between 1-not graduated from primary school to 5-graduated from university or a college)*, and the neighborhood that the focal child lives in *(ranging between 1 to 4)*. For each variable to be considered a match, the values of the focal case and the possible matched case should have been the same except for economic well-being. The economic well-being of the family was determined as a factor score ($\bar{X} = 0$, $SD = 1$) based on four indicators: the material possessions of the family, the maternal report of the monthly per-person expenditures of the family, the value of the residence of the family reported by the mother in terms of actual or estimated monthly rent, and the quality of the physical environment (e.g. "Building appears safe") scale score from the Turkish adaptation of the Home Observation for Measurement of the Environment (HOME; Bradley & Caldwell, 1979). For economic well-being score, I took all values within 0.5 *SD* of the value for the focal child (See Section 3.2).

Later, for matching procedure eight criteria and their priority scores were determined (See Table 3). To give a priority score to a possible matched case, the values of the selected variables were compared to see how similar the characteristics of possible matched cases with the focal case. For instance, if there is a match on economic well-being, parity, and education

of mother between a possible matched case and a focal case, that possible matched case was given the priority score 5.

Table 3.1

The Variables and the Priority Scores for Matching Procedure

priority scores	economic well-being	parity	number of children at home	education of mother	education of father	neighborhood that focal child lives in
1	√	√	√	√	√	√
2	√	√	√	√		√
3	√	√	√	√		
4	√	√	√		√	
5	√	√		√		
6	√		√	√		
7	match on any three of the six variables					
8	match only the focal child's sex and the province the focal child lives in and fewer than three of the six variables					

Note. Check marks were used to indicate whether there was a match.

After assigning scores to possible matched cases, for each case in the focal group multiple cases were identified as matched controls. However, a matched case could be a potential match for multiple focal cases. Therefore, an analysis was done to select the match that was best or that was just a little bit worse than the best match and at least three matches were permitted for each case in the focal group. Then, the matched control group was identified after eliminating duplicate possible matched cases. As a result, for each case in the

focal group at least one and at most three cases were included as a matched case (*N* = 307, 29%). From here on, I refer to these matched cases as the matched control group.

After selecting the matched control group, the pre-birth and post-birth interviews were determined according to focal group which they were assigned to as a match. For instance, if the child in the focal group experienced the birth of a sibling between the second and third waves of the study, the matched pre-birth interview of the matched case of that child was wave 2 and the matched post-birth interview was wave 3.

Procedures to identify matched controls for Study 2

For Study 2, first the children and their mothers who participated in the observational protocol were selected (*N* = 123, 12%). Among these children who did not have a younger sibling at ECDET study's first wave of data collection and experienced a sibling birth during the five-year survey were determined (*N* = 33, 27%). The pre-birth and post-birth interviews of these children had already been identified and the procedure is described above (See Section 3.1.1). From here on, similar with the Study 1, I refer to these children as focal group.

For matching procedure of Study 2, first I selected the following variables that were used to find matched cases for focal group: the focal child's sex, number of children at home *(ranging between 1 and 4)*, and the province that the focal child lives in. I used different criteria for matching procedure of the qualitative data because as I explained above only 12% of participants participated in the observation protocol. Therefore, I had a small subsample for finding matched cases.

After identifying matching variables, the values that focal cases had for each matching variable were determined. Among the possible matched cases those that had the same values with the focal cases were listed. Multiple cases were identified as matched controls for each

focal case. However, a matched case should be a potential match only for one focal case. Hence, duplicate cases were eliminated in such a way that at least one matched case was assigned to each case in the focal group (N = 68, 55%). For instance, a matched case was matched with only one focal case but a focal case might have matched with more than one matched cases (See Table 3.2).

Table 3.2

Examples for the Focal Cases and the Matched Cases Which Were Assigned to Them

cases	
focal	matched
15	10
	13
	14
21	23
22	137
	410
	612
	614
	624
46	11
	12
47	17
	43
69	68
	171
121	195
	201

Note. The numbers refer to case numbers that were assigned to each case.

Similar with Study 1, from here on I refer to these matched cases as matched control group. After selecting matched control group, their pre-birth and post-birth interviews were determined according to the focal cases to which they were assigned as a match. For instance, if the child in the focal group experienced the birth of a sibling between the second and third waves of the study, the matched pre-birth interview of the matched case of that child was wave 2 and the matched post-birth interview was wave 3.

3.2 Measures

In the current study both quantitative (interview) and qualitative (observational) data were used. Quantitative data were collected by questionnaires that are administered by interviewers to participating mothers and HOME observations, and qualitative data were collected by coding mother-child interactions from video recordings. In this section, the quantitative and qualitative measures are presented, respectively.

Eyberg Child Behavior Inventory – TR

Eyberg Child Behavior Inventory (ECBI; Eyberg & Robinson, 1983) assesses the behavior problems in children between the ages of 2 and 17. It consists of 36 items which are rated by mothers considering the frequency of the behavior (Intensity Scale).The internal reliability of the intensity scale was found to be 0.95 (Robinson, Eyberg, & Ross, 1980).

In this study, the data collected by using the translated and adapted version of the ECBI (Kumru, Sayıl, & Yağmurlu, 2006) was used to examine the changes in older children's externalizing behaviors before and after the birth of a sibling. The ECBI-TR includes 36 items (e.g. "Fights with peers", "Whines", "Argues with the parents about rules"). Mothers rated the frequency of their children's behavior on 5-point scales instead of 7-point scales as in the original version in order to make easier for mothers to rate the items

The internal reliabilities of ECBI-TR scale were examined by considering scores the focal children got at pre-birth interview and post-birth interview and the reliabilities were found to be satisfactory. The internal reliability scores of total intensity scale for pre-birth interview are 0.93, 0.94, 0.95, and 0.92 for wave 1, wave 2, wave 3, and wave 4 respectively. On the other hand, the internal reliability scores of total intensity scale for post-birth interview are 0.95, 0.95, 0.91, and 0.93 for wave 2, wave 3, wave 4, and wave 5 respectively.

Home Observation for Measurement of the Environment (HOME) – TR

The Home Observation for Measurement of the Environment (HOME; Bradley & Caldwell, 1984) is used to systematically assess the environment in which the child is reared. In this study, the Turkish adaptation of the Home Observation for Measurement of the Environment (HOME-TR; Baydar & Bekar, 2007) was used. The original measure consisted of observations and an unstructured interview but in large scale surveys, the HOME items included observations and structured questions.

There are 2 versions of HOME-TR and both versions were used in this study. The first one is for 3-4-5 year old children and the second one is for 6-7 year old children. The first version includes 52 items and 7 subscales. The five of these subscales were used in this study: the learning materials in the home for children (e.g. “Child has toys which teach colors, size, and shapes”), responsiveness (e.g. “Mother holds child close at least 5 minutes during the visit”), variety of experiences (e.g. “Did you go to a trip to somewhere else (to a prairie, village, town or city) with your child during last year?”), use of harsh discipline (e.g. “Mother conversed with the child in a harsh manner, scolded at or derogated him more than once during a visit”), and academic stimulation (e.g. “Child recognizes his/her name”). There are 10 items in the learning materials scale, 8 items in the responsiveness scale, 4 items in the

variety of experiences scale, 6 items in the use of harsh discipline scale, and 6 items in the academic stimulation scale.

The second version includes 45 items and 6 subscales. The four of these subscales were used in this study: the learning materials in the home for children (e.g. “Child has a real or toy musical instrument”), responsiveness (e.g. “Mother praises child at least two times during the visit”), variety of experiences (e.g. “Did you go to a trip to somewhere else (to a prairie, village, town or city) with your child during last year?”), and power assertive parenting scale (e.g. “Mother talked badly about her child or declared that her child made her angry”) (Baydar & Bekar, 2007). There are 8 items in the learning materials scale, 10 items in the responsivity scale, 12 items in the variety of experiences scale, and 6 items in the power assertive parenting scale. There was not an academic stimulation scale in the second version of HOME-TR. Therefore, I determined 6 items (e.g. “Do you encourage your child to read a few words?”) from this version which could be constituted a scale and interpreted as academic stimulation. First, I conducted factor analysis and results showed that factor loadings of these items were ranging from 0.42 to 0.69 and 0.50 to 0.78 for age 6 and age 7 items respectively. Then, I conducted reliability analysis with these items and the internal reliability scores are 0.64 and 0.74 for age 6 and age 7 respectively. Last, in order to use these items as an academic stimulation scale, I calculated z-scores of the academic stimulation scores.

In this study, 3 subscales of both HOME-TR versions were used to measure: Learning materials, responsiveness, and variety of experiences. Cronbach alpha values of all subscales were written respectively. The internal reliability scores for the first version (age 3-4-5) are 0.91, 0.90, and 0.89, for learning materials scale, 0.82, 0.84, and 0.86, for responsiveness scale, 0.55, 0.53, and 0.57, for variety of experiences scale, and 0.62, 0.57, and 0.61 for use of

harsh discipline scale, and 0.79, 0.76, and 0.83 for academic stimulation scale for wave 1, wave 2, and wave 3 respectively. The internal reliability scores for the second version (age 6-7) are 0.77 and 0.79 for learning materials scale, 0.87 and 0.92 for responsiveness scale, 0.76 and 0.83 for variety of experiences scale, and 0.42 and 0.56 for power assertive parenting scale, and 0.64 and 0.74 for academic stimulation scale for wave 4 and wave 5 respectively.

In both versions, I used same 3 scales (learning materials, responsiveness, and variety of experiences). On the other hand, I used the use of harsh discipline scale from the first version and the power assertive parenting scale in the second version which was constituted by items from the HOME interview. Same items were included in both the use of harsh discipline scale and the power assertive parenting scale. In addition, since second version of HOME-TR did not include an academic stimulation scale, as I explained above I constructed an academic stimulation scale for this version.

Maternal Depression

Mothers' depressive symptoms were measured with the Turkish adaptation of the Brief Symptom Inventory (BSI; Derogatis, 1992), which is a 53-item self-report measure that assesses psychiatric symptoms. As in the original, the Turkish version of this scale (Sahin & Durak, 1994) has 53 items and 10 subscales (depression, anxiety, hostility, somatization, obsessive-compulsive, interpersonal sensitivity, phobic anxiety, paranoid ideation, psychotic, and additives). Items are rated on a 5-point Likert scale. In this study, I used 6-item depression subscale to measure mothers' depressive symptoms after the birth of a sibling.

Short Temperament Scale for Children

Focal children's temperamental characteristics were measured with the translated and adapted version of the Short Temperament Scale for Children (STSC; Prior, Sanson, &

Oberklaid, 1989). In this version (Yağmurlu & Sanson, 2009), the scale includes 30 items and 4 subscales (approach, persistence, rhythmicity and reactivity) which are rated by mothers on a 5-point Likert scale. In this study, I used the reactivity subscale to examine the moderating effect of the older child's temperament in the relation between birth of a sibling and the externalizing behaviors. There are 9 items in the reactivity subscale (e.g. "If my child resists some activity such as having hair brushed, he/she will continue to resist it for months."). The internal reliability of reactivity subscale is 0.75 (Baydar et al., 2008).

Economic Well-Being

The economic status of the family was determined as a factor score ($\bar{X} = 0$, $SD = 1$) based on four indicators (see below): (1) the material possessions of the family, (2) the maternal report of the monthly per-person expenditures of the family, (3) the value of the residence of the family reported by the mother in terms of actual or estimated monthly rent, and (4) the quality of the physical environment (e.g. "Building appears safe") scale score from the Turkish adaptation of the Home Observation for Measurement of the Environment (HOME; Bradley & Caldwell, 1979).

The indicator of material possessions was composed on the basis of ownership of 12 material possessions containing basic durable goods such as refrigerator and television, and nonessential items which represent further economic well-being such as computer, car and a credit card. Per-person expenditures of the family were estimated by dividing the maternal report of total expenditures of the household by the number of members of the household as reported in the demographic questionnaire. The third indicator was reported by the mother in terms of the actual monthly rent or, if they owned their home, how much they would have paid for their home for monthly rent. Last, for the quality of the physical environment, the

interviewers rated the residence and its immediate surroundings in terms of its safety, and the quality of living spaces (HOME-TR; Baydar & Bekar, 2007).

Birth Order

In order to control the birth order of the children, a dummy variable was created indicating 1 = firstborn child and 0 = later born child. If the child had no older sibling who was born before him/her and experienced a sibling birth during the study, that child was accepted as firstborn child. On the other hand, if the child had an older sibling who was born before him/her, that child was accepted as later born child.

School Status

In order to examine whether going to school before the birth of a sibling or starting school during the inter-survey interval, two dummy variables were created for school status. First dummy variable indicated 1 = children who were already at school at baseline and 0 = everyone else. Second dummy variable indicated 1 = children started school during the inter-survey interval and 0 = everyone else. The data for school status of children were obtained by the mothers' answers to the question of "Currently does your child go to preschool or first grade?"

Presence of Extended Family Member

In order to investigate whether the presence of an extended family member for caring for the child had an impact on the influences of sibling birth, this variable was taken as a control variable. There were 9 categories for extended family members; 1 (mother), 2 (mother-in-law), 3 (grandmother), 4 (daughter-in-law), 5 (sister-in-law), 6 (daughter of brother-in-law), 7 (aunt), 8 (sister), and 9 (aunt-in-law). There were other extended family

members who lived with the family but I chose only female relatives because only they might be responsible for caring for the child.

Parent-Child Interaction System (PARCHISY)

The quality of the mother-child interaction was measured by coding the 10 min video-recorded observations of the mothers and the focal children during a structured task where the child and the mother play with legos to construct predetermined lego figures. The videotaped mother-child interactions were coded by trained graduate and undergraduate students using the Parent-Child Interaction System (PARCHISY; Deater-Deckard, Pylas, & Petrill, 1997). The training of students had three steps. First, they learned every item and their ratings. Second, they watched training videos with me and rated items in a collaborative process. Last, 15 videos were given to the students and they were asked to rate the videos individually. Then, the ratings of the students were examined in terms of the inter-rater reliability with me. The inter-rater reliability was established by assessing the consistency between each student's ratings and my ratings for the videos.

The original PARCHISY consists of 7 items that refer to mother's behaviors (e.g. positive and negative content/control, responsiveness, on task, and verbalizations), 8 items referring child's behaviors (e.g. positive and negative affect, noncompliance, autonomy/independence, activity), and 3 items that refer to mother-child interactions (reciprocity, conflict, and cooperation). The variables are rated on a 7-point scales ranging from 1 *(no instances)* to 7 *(constant, throughout interaction)*.

For this study, a Turkish version of the Parent-Child Interaction System (PARCHISY-TR) was developed (Çeviker, 2014 - See Appendix A) to score the videotaped mother-child interactions during a 10 minute structured observations. The original PARCHISY manual was translated into Turkish and the following changes were made: A new child's behavior item

(oppositional defiant) was added and variables were rated on 5-point scales ranging from 1 *(no instances)* to 5 *(constant, throughout interaction)*. Oppositional defiant behavior was added because I estimated that there might be an association between child's defiant behavior and the birth of a sibling. In addition, I changed the rating system from 1 to 7 to 1 to 5 in order to evaluate of the mother-child interaction per minute clearly. The definitions and the examples of mother, child, and dyadic items used in the present study are given in Table 3.2.

The data for the present study came from the interactions of 33 (focal group) and 68 (matched control group) mother-child dyads that were coded by trained graduate and undergraduate students. 10 minute structured observations were divided into 1-minute sections and items were coded per minute (See Appendix B). The inter-rater reliability scores of the items were satisfactory. The ranges were 0.86 - 0.98 for total mother items, 0.70 - 0.96 for total child items, and 0.70 - 0.95 for total interaction items.

Table 3.3

Definitions and Examples of PARCHISY Mother, Child, and Dyadic Codes

Category	Definition	Example
Mother Codes		
Positive Content (control)	Use of praise, explanation, and open-ended questions	- Which lego should we put there? - Well done - We have to put it there to leave a space
Negative Content (control)	Use of physical control of legos or child's hand/arm/body, use of criticism	- No, don't do that - I won't let you to watch TV if you don't finish this
Positive Affect (warmth)	Smiling, laughing, using endearments	- My love, my dear, my baby
Negative Affect (rejection)	Frowning, cold/harsh voice	- You can not do this well - If you don't listen to me, I won't play with you
Responsiveness	Responsiveness to child's questions, comments, and behaviors – either verbal or behavioral	- Watching child's behaviors during task - Responding child's questions/comments
On Task – Initiative/Persistence	Persistence is with respect to the task that was given to them, doing other structures with legos does not qualify as completing the task	- Focusing what the child's doing during task - Encouraging child by saying "You can do that"
Verbalisations	Except nodding and saying "Hmm" each utterance are accepted as verbalisations	
Child Codes		
Positive Affect (warmth)	Smiling, laughing, using endearments	- Mummy - I love you
Negative Affect (rejection)	Frowning, cold/harsh voice	- I don't want to play with you - Don't touch this - Go away
Responsiveness	Responsiveness to mother's questions, comments, and behaviors – either verbal or behavioral	- Observing mother during task - Responding mother's questions/comments
On Task – Initiative/Persistence	Persistence is with respect to the task that was given to them, doing other structures with legos does not qualify as completing the task	- Focusing on the structure and trying to do it with legos

Noncompliance	Showing noncompliance either in an active or a passive way	- Refusing to put the lego that mother gave to the child either verbal or behavioral (active) - Pretending not heard the mother's suggestions (passive)
Autonomy/ Independence	Child leads and controls task, does not include off-task behaviors	
Activity - Energy	Includes all minor body movements and major body movements, not including fine motor manipulation of legos	- Moving arms, pointing to lego or picture that was given - Jumping up and down, getting up and sitting down
Verbalisations	Except nodding and saying "Hmm" each utterance are accepted as verbalisations	
Oppositional defiant	Reacting/opposing mother's suggestions or comments with negative words or behaviors	- Responding to mother's suggestions by yelling, throwing legos or hitting mother
Responsiveness	Responsiveness to mother's questions, comments, and behaviors – either verbal or behavioral	- Observing mother during task - Responding mother's questions/comments
Dyadic Codes		
Reciprocity	Shared positive affect, eye contact, a turn-taking quality of interaction	- Being happy when the structure is done or laughing when the structure breaks down - Talking/acting in turn
Conflict	Minor or major disagreement - mutual or shared negative affect; arguing, tussling over legos, etc.	- Mother: "You don't listen to me, I won't play with you." Child: "I don't care, do whatever you want."
Cooperation	Explicit agreement and discussion about how to proceed with and complete task	- Mother: "Shall we do this next?" Child: "Yes."

3.3 Statistical Methods

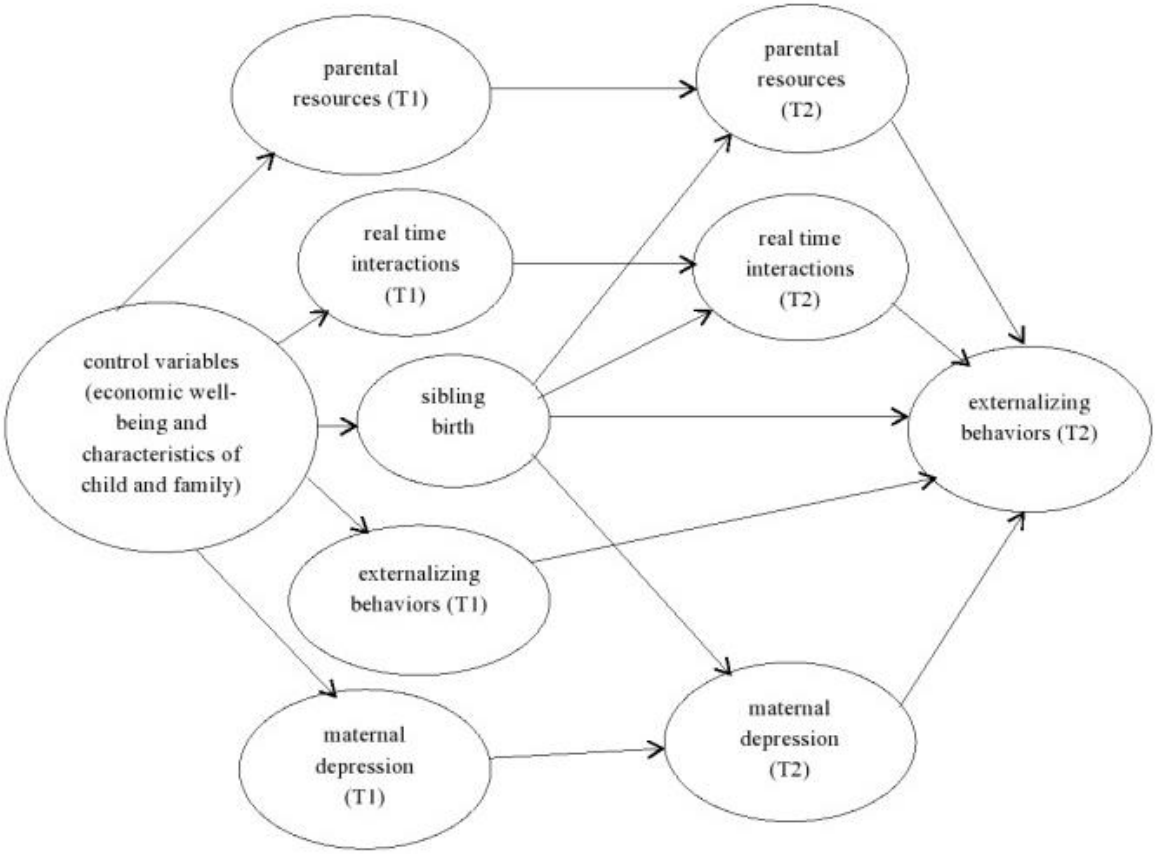
In the present study, preliminary descriptive analyses were conducted. Bivariate correlations of Study 1 and Study 2 variables prior to the birth of a sibling (baseline) were conducted to determine whether the variables were associated with each other. Then, correlations of baseline with the first survey after birth measures of the matched control group in both studies were conducted in order to see whether there was rank order stability.

Later on, multiple regression analyses were conducted to estimate the association between the birth of a sibling and changes in parental resources, maternal depression, and focal child's externalizing behaviors. Then, multiple regression analyses were conducted to estimate the association between the birth of a sibling and changes in real time interactions.

Mediation analyses were conducted to determine whether the changes in parental resources or the changes in real time interactions mediate the association between the birth of a sibling and externalizing behaviors of the focal child.

Last, subgroup analyses were conducted to estimate whether there is an association between the sibling birth and focal children's externalizing behaviors for children who were at risk (highly reactive, who lived in a family with lower economic well-being, between the ages of 3 and 4 or provided low parental resources during baseline). Figure 1 represents the model of the association that was estimated in the present study.

Figure 1. *The Model of the Association of the Birth of a Sibling with Parental Resources, Real Time Interactions, Maternal Depression, and Externalizing Behaviors*



Note: T1 = prior to the birth of a sibling, T2 = first survey after the birth of a sibling.

Chapter 4

RESULTS

The findings of the current study are presented in three sections: sample of the study; descriptive and bivariate analyses for Study 1 and Study 2 measures that include analyses to investigate the differences in developmental resources (parental resources and real time interactions) and child externalizing behaviors after sibling birth; and analyses to investigate the moderation of the effects of the sibling birth by parental resources, real time interactions, and focal child's and family's characteristics.

4.1 Sample

4.1.1 *Study 1*

The demographic characteristics of the participants of Study 1 are presented in Table 4.1. The sample for the Study 1 consisted of 560 mother-child dyads. Among those, 253 children were focal children, and 307 children were matched controls.

Of the 253 children in the focal group, 51.4% and of the 307 children in the matched control group 53.1% were male. The mothers in the focal group completed on average 5.85 years of education, similarly the mothers in the matched control group completed on average 5.57 years of education. 66.8% of children in the focal group and 61.8% children in the matched control group were firstborn children in their families. 29.2% of children in the focal group experienced the birth of a sibling between the ages of 3 and 4. The characteristics of the

focal group and matched control group were not statistically significantly different from each other. This indicated that the matching was successful.

4.1.2 *Study 2*

The demographic characteristics of the participants of Study 2 are presented in Table 4.2. The sample for the Study 2 consisted of 101 mother-child dyads. Among those, 33 children were focal children, and 68 children were matched controls.

Of the 33 children in the focal group, 66.7% and of the 68 children in the matched control group 54.4% were female. The mothers in the focal group completed on average 7.36 years of education, on the other hand the mothers in the matched control group studied on average 5.63 years. 69.7% of children in the focal group and 56% children in the matched control group were firstborn children in their families. 45.5% of children in the focal group experienced the birth of a sibling between the ages of 3 and 4. The characteristics of the focal group and matched control group were not statistically significantly different from each other.

The matching was not able to identify a control group for Study 2 that was as closely matched as in Study 1 because first, there were fewer participants in Study 2. In ECDET study, among the sample only 123 mother-child interactions were video-recorded. Therefore, there were limited possible cases for matching the 33 focal cases. Second, due to limited number of possible cases, I used fewer criteria for Study 2 compared to Study 1 in order to find match cases (See Section 3.1.2).

Table 4.1

Characteristics of the Study 1 Sample (N = 560)

Variables	Focal group (*N* = 253)	Matched control group (*N* = 307)	*t* / (X^2)	*p*
Focal child age (in months)	41.27 (3.62)	40.94 (3.49)	.74	.46
Mother's education (years)	5.85 (3.74)	5.57 (3.48)	.86	.39
Gender			(.86)	.35
Female	48.6%	46.9%		
Male	51.4%	53.1%		
Number of children			(4.77)	.19
1	39.9%	24.4%		
2	37.2%	43.6%		
3	14.2%	15.3%		
4 & 4+	8.7%	16.6%		
Birth order of the focal child			(32.82)	.78
1	66.8%	56%		
2	21.7%	25.4%		
3	6.7%	8.1%		
4	2.8%	4.6%		
5	.8%	2.9&		
6 & 6+	1.2%	3%		
Time of birth of the new sibling				
Birth between age 3 and 4	29.2%			
Birth between age 4 and 5	24.1%			
Birth between age 5 and 6	22.1%			
Birth between age 6 and 7	24.5%			

Note 1. The values are the means with the standard deviations in parentheses.

Note 2. The values for the focal child age and the mother's education belong to wave 1.

Note 3. The values are the t-test scores with the chi-square scores in parentheses.

Table 4.2

Characteristics of the Study 2 Sample (N = 101)

Variables	Focal group (*N* = 33)	Matched control group (*N* = 68)	*t* / (X^2)	*p*
Focal child age (in months)	40.21 (3.50)	41.36 (3.96)	1.29	.21
Mother's education (years)	7.36 (4.26)	5.63 (3.46)	1.91	.07
Gender			(.001)	.97
Female	66.7%	54.4%		
Male	33.3%	45.6%		
Number of children			(8.64)	.47
1	66.7%	23.5%		
2	21.2%	57.4%		
3	6.1%	11.8%		
4 & 4+	6.1%	7.4%		
Birth order of the focal child			(1.95)	.98
1	69.7%	61.8%		
2	18.2%	32.4%		
3	6.1%	1.5%		
4	3.0%	2.9%		
6 & 6+	3.0%	1.5%		
Time of birth of the new sibling				
Birth between age 3 and 4	45.5%			
Birth between age 4 and 5	12.1%			
Birth between age 5 and 6	24.2%			
Birth between age 6 and 7	18.2%			

Note 1. The values are the means with the standard deviations in parentheses.

Note 2. The values for the focal child age and the mother's education belong to wave 1.

Note 3. The values are the t-test scores with the chi-square scores in parentheses.

4.2 Descriptive and bivariate analyses

In this section first, the descriptive statistics for Study 1 and Study 2 are presented. Then, the correlations between Study 1 variables (baseline and first survey after birth of a sibling) and Study 2 variables (baseline and first survey after birth of a sibling) are presented. I refer to baseline as the time point prior to the birth of a sibling.

4.2.1 Descriptive statistics of Study 1

Descriptive statistics of Study 1 variables were compared to establish whether there were significant differences preceding the birth of the sibling. The means, standard deviations, and t-tests of study variables are presented in Table 4.3. The characteristics of the focal group and matched control group were not statistically significantly different from each other except for maternal depression.

Table 4.3

Descriptive Statistics for the Study 1 Sample at Baseline

Sample characteristics	Focal group *(N = 253)*	Matched control group *(N = 307)*	*t / (p)*	*N*
Focal child age (in months)	59.24 (14.61)	58.36 (14.42)	.70 (.49)	248
Economic well-being	-.14 (.94)	-.20 (.89)	.63 (.53)	238
Mother's education	5.85 (3.74)	5.57 (3.48)	.86 (.39)	253
Reactivity	49.87 (16.62)	50.18 (16.34)	.21 (.84)	253
Learning materials	38.98 (31.89)	40.29 (32.13)	.45 (.65)	241
Responsiveness	57.29 (28.72)	59.74 (29.56)	.99 (.32)	246
Variety of experiences	41.14 (21.63)	43.38 (24.11)	1.12 (.27)	248
Harsh discipline	14.12 (17.18)	11.85 (15.12)	1.46 (.15)	244
Academic stimulation	-.06 (1.01)	.07 (.98)	1.39 (.17)	248
Externalizing behaviors	31.28 (16.88)	31.62 (17.32)	.22 (.83)	248
Maternal depression	12.30 (15.55)	17.86 (21.48)	3.23 (.00)	248

Note 1. The values for economic well-being and reactivity belong to wave 1.

Note 2. The values are the means with the standard deviations in parentheses.

4.2.2. Correlations between variables of Study 1 prior to the birth of a sibling

Correlations among the variables of Study 1 were estimated. The correlations of the control variables (economic well-being, mother's education, and reactivity), parental resources (learning materials, responsiveness, variety of experiences, harsh discipline, and academic stimulation), maternal depression, and and child externalizing behaviors are presented in Table 4.4.

The family's economic well-being was positively associated with mother's responsiveness at baseline interview ($r = .35$, $p < .01$). Mother's education was positively correlated with academic stimulation provided to the child ($r = .40$, $p < .01$). On the other hand, child's reactivity ($r = .34$, $p < .01$) and maternal use of harsh discipline ($r = .32$, $p < .01$) were positively correlated with child externalizing behaviors at baseline interview (See Table 4.4.).

Table 4.4

Statistics for Study 1: Bivariate Correlations, Means, and Standard Deviations of Study Variables at Baseline

Variables	2	3	4	5	6	7	8	9	10	*M*	*SD*	*N*
1.Economic well-being	.56**	-.18**	.62**	.35**	.57**	-.15**	.42**	-.08	-.18**	-.14	.91	545
2.Mother's education	-	-.14**	.47**	.34**	.46**	-.15**	.40**	-.08	-.16**	5.76	3.56	560
3.Reactivity		-	-.17**	-.16**	-.14**	.18**	-.11**	.34**	.14**	49.66	16.38	560
4.Learning materials			-	.48**	.60**	-.17**	.55**	-.17**	-.09*	40.92	31.72	542
5.Responsiveness				-	.42**	-.19**	.38**	-.11**	-.05	58.58	29.11	545
6.Variety of experiences					-	-.14**	.52**	-.15**	-.16**	42.95	22.76	549
7.Harsh discipline						-	-.15**	.32**	.12**	12.93	15.90	543
8.Academic stimulation							-	-.10*	-.01	.02	.99	549
9.Externalizing behaviors								-	.25**	31.29	17.29	549
10. Maternal depression									-	14.92	18.66	549

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

4.2.3. Correlations of the pre-birth interview measures with the post-birth interview measures of the matched control group (Study 1)

The correlations of the measures of parental resources (learning materials, responsiveness, variety of experiences, harsh discipline, and academic stimulation) and child externalizing behaviors at pre-birth interview and with post-birth interview were estimated. These correlations are presented in Table 4.5. The table shows that there was rank order stability between parental resources and child externalizing behaviors for the matched control group at pre- and post-birth interviews.

Among the parental resources the highest correlation was between the learning materials. There was a positive correlation between the learning materials at pre-birth and post-birth interview ($r = .63$, $p < .01$). Second, the correlation between variety of experiences at pre-birth and post-birth interview was positive ($r = .55$, $p < .01$). Similarly, there was a positive correlation between the child externalizing behaviors and maternal depression at pre-birth and post-birth interview ($r = .50$, $p < .01$). The correlations at the table indicated that there was moderate rank order stability between the parental resources that were provided to the matched control group and the externalizing behaviors of matched control group at pre-birth and post-birth interviews.

Table 4.5

Correlations between Parental Resources, Maternal Depression, and Child Externalizing Behaviors for Matched Control Group (pre-birth with post-birth interviews)

Variables	*r*
Learning Materials	.63**
Responsiveness	.36**
Variety of Experiences	.55**
Harsh Discipline	.21**
Academic Stimulation	.41**
Externalizing Behaviors	.50**
Maternal depression	.50**

Note 1. **$p < .01$.

Note 2. *r* values stand for the correlations of variables at pre- and post-birth interviews for Study 1.

4.2.4 Descriptive statistics of Study 2

Descriptive statistics of Study 2 variables were compared to establish whether there were significant differences preceding the birth of the sibling. The means, standard deviations, and t-tests of study variables are presented in Table 4.6. There was a significant difference between mother's responsiveness before the birth of a sibling, t (32) = 4.09, $p < .00$. Mothers of children who had no new sibling during the study scored significantly higher (M = 4.64, SD = .50) than the mothers of children who had a new sibling (M = 3.87 SD = .85) at pre-birth interview. Moreover, there were significant differences between children's scores before the birth of a sibling. Children in focal group showed less positive affect, t (32) = 3.17, $p < .01$ and scored lower in responsiveness, t (32) = 4.80, $p < .01$ compared to children in matched control group.

Table 4.6

Descriptive Statistics for the Study 2 Sample at Baseline

	Focal group (N = 33)	Matched control group (N = 68)		
Sample characteristics	*M (SD)*	*M (SD)*	*t / (p)*	*N*
Focal child age (in months)	53.32 (14.58)	54.22 (16.70)	.22 (.83)	33
Economic well-being	.50 (1.15)	-.09 (.96)	2.79** (.01)	30
Mother's education	7.36 (4.26)	5.64 (3.46)	1.91^{+} (.07)	33
Reactivity	47.98 (13.16)	54.29 (15.56)	1.69 (.10)	33
Positive control	2.20 (.85)	2.16 (.82)	.17 (.87)	33
Negative control	3.51 (1.01)	2.93 (.85)	2.32* (.03)	33
Positive affect (m)	1.66 (.68)	1.68 (.76)	.13 (.90)	33
Negative affect (m)	1.08 (.14)	1.11 (.17)	.64 (.53)	33
Responsiveness (m)	3.87 (.85)	4.64 (.50)	4.09** (.00)	33
On task (m)	4.87 (.27)	4.90 (.20)	.49 (.63)	33
Verbalizations (m)	3.97 (.86)	4.05 (.80)	.34 (.74)	33
Positive affect (c)	1.21 (.20)	1.40 (.39)	3.17** (.00)	33
Negative affect (c)	1.10 (.23)	1.20 (.30)	1.66 (.11)	33
Responsiveness (c)	3.90 (.82)	4.65 (.42)	4.80** (.00)	33
On task (c)	4.82 (.39)	4.69 (.43)	1.51 (.14)	33
Noncompliance	1.29 (.50)	1.27 (.40)	.22 (.83)	33
Autonomy	2.62 (1.24)	2.93 (1.05)	1.00 (.32)	33
Activity	3.16 (.41)	3.51 (.69)	2.71** (.01)	33
Verbalizations (c)	2.91 (.78)	3.29 (.70)	2.33* (.03)	33
Oppositional defiant	1.10 (.29)	1.14 (.21)	.91 (.37)	33
Reciprocity	4.17 (.95)	4.10 (.65)	.39 (.70)	33
Conflict	1.03 (.15)	1.07 (.12)	1.70^{+} (.10)	33
Cooperation	3.06 (1.25)	3.81 (.87)	3.20** (.00)	33

Note 1. (m): Mother codes, (c): Child codes. $^{+}p < .10$, $*p < .05$, $**p < .01$

Note 2. The values for economic well-being and reactivity belong to wave 1.

Note 3. The values are the means with standard deviations in parentheses.

4.2.5 Correlations between variables of Study 2 prior to the birth of a sibling

Correlations among the Study 2 variables were estimated. The correlations of the mother's behaviors (e.g. positive and negative content/control, responsiveness, on task, and verbalizations) and child's behaviors (e.g. positive and negative affect, noncompliance, autonomy/independence, and activity) are presented in Table 4.7.

The mother's negative control was negatively associated with focal child's autonomy at baseline (r = -.47, p < .01). On the other hand, negative affect of mother was positively associated with child's negative affect (r = .45, p < .01), and child's behaviors of noncompliance (r = .51, p < .01) and oppositional defiant (r = .51, p < .01). The results also showed that mother's responsiveness was positively associated with the child's responsiveness (r = .66, p < .01).

When the correlations among the mother's behaviors and the child's behaviors were estimated, due to the fact that there were multiple comparisons I also did Bonferroni correction. The results are presented in Table 4.8.

Correlations among the mother's behaviors (e.g. positive and negative content/control, responsiveness, on task, and verbalizations) and mother-child interaction (reciprocity, conflict, and cooperation) were also estimated. The results are presented in Table 4.9.

The mother's negative affect was positively associated with mother-child conflict (r = .53, p < .01). On the other hand, mother's responsiveness was positively associated with reciprocity (r = .37, p < .01) and cooperation (r = .66, p < .01) between the mother and the child.

Table 4.7

Statistics for Study 2: Bivariate Correlations, Means, and Standard Deviations of Mother and Child Behaviors at Baseline (N = 101)

Variables	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	*M*	*SD*
1.Positive control	-.19	.42**	-.07	.27**	.00	.69**	.20*	-.02	.03	.02	.07	-.01	.23*	.34**	.09	2.18	.91
2.Negative control	-	.05	.09	-.37**	.30**	.10	-.15	-.06	-.32	-.11	.06	-.47**	.07	-.11	-.10	2.99	1.07
3.Positive affect (m)		-	-.00	.06	.09	.46**	.21*	.03	-.06	-.10	.02	-.18	.02	.17	.00	1.58	.65
4.Negative affect (m)			-	-.19	-.17	.02	-.11	.45**	-.27	-.45**	.51**	-.15	.21*	.12	.51**	1.10	.16
5.Responsiveness (m)				-	.34**	.41**	.21*	-.09	.66**	.18	-.17	.07	-.03	.20*	-.10	4.37	.77
6.On task (m)					-	.22*	-.01	-.33**	.28**	.07	-.23*	-.33**	-.07	-.06	-.21*	4.89	.22
7.Verbalizations (m)						-	.12	.08	.09	-.12	.19	-.28**	.20	.39**	.11	3.96	.87
8.Positive affect (c)							-	.10	.18	.04	-.08	.08	.30**	.35**	-.08	1.28	.31
9.Negative affect (c)								-	-.17	-.31**	.69**	.14	.40**	.34**	.74**	1.14	.24
10.Responsiveness (c)									-	.29**	-.42**	.08	-.13	.21*	-.22*	4.40	.69
11.On task (c)										-	-.50**	.32**	-.16	-.09	-.41**	4.76	.41
12.Noncompliance											-	-.05	.29**	.19	.71**	1.27	.46
13.Autonomy												-	.09	.15	.08	2.72	1.13
14.Activity													-	.52**	.42**	3.24	.73
15.Verbalizations (c)														-	.29**	2.99	.79
16.Oppositional defiant															-	1.13	.25

Note. (m): Mother codes, (c): Child codes. *$p < .05$. **$p < .01$.

Table 4.8

Statistics for Study 2: Bivariate Correlations, Means, and Standard Deviations of Mother and Child Behaviors at Baseline (with Bonferroni Correction) (N = 101)

Variables	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	*M*	*SD*
1.Positive control	-.19	.42*	-.07	.27	.00	.69*	.20	-.02	.03	.02	.07	-.01	.23	.34*	.09	2.18	.91
2.Negative control	-	.05	.09	-.37*	.30*	.10	-.15	-.06	-.32	-.11	.06	-.47*	.07	-.11	-.10	2.99	1.07
3.Positive affect (m)		-	-.00	.06	.09	.46*	.21	.03	-.06	-.10	.02	-.18	.02	.17	.00	1.58	.65
4.Negative affect (m)			-	-.19	-.17	.02	-.11	.45*	-.27	-.45*	.51*	-.15	.21	.12	.51*	1.10	.16
5.Responsiveness (m)				-	.34*	.41*	.21	-.09	.66*	.18	-.17	.07	-.03	.20	-.10	4.37	.77
6.On task (m)					-	.22	-.01	-.33*	.28	.07	-.23	-.33*	-.07	-.06	-.21	4.89	.22
7.Verbalizations (m)						-	.12	.08	.09	-.12	.19	-.28	.20	.39*	.11	3.96	.87
8.Positive affect (c)							-	.10	.18	.04	-.08	.08	.30*	.35*	-.08	1.28	.31
9.Negative affect (c)								-	-.17	-.31*	.69*	.14	.40*	.34*	.74*	1.14	.24
10.Responsiveness (c)									-	.29*	-.42*	.08	-.13	.21	-.22	4.40	.69
11.On task (c)										-	-.50*	.32*	-.16	-.09	-.41*	4.76	.41
12.Noncompliance											-	-.05	.29*	.19	.71*	1.27	.46
13.Autonomy												-	.09	.15	.08	2.72	1.13
14.Activity													-	.52*	.42*	3.24	.73
15.Verbalizations (c)														-	.29*	2.99	.79
16.Oppositional defiant															-	1.13	.25

Note. (m): Mother codes, (c): Child codes. *$p < .003$.

Table 4.9

Statistics for Study 2: Bivariate Correlations, Means, and Standard Deviations of Mother Behaviors and Mother-Child Interaction at Baseline (N = 101)

Variables	2	3	4	5	6	7	8	9	10	*M*	*SD*
1.Positive control	-.19	.42**	-.07	.27**	.00	.69**	.46**	-.01	.32**	2.18	.91
2.Negative control	-	.05	.09	-.37**	.30**	.10	.10	-.11	-.18	2.99	1.07
3.Positive affect		-	-.00	.06	.09	.46**	.36**	-.09	.18	1.58	.65
4.Negative affect			-	-.19	-.17	.02	-.25*	.53**	-.23*	1.10	.16
5.Responsiveness				-	.34**	.41**	.37**	-.04	.66**	4.37	.77
6.On task					-	.22*	.33**	-.19	.29**	4.89	.22
7.Verbalizations						-	.69**	.10	.47**	3.96	.87
8.Reciprocity							-	-.22*	.65**	3.96	.90
9.Conflict								-	-.24*	1.07	.15
10.Cooperation									-	3.45	1.08

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

4.2.6. Correlations of the pre-birth interview measures with the post-birth interview measures of the matched control group (Study 2)

The correlations of the mother's behaviors (e.g. positive and negative content/control, responsiveness, on task, and verbalizations), child's behaviors (e.g. positive and negative affect, noncompliance, autonomy/independence, and activity), and mother-child interaction (reciprocity, conflict, and cooperation) at baseline and first survey after birth were estimated. The results are presented in Table 4.10. The table shows that there was rank order stability between mother behaviors, child behaviors, and mother-child interaction for the matched control group at baseline and first survey after birth.

Among the mother's behaviors the highest correlation was between the mother's positive affect ($r = .56$, $p < .01$) following with mother's verbalizations ($r = .52$, $p < .01$). The highest correlation among the child's behaviors was between the autonomy behavior of the child ($r = .42$, $p < .01$). Lastly, the conflict between the mother and the child during interaction had the highest correlation among the mother-child interaction behaviors ($r = .31$, $p < .01$).

Table 4.10

Correlations between Mother Behaviors, Child Behaviors, and Mother-Child Interaction for Matched Control Group (pre-birth with post-birth interviews) (N = 68)

Variables	*r*
Positive Control	.48**
Negative Control	.45**
Positive Affect (m)	.56**
Negative Affect (m)	.38**
Responsiveness (m)	.11
On Task (m)	.29*
Verbalizations (m)	.52
Positive Affect (c)	.21*
Negative Affect (c)	.31**
Responsiveness (c)	.40**
On Task (c)	.34**
Noncompliance	.17
Autonomy	.42**
Activity	.39**
Verbalizations (c)	.31**
Oppositional Defiant	.32**
Reciprocity	.21*
Conflict	.31**
Cooperation	.29**

Note 1. $*p < .05$, $**p < .01$.

Note 2. *r* values stand for the correlations of variables at pre- and post-birth interviews for Study 2.

4.3 Regression analyses of parental resources, real time interactions, maternal depression, and externalizing behaviors

In this section first, the multiple regression and mediation analyses for Study 1 are presented. Then, the multiple regression and mediation analyses for Study 2 are presented. In this section, I refer to Time 1 as baseline and Time 2 as the first survey after the birth of a sibling.

4.3.1 Predicting parental resources, maternal depression, and externalizing behaviors of children at first survey after the birth of a sibling

Multiple regression analyses were done in order to test the association between the birth of a sibling and parental resources, maternal depression and externalizing behaviors of children. In Model 1.a, Time 1 measures of each parental resource, Time 1 measure of maternal depression, Time 1 measure of externalizing behaviors of children, and sibling birth were independent variables. For regression analyses of parental resources, Time 2 measures of each parental resource were the dependent variable. For regression analysis of maternal depression, Time 2 measure of maternal depression was the dependent variable. For regression analysis of externalizing behaviors of children, Time 2 externalizing behaviors of children was the dependent variable. In Model 1.b, Time 1 measures of each parental resource, Time 1 measure of maternal depression, Time 1 measure of externalizing behaviors of children, economic well-being, child age at pre-birth interview, years of education of mother, birth order of the child, and sibling birth were independent variables. Dependent variables of Model 1.b were Time 2 measures of each parental resource for regression analyses of parental resources, Time 2 measure of maternal depression for regression analysis of maternal depression, and Time 2 externalizing behaviors of children for regression analyses

of externalizing behaviors of children. The results of the regression analyses are presented in Table 4.11.

According to the results for Model 1.a, Time 1 responsiveness and sibling birth accounted for 10% of the variance in Time 2 responsiveness (F (2, 526) = 30.23, $p < .00$). Sibling birth significantly predicted Time 2 responsiveness (β = -.110, t = 2.66, $p < .00$) as did Time 1 responsiveness (β = .296, t = 7.17, $p < .01$). Similarly, Time 1 academic stimulation and sibling birth accounted for 18% of the variance in Time 2 academic stimulation (F (2, 534) = 59.99, $p < .00$). Sibling birth significantly predicted Time 2 academic stimulation (β = -.085, t = 2.17, $p < .05$) as did Time 1 academic stimulation (β = .414, t = 10.55, $p < .00$).

Results for Model 1.b showed that when controlling for economic well-being, child age at pre-birth interview, years of education of mother, and birth order of the child, Time 2 responsiveness and Time 2 learning materials were predicted by sibling birth. Time 1 responsiveness, sibling birth, and control variables accounted for 23% of the variance in Time 2 responsiveness (F (6, 507) = 25.10, $p < .00$). Sibling birth significantly predicted a decline in Time 2 responsiveness (β = -.121, t = 3.07, $p < .01$). Similarly, Time 1 learning materials, sibling birth, and control variables explained 54% of the variance in Time 2 learning materials (F (6, 500) = 97.12, $p < .00$). A significant decline was predicted in Time 2 learning materials by sibling birth (β = -.081, t = 2.62, $p < .01$). The results also showed that after sibling birth an increase was predicted at learning materials (β = .075, t = 2.36, $p < .05$) and at harsh discipline (β = .091, t = 2.05, $p < .05$) for firstborn children.

Table 4.11

Summary of Multiple Regression Analysis for Variables Predicting Children's Parental Resources, Maternal Depression, and Externalizing Behaviors at First Survey after the Birth of a Sibling

Variables							
	Learning Materials	Responsiveness	Variety of Experiences	Harsh Discipline	Academic Stimulation	Maternal Depression	Externalizing Behaviors
Model 1.a							
Sibling Birth	-3.232 (-.053)	-6.082** (-.110)	-2.700 (-.059)	2.342 (.070)	-.176* (-.089)	-.173 (-.005)	-.847 (-.025)
Baseline Measure	.614** (.639)	.282** (.296)	.500** (.502)	.237** (.223)	.401** (.402)	.395** (.447)	.506** (.511)
R^2	.42	.10	.26	.06	.18	.20	.26
N	521	529	537	526	537	537	537
Model 1.b							
Sibling Birth	-4.955** (-.081)	-6.669** (-.121)	-3.782* (-.083)	1.803 (.054)	-.221** (-.111)	-.762 (-.023)	-1.047 (-.031)
Baseline Measure	.374** (.387)	.116** (.122)	.244** (.244)	.198** (.188)	.261** (.260)	.387** (.437)	.488** (.491)
Economic Well-Being	9.660** (.288)	6.490** (.215)	7.756** (.313)	-.368 (-.020)	.171** (.157)	-1.705* (-.094)	-.307 (-.017)
Child Age (at baseline)	-.110 (-.051)	-.219** (-.116)	-.029 (-.019)	.060 (.052)	.002 (.032)	-.075 (-.066)	-.066 (-.056)
Education of Mother	1.457** (.168)	1.625** (.211)	.885** (.139)	-.646** (-.139)	.060** (.214)	-.040 (-.009)	-.457* (-.095)
Birth Order	4.721* (.075)	-.067 (-.001)	1.934 (.042)	3.114* (.091)	.086 (.042)	2.226 (.066)	1.257 (.036)
R^2	.54	.23	.36	.08	.28	.22	.27
N	507	514	522	511	522	523	522

Note 1. * $p < .05$, ** $p < .01$.

Note 2. Scores are the unstandardized coefficients with standardized coefficients in parentheses.

In addition to controlling the birth order of the child, the school status of the child and the presence of a female extended family member were also controlled while testing the association between the birth of a sibling and parental resources, maternal depression and externalizing behaviors of children.

In Model 1.c, Time 1 measures of each parental resource, Time 1 measure of maternal depression, Time 1 measure of externalizing behaviors of children, economic well-being, child age at pre-birth interview, years of education of mother, school status of the child (already in school at pre-birth and started school during inter-survey), and sibling birth were independent variables. Dependent variables of Model 1.c were Time 2 measures of each parental resource for regression analyses of parental resources, Time 2 measure of maternal depression for regression analysis of maternal depression, and Time 2 externalizing behaviors of children for regression analyses of externalizing behaviors of children. The results of the regression analyses are presented in Table 4.12.

When controlling for economic well-being, child age at pre-birth interview, years of education of mother, and school status of the child, sibling birth predicted a significant decline in both Time 2 responsiveness (β = -.124, t = 3.12, p < .01) and Time 2 academic stimulation (β = -.110, t = 2.82, p < .01). The results also showed that for children who started school during inter-survey interval, a significant increase was predicted at responsiveness after sibling birth (β = .133, t = 2.25, p < .05) while a significant decline was predicted at maternal depression (β = -.140, t = 2.38, p < .05).

Table 4.12

Summary of Multiple Regression Analysis for Variables Predicting Children's Parental Resources, Maternal Depression, and Externalizing Behaviors at First Survey after the Birth of a Sibling (controlling school status)

Variables							
	Learning Materials	Responsiveness	Variety of Experiences	Harsh Discipline	Academic Stimulation	Maternal Depression	Externalizing Behaviors
Model 1.c							
Sibling Birth	-3.732 (-.061)	-6.846** (-.124)	-3.085 (-.068)	2.320 (.070)	-.218** (-.110)	-.041 (-.001)	-.337 (-.010)
Baseline Measure	.373** (.383)	.119** (.124)	.245** (.244)	.186** (.176)	.252** (.251)	.377** (.422)	.487** (.490)
Economic Well-Being	9.754** (.282)	6.824** (.219)	7.827** (.307)	-.545 (-.029)	.155** (.138)	-1.765* (-.095)	-.402 (-.021)
Child Age (at baseline)	-.212 (-.100)	-.407** (-.216)	-.102 (-.066)	.151 (.133)	-.001 (-.021)	.043 (.038)	-.035 (-.031)
Education of Mother	1.650** (.191)	1.570** (.204)	.903** (.142)	-.488* (-.105)	.066** (.237)	-.033 (-.007)	-.347 (-.073)
Already in school (at pre-wave)	3.886 (.040)	7.180 (.086)	4.332 (.063)	-2.950 (-.058)	.102 (.033)	-4.414 (-.087)	-3.578 (-.070)
Started school during inter-survey	3.323 (.047)	8.477* (.133)	1.512 (.029)	-3.688 (-.096)	.169 (.074)	-5.321* (-.140)	1.363 (.035)
R^2	.53	.23	.35	.07	.27	.22	.27
N	487	494	501	492	501	502	501

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

Multiple regression analyses were done also with controlling the presence of a female extended family member. In Model 1.d, Time 1 measures of each parental resource, Time 1 measure of maternal depression, Time 1 measure of externalizing behaviors of children, economic well-being, child age at pre-birth interview, years of education of mother, presence of extended family member, and sibling birth were independent variables. Dependent variables of Model 1.d were Time 2 measures of each parental resource for regression analyses of parental resources, Time 2 measure of maternal depression for regression analysis of maternal depression, and Time 2 externalizing behaviors of children for regression analyses of externalizing behaviors of children. The results of the regression analyses are presented in Table 4.13.

When controlling for economic well-being, child age at pre-birth interview, years of education of mother, and presence of extended family member, sibling birth predicted a significant decline in Time 2 responsiveness (β = -.124, t = 3.17, p < .01) and Time 2 academic stimulation (β = -.108, t = 2.85, p < .01). The results also showed that for children who might be taken care of by a female extended family member, a significant increase was predicted at learning materials (β = .067, t = 2.16, p < .05) and at maternal depression (β = .082, t = 2.09, p < .05) after sibling birth.

Table 4.13

Summary of Multiple Regression Analysis for Variables Predicting Children's Parental Resources, Maternal Depression, and Externalizing Behaviors at First Survey after the Birth of a Sibling (controlling presence of extended family member)

Variables							
	Learning Materials	Responsiveness	Variety of Experiences	Harsh Discipline	Academic Stimulation	Maternal Depression	Externalizing Behaviors
Model 1.d							
Sibling Birth	-4.675* (-.076)	-6.823** (-.124)	-3.680* (-.081)	2.231 (.067)	-.215** (-.108)	-.690 (-.021)	-.804 (-.024)
Baseline Measure	.382** (.394)	.125** (.132)	.244** (.245)	.203** (.193)	.260** (.258)	.379** (.428)	.493** (.495)
Economic Well-Being	9.628** (.287)	6.577** (.218)	7.792** (.315)	-.493 (-.027)	.172** (.158)	-1.659 (-.092)	-.405 (-.022)
Child Age (at baseline)	-.123 (-.057)	-.217** (-.114)	-.034 (-.022)	.053 (.046)	.002 (.029)	-.081 (-.071)	-.069 (-.059)
Education of Mother	1.655** (.191)	1.642** (.213)	.968** (.152)	-.560* (-.120)	.063** (.227)	.056 (.012)	-.426 (-.089)
Presence of extended family member	4.981* (.067)	4.654 (.070)	2.529 (.046)	-2.522 (-.062)	.081 (.034)	3.262* (.082)	-1.979 (-.048)
R^2	.54	.23	.36	.07	.28	.23	.28
N	507	514	522	511	522	523	522

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

4.3.2 The mediated effects of parental resources on externalizing behaviors of children after the birth of a sibling

To determine whether parental resources mediated the relationship between the sibling birth and externalizing behaviors of children, first I estimated a regression model. In this model, sibling birth was the independent variable and Time 2 parental resources were proposed mediators. Economic well-being, child age at pre-birth interview, years of education of mothers, and Time 1 parental resources were control variables and Time 2 externalizing behaviors of children was dependent variable (See Figure 1).

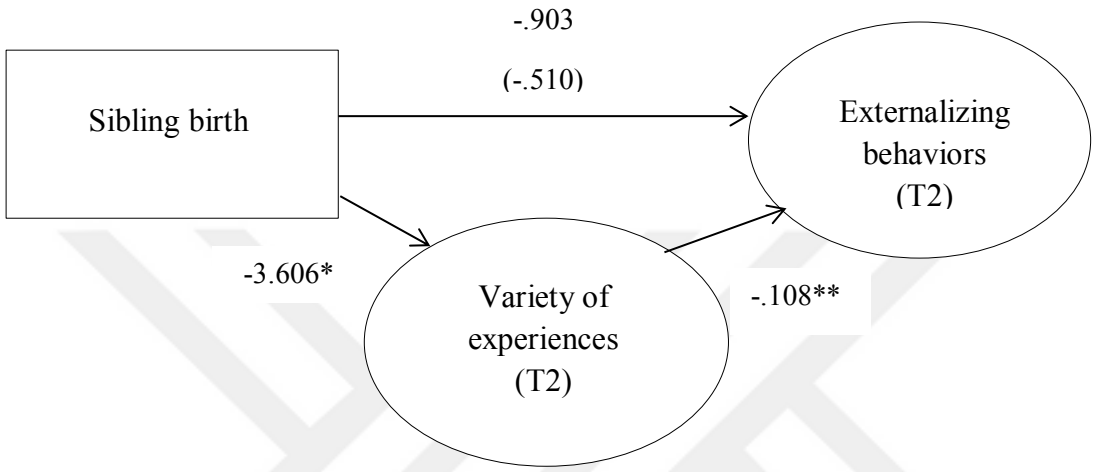
The results of the mediation analyses were summarized as four steps in Table 4.14. These four steps were defined as the effect of sibling birth on Time 2 parental resource (path a), the direct effect of Time 2 parental resource on Time 2 externalizing behaviors of children (path b), the total effect of sibling birth on Time 2 externalizing behaviors of children (path c), and the direct effect of sibling birth controlling for Time 2 parental al resource on Time 2 externalizing behaviors of children (path c').

According to the results, only the model in which Time 2 variety of experiences was the mediator accounted for a significant proportion of variance in children's Time 2 externalizing behaviors (R^2 = .05, adjusted-R^2 = .04, F (6, 514) = 4.55, p < .00). The results showed that the total effect of sibling birth on Time 2 externalizing behaviors of children was not significant (See Figure 2), and there was a total mediation.

According to the results of bootstrapping which was done using Preacher and Hayes (2008) Multiple Mediation module (INDIRECT), the estimated indirect (mediated) effect was .393 (*SE* = .226). The 95% bias corrected bootstrap confidence interval (1000 trials) was from .066 to 1.044. This can be interpreted as the variety of experiences that family provided the children at Time 2 significantly mediated the effect of sibling birth on Time 2 externalizing

behaviors of children. In other words, sibling birth was associated with approximately .39 points lower externalizing behaviors score as mediated by Time 2 variety of experiences.

Figure 2. Variety of Experiences as a Mediator of Sibling Birth - Externalizing Behaviors Link



Note 1. T2: first survey after the birth of a sibling.

Note 2. * $p < .05$, ** $p < .01$.

Table 4.14

Summary of Mediation Analysis for Study 1

proposed mediators	paths												
	a			b			c			c’			
	B	*t*	*p*	*B*	*t*	*p*	*B*	*t*	*p*	*B*	*t*	*p*	*N*
learning materials	-4.529*	2.40	.01	-.059	1.68	.09	-.832	.55	.58	-1.103	.73	.47	506
responsiveness	-6.728**	3.11	.00	-.027	.91	.36	-.281	.19	.85	-.469	.31	.76	513
variety of experiences	-3.606*	2.24	.03	-.108**	2.71	.01	-.510	.35	.73	-.903	.61	.54	521
harsh discipline	2.186	1.52	.13	.308**	7.15	.00	-.824	.56	.57	-1.498	1.07	.28	510
academic stimulation	-.212**	2.82	.01	-1.480	1.72	.09	-.497	.34	.74	-.812	.55	.58	521

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

4.3.3 Subgroup analyses for Study 1

Some children may be at high risk for externalizing behaviors due to factors other than sibling birth. The risk in here refers that the association of sibling birth with parental resources and with children's externalizing behaviors is expected to be larger for some children because it is likely that those children would be more vulnerable to negative consequences of sibling birth than others. In this section, multiple regression analyses were conducted in order to answer the question whether there was an association of sibling birth with parental resources and with children's externalizing behaviors for children who were at risk. I considered being between the ages of 3 and 4 at the baseline, being highly reactive, was provided low parental resources during baseline and lived in a family with low economic well-being as risk factors.

There were some situations that might put children at risk. For instance, young age might constitute risk for children because younger children may not be capable of regulating their behaviors when aroused and they tend to externalize their arousal. Therefore, the association of sibling birth with externalizing behaviors might be stronger for younger children. Second, high reactivity might constitute a risk for children because components of reactivity made contribution to the development of externalizing behaviors (Morris et al., 2014). Children who were highly reactive at the beginning of the ECDET study might show higher externalizing behaviors after the sibling birth compared to children who were not highly reactive.

Above I explained two situations that might put children at risk. These were about the child's characteristics. However, some external situations might also constitute risk factors for externalizing behaviors. For instance, the association of sibling birth with externalizing behaviors might be larger for children who were provided low parental resources before the

sibling birth. That is, if a child was already deprived of parental resources, the sibling birth might make the situation worse because a new member in the family will result in a further decline in parental resources. In addition, low income might constitute risk for externalizing behaviors because economic well-being is related to externalizing behaviors of children. The sibling birth is also related to an increase in expenses in the family. That's why the association of sibling birth with externalizing behaviors might be larger for children who live in a family with low economic well-being before the birth of a sibling.

Among the sample of Study 1, at risk children were identified as follows. There were 4 groups of children who were hypothesized to at high risk for externalizing behaviors. These were younger children, highly reactive children, children who were provided low parental resources at baseline, and children who lived in a family with low economic well-being. The subgroup of younger children was determined by selecting the children who were between the ages of 3 and 4 at the baseline. The subgroup of highly reactive children was determined by a mean cutoff of the Reactivity subscale in STSC. For the third subgroup, I used the measures of three parental resources (learning materials, responsiveness, and variety of experiences). These parental resources were selected because they were expected to be associated with the externalizing behaviors and also they were expected to decrease after the birth of a sibling. After determining the parental resources, a new variable (pre-resources) was constituted from these 3 parental resources by summing up the scores of these variables. Later, children who scored below the mean at pre-resource variable were selected for the third subgroup. The fourth subgroup consisted of children who scored below the mean in the economic well-being measure.

According to the preliminary analyses, without controlling for Time 2 parental resources, sibling birth was not significantly associated with externalizing behaviors in any of these four subgroups. The association of sibling birth with externalizing behaviors was not

significant for younger children (F (1, 173) = .69, p = .41), highly reactive children (F (1, 276) = .46, p = .50), children who were provided low parental resources at Time 1 (F (1, 280) = .002, p = .96), and children who lived in a family with low economic well-being (F (1, 293) = .01, p = .94).

The results of the preliminary analyses that conducted to test the association of sibling birth with each of the parental resources for the subgroups are presented in Table 4.15.

Table 4.15

Summary of Regression Analysis for Sibling Birth Predicting Time 2 Parental Resources at High Risk Subgroups

		Learning materials	Responsiveness	Variety of experiences	Harsh discipline	Academic stimulation
Subgroups						
Younger	Sibling birth	-5.148 (-.079)	-6.720 (-.114)	-4.401 (-.096)	4.286 (.146)	-.371* (-.181)
	R^2	.01	.01	.01	.02	.03
	N	176	175	176	174	176
Highly reactive	Sibling birth	-6.122 (-.107)	-9.252** (-.172)	-5.078* (-.118)	3.145 (-.094)	-.247* (-.128)
	R^2	.01	.03	.01	.01	.02
	N	271	273	277	272	277
Lived in family with low economic well-being	Sibling birth	-7.728** (-.170)	-8.644** (-.168)	-4.975* (-.134)	7.162** (.211)	-.234* (-.131)
	R^2	.03	.03	.02	.05	.02
	N	287	291	295	290	295
Provided low parental resources at Time 1	Sibling birth	-6.440* (-.132)	-6.639* (-.129)	-3.515 (-.087)	6.085** (.179)	-.191 (-.106)
	R^2	.02	.02	.01	.03	.01
	N	276	279	281	278	281

Note 1. * $p < .05$, ** $p < .01$.

Note 2. Scores are the unstandardized coefficients with standardized coefficients in parentheses.

The results showed that sibling birth significantly predicted academic stimulation at Time 2 for younger children (F (1, 174) = 5.91, $p < .05$). For highly reactive children, sibling birth significantly predicted responsiveness at Time 2 (F (1, 271) = 8.23, $p < .00$). In addition, the sibling birth significantly predicted harsh discipline at Time 2 for children who were provided low parental resources at Time 1 (F (1, 276) = 9.12, $p < .00$). Last, sibling birth significantly predicted all parental resources at Time 2 for children who lived in a family with low economic well-being (See Table 4.15).

I estimated five regression models to test the association of birth of a sibling with parental resources and with externalizing behaviors of children. In the first model, Time 2 measure of learning materials and sibling birth were independent variables. In the second model, Time 2 measure of responsiveness and sibling birth were independent variables. In the third model, Time 2 measure of variety of experiences and sibling birth were independent variables. In the fourth model, Time 2 measure of harsh discipline and sibling birth were independent variables. Last, in the fifth model, Time 2 measure of academic stimulation and sibling birth were independent variables. In all five regression models, Time 2 externalizing behaviors of children was the dependent variable. Multiple regression analyses were done for each subgroup. The results are presented in Tables 4.16, 4.17, 4.18, and 4.19.

According to the results for the younger children (See Table 4.16), Time 2 harsh discipline and sibling birth accounted for 14% of the variance in Time 2 externalizing behaviors of children (F (2, 170) = 14.09 , $p < .00$). Time 2 harsh discipline significantly predicted Time 2 externalizing behaviors of children (β = .376, t = 5.23, $p < .01$) who were between the ages of 3 and 4 at baseline. Also, Time 2 learning materials and sibling birth accounted for 5% of the variance in Time 2 externalizing behaviors of children (F (2, 172) = 4.26, $p < .05$). Time 2 learning materials significantly predicted Time 2 externalizing behaviors of children (β = -.209, t = 2.79, $p < .01$) who were between the ages of 3 and 4 at

baseline. When controlling for Time 2 parental resources, sibling birth was not a significant predictor of externalizing behaviors for younger children (See Table 4.16).

Table 4.16

Summary of Multiple Regression Analysis for Time 2 Parental Resources and Sibling Birth Predicting Younger Children's Time 2 Externalizing Behaviors

Variables	Estimated Coefficients	R^2	N
Sibling Birth Learning Materials	-2.939 (-.082) -.115** (-.209)	.05	175
Sibling Birth Responsiveness	-2.480 (-.069) -.030 (-.050)	.01	174
Sibling Birth Variety of Experiences	-2.983 (-.083) -.150* (-.192)	.04	175
Sibling Birth Harsh Discipline	-4.427 (-.122) .463** (.376)	.14	173
Sibling Birth Academic Stimulation	-2.484 (-.069) -.566 (-.032)	.01	175

Note 1. * $p < .05$, ** $p < .01$.

Note 2. Scores are the unstandardized coefficients with standardized coefficients in parentheses.

The results of multiple regression analysis for highly reactive children showed that Time 2 harsh discipline and sibling birth accounted for 9% of the variance in Time 2 externalizing behaviors of children (F (2, 269) = 13.23 , $p < .00$). Time 2 harsh discipline significantly predicted Time 2 externalizing behaviors of children ($\beta = .298$, $t = 5.10$, $p < .00$).

When controlling for Time 2 parental resources, sibling birth was not a significant predictor of externalizing behaviors for highly reactive children (See Table 4.17).

Table 4.17

Summary of Multiple Regression Analysis for Time 2 Parental Resources and Sibling Birth Predicting Highly Reactive Children's Time 2 Externalizing Behaviors

Variables	Estimated Coefficients	R^2	N
Sibling Birth Learning Materials	-2.293 (-.065) -.066 (-.106)	.01	271
Sibling Birth Responsiveness	-1.411 (-.040) -.010 (-.016)	.002	273
Sibling Birth Variety of Experiences	-1.913 (-.054) -.089 (-.108)	.01	277
Sibling Birth Harsh Discipline	-2.348 (-.066) .318** (.298)	.09	272
Sibling Birth Academic Stimulation	-1.797 (-.051) -1.360 (-.074)	.01	277

Note 1. ** $p < .01$.

Note 2. Scores are the unstandardized coefficients with standardized coefficients in parentheses.

According to the results for the children who were provided low parental resources at Time 1, Time 2 harsh discipline and sibling birth accounted for 7% of the variance in Time 2 externalizing behaviors of children (F (2, 275) = 9.81 , $p < .00$). Time 2 harsh discipline significantly predicted Time 2 externalizing behaviors of children ($\beta = .262$, $t = 4.43$, $p < .00$). When controlling for Time 2 parental resources, sibling birth was not a significant predictor

of externalizing behaviors for the children who were provided low parental resources at Time 1 (See Table 4.18).

Table 4.18

Summary of Multiple Regression Analysis for Time 2 Parental Resources and Sibling Birth Predicting Children's Time 2 Externalizing Behaviors Who Were Provided Low Parental Resources at Time 1

Variables	Estimated Coefficients	R^2	N
Sibling Birth Learning Materials	-.258 (-.008) -.012 (-.017)	.000	276
Sibling Birth Responsiveness	-.083 (-.002) -.012 (-.019)	.000	279
Sibling Birth Variety of Experiences	-.364 (-.011) -.068 (-.082)	.01	281
Sibling Birth Harsh Discipline	-1.508 (-.045) .258** (.262)	.07	278
Sibling Birth Academic Stimulation	-.449 (-.013) -1.692 (-.092)	.01	281

Note 1. ** $p < .01$.

Note 2. Scores are the unstandardized coefficients with standardized coefficients in parentheses.

Last, according to the results, Time 2 harsh discipline and sibling birth accounted for 9% of the variance in Time 2 externalizing behaviors of children (F (2, 287) = 14.48 , $p < .00$) for children who lived in a family with low economic well-being. Time 2 harsh discipline significantly predicted Time 2 externalizing behaviors of children (β = .310, t = 5.38, $p < .00$). When controlling for Time 2 parental resources, sibling birth was not a significant predictor of externalizing behaviors for the children who lived in a family with low economic well-being (See Table 4.19).

Table 4.19

Summary of Multiple Regression Analysis for Time 2 Parental Resources and Sibling Birth Predicting Children's Time 2 Externalizing Behaviors Who Lived in a Family with Low Economic Well-being

Variables	Estimated Coefficients	R^2	N
Sibling Birth	-.844 (-.024)	.01	287
Learning Materials	-.065 (-.084)		
Sibling Birth	-.194 (-.006)	.001	291
Responsiveness	-.021 (-.031)		
Sibling Birth	-.561 (-.016)	.01	295
Variety of Experiences	-.081 (-.086)		
Sibling Birth	-2.244 (-.064)	.09	290
Harsh Discipline	.322** (.310)		
Sibling Birth	-.669 (-.019)	.01	295
Academic Stimulation	-2.188 (-.111)		

Note 1. ** $p < .01$.

Note 2. Scores are the unstandardized coefficients with standardized coefficients in parentheses.

In a nutshell, sibling birth did not predict Time 2 externalizing behaviors in any of the analyses for subgroups. On the other hand, harsh discipline significantly predicted Time 2 externalizing behaviors of the subgroups in all analyses. In addition, in the previous analyses it was found that sibling birth did not predict a change in harsh discipline (See Table 4.11).

4.3.4 Predicting real time interactions of children at first survey after the birth of a sibling

Multiple regression analyses were done in order to test the association between the birth of a sibling and mother behaviors, child behaviors, and mother-child interaction during real time interactions.

In Model 2.a, Time 1 measures of mother behaviors, child behaviors, mother-child interaction, and sibling birth were independent variables. For regression analysis of mother behaviors, Time 2 measures of each mother behavior were the dependent variable. For regression analysis of child behaviors, Time 2 measures of each child behavior were the dependent variable. Finally, for regression analysis of mother-child interaction, Time 2 measure of each mother-child interaction was the dependent variable.

In Model 2.b, Time 1 measures of mother behaviors, child behaviors, mother-child interaction, economic well-being, child age at pre-birth interview, years of education of mother, and sibling birth were independent variables. Dependent variables of Model 2.b were Time 2 measures of each mother behavior for regression analyses of mother behaviors, Time 2 measures of each child behavior for regression analyses of child behaviors, and finally Time 2 measures of each mother-child interaction for regression analyses of mother-child interaction. The results of the regression analyses are presented in Tables 4.20, 4.21, and 4.22.

According to the results for Model 2.a, Time 1 mother's positive control and sibling birth accounted for 23% of the variance in Time 2 mother's positive control (F (2, 98) = 14.96, $p < .00$). Sibling birth significantly predicted Time 2 mother's positive control (β = -.148, t = 1.67, $p < .10$) as did Time 1 mother's positive control (β = .463, t = 5.24, $p < .00$). Results for Model 2.b showed that when controlled for economic well-being, child age at pre-birth interview, and years of education of mother, Time 2 mother's responsiveness was

predicted by sibling birth and its baseline measure. Time 1 mother's responsiveness, sibling birth, and control variables accounted for 23% of the variance in Time 2 mother's responsiveness (F (5, 91) = 5.53, $p < .00$). Sibling birth significantly predicted Time 2 mother's responsiveness (β = -.230, t = 2.24, $p < .05$) as did Time 1 mother's responsiveness (β = .277, t = 2.72, $p < .01$) (See Table 4.20).

In Model 2.a, Time 1 child's negative affect and sibling birth accounted for 14% of the variance in Time 2 child's negative affect (F (2, 98) = 7.77, $p < .01$). Sibling birth significantly predicted Time 2 child's negative affect (β = -.201, t = 2.13, $p < .05$) as did Time 1 child's negative affect (β = .289, t = 3.06, $p < .01$). Similarly, Time 1 child's responsiveness and sibling birth accounted for 20% of the variance in Time 2 child's responsiveness (F (2, 98) = 12.43, $p < .00$). Sibling birth significantly predicted Time 2 child's responsiveness (β = -.234, t = 2.22, $p < .05$) as did Time 1 child's responsiveness (β = .283, t = 2.69, $p < .01$). Results for Model 2.b showed that when controlled for economic well-being, child age at pre-birth interview, and years of education of mother, Time 2 child's oppositional defiant behavior was predicted by sibling birth and its baseline measure. Time 1 child's oppositional defiant behavior, sibling birth, and control variables accounted for 16% of the variance in Time 2 child's oppositional defiant behavior (F (5, 91) = 3.33, $p < .01$). Sibling birth significantly predicted Time 2 child's oppositional defiant behavior (β = -.172, t = 1.76, $p < .10$) as did Time 1 child's oppositional defiant (β = .308, t = 3.15, $p < .01$) (See Table 4.21).

The results for mother-child interaction in Model 2.a and showed that sibling birth did not predict Time 2 mother-child interaction behaviors, only all Time 1 mother-child interaction behaviors significantly predicted Time 2 mother-child interaction behaviors. In Model 2.b, results showed that when controlled for economic well-being, child age at pre-birth interview, and years of education of mother, Time 2 conflict was predicted by sibling

birth and its baseline measure. Time 1 conflict, sibling birth, and control variables accounted for 15% of the variance in Time 2 conflict (F (5, 91) = 3.22, $p < .01$). Sibling birth significantly predicted Time 2 conflict (β = -.170, t = 1.72, $p < .10$) as did Time 1 conflict (β = .298 t = 3.00, $p < .01$) (See Table 4.22).

Table 4.20

Summary of Multiple Regression Analysis for Variables Predicting Mother Behaviors at First Survey after the Birth of a Sibling

Variables	Positive control	Negative control	Positive affect	Negative affect	Responsiveness	On task	Verbalizations
Model 2.a							
Sibling birth	-.287^{+} (-.148)	.063 (.030)	-.076 (-.082)	-.024 (-.102)	-.276 (-.185)	-.071 (-.100)	-.047 (-.028)
Baseline measure	.465** (.463)	.390** (.426)	.315** (.471)	.222** (.316)	.263** (.289)	.251^{+} (.169)	.497** (.550)
R^2	.23	.19	.22	.11	.17	.04	.30
N	101	101	101	101	101	101	101
Model 2.b							
Sibling birth	-.307^{+} (-.156)	.106 (.050)	-.079 (-.083)	-.019 (-.077)	-.334* (-.230)	-.073 (-.101)	-.032 (-.019)
Baseline measure	.406** (.406)	.360** (.394)	.312** (.466)	.234** (.331)	.251** (.277)	.281 (.186)	.513** (.562)
Economic well-being	.137 (.155)	-.134 (-.142)	.030 (.072)	-.012 (-.112)	-.021 (-.032)	.015 (.046)	-.008 (-.010)
Child age (at baseline)	-.005 (-.076)	-.003 (-.037)	-.001 (-.041)	.001 (.091)	-.008* (-.183)	-.006** (-.262)	-.002 (-.038)
Education of mother	.003 (.011)	.023 (.088)	-.012 (-.107)	.001 (.050)	.027 (.153)	-.002 (-.020)	-.006 (-.027)
R^2	.26	.20	.24	.13	.23	.12	.33
N	97	97	97	97	97	97	97

Note 1. $^{+}p < .10$, * $p < .05$, ** $p < .01$.

Note 2. Scores are the unstandardized coefficients with standardized coefficients in parentheses.

Table 4.21

Summary of Multiple Regression Analysis for Variables Predicting Child Behaviors at First Survey after the Birth of a Sibling

Variables	Positive affect	Negative affect	Responsiveness	On task	Noncompliance	Autonomy	Activity	Verbalizations	Oppositional defiant
Model 2.a									
Sibling birth	-.119 (-.153)	-.077* (-.201)	-.335* (-.234)	.084 (.109)	-.159 (-.136)	.267 (.113)	-.214 (-.135)	.084 (.052)	-.089 (-.139)
Baseline measure	.221^{+} (.188)	.213** (.289)	.278** (.283)	.291** (.327)	.209^{+} (.173)	.420** (.428)	.387** (.381)	.296** (.310)	.380** (.309)
R^2	.07	.14	.20	.13	.05	.19	.17	.10	.12
N	101	101	101	101	101	101	101	101	101
Model 2.b									
Sibling birth	-.125 (-.158)	-.087* (-.224)	-.301* (-.205)	.075 (.096)	-.184 (-.153)	.101 (.042)	-.205 (-.127)	.049 (.031)	-.113^{+} (-.172)
Baseline measure	.220^{+} (.185)	.193** (.264)	.370** (.357)	.267** (.299)	.190 (.156)	.313** (.314)	.396** (.392)	.310** (.318)	.377** (.308)
Economic well-being	.012 (.034)	-.003 (-.020)	-.041 (-.063)	.015 (.043)	.053 (.098)	.154 (.143)	.098 (.136)	.025 (.035)	.032 (.110)
Child age (at baseline)	.002 (.079)	.000 (-.019)	-.014** (-.298)	.001 (.054)	-.001 (-.015)	.016* (.207)	.007 (.139)	.002 (.042)	.000 (-.012)
Education of mother	-3.353 (.000)	.000 (-.004)	.013 (.076)	.003 (.032)	-7.970 (-.001)	.047 (.161)	-.040 (-.203)	-.011 (-.057)	.004 (.051)
R^2	.07	.14	.31	.13	.06	.30	.22	.10	.16
N	97	97	97	97	97	97	97	97	97

Note 1. $^{+}p < .10$, * $p < .05$, ** $p < .01$.

Note 2. Scores are the unstandardized coefficients with standardized coefficients in parentheses.

Table 4.22

Summary of Multiple Regression Analysis for Variables Predicting Mother-Child Interaction at First Survey after the Birth of a Sibling

Variables			
	Reciprocity	Conflict	Cooperation
Model 2.a			
Sibling birth	-.175 (-.093)	-.047 (-.155)	-.066 (-.031)
Baseline measure	.218* (.220)	.258** (.280)	.257** (.277)
R^2	.05	.12	.08
N	101	101	101
Model 2.b			
Sibling birth	-.194 (-.101)	-.052^{+} (-.170)	-.077 (-.036)
Baseline measure	.178^{+} (.177)	.276** (.298)	.273** (.288)
Economic well-being	.146 (.171)	-.010 (-.074)	.046 (.047)
Child age (at baseline)	-.020** (-.329)	.001 (.118)	-.025** (-.368)
Education of mother	-.008 (-.035)	.006 (.170)	.014 (.052)
R^2	.19	.15	.25
N	97	97	97

Note 1. $^{+}p < .10$, * $p < .05$, ** $p < .01$.

Note 2. Scores are the unstandardized coefficients with standardized coefficients in parentheses.

4.3.5 The mediated effects of real time interactions on externalizing behaviors of children after the birth of a sibling

To determine whether mother behaviors, child behaviors, and mother-child interaction mediated the relationship between sibling birth and externalizing behaviors of children, first I estimated a regression model. In this model, sibling birth was the independent variable and Time 2 mother behaviors, child behaviors, and mother-child interaction were proposed mediators. Economic well-being, child age at pre-birth interview, years of education of mothers, and Time 1 mother behaviors, child behaviors, and mother-child interaction were control variables and Time 2 externalizing behaviors of children was dependent variable (See Figure 1).

The results of the mediation analyses were summarized as four steps in Tables 4.23, 4.24, and 4.25. These four steps were defined as the effect of sibling birth on Time 2 real time interaction (path a), the direct effect of Time 2 real time interaction on Time 2 externalizing behaviors of children (path b), the total effect of sibling birth on Time 2 externalizing behaviors of children (path c), and the direct effect of sibling birth controlling for Time 2 real time interaction on Time 2 externalizing behaviors of children (path c'). According to the results, Time 2 mother behaviors, child behaviors, or mother-child interaction did not mediate the relationship between sibling birth and externalizing behaviors of children in any of the analyses.

Table 4.23

Summary of Mediation Analysis for Study 2 (mother behaviors) (N = 97)

	Paths											
proposed	a			b			c			c’		
mediators	*B*	*t*	*p*	*B*	*t*	*p*	*B*	*t*	*p*	*B*	*t*	*p*
positive control	-.307^{+}	1.71	.09	2.423	1.16	.25	-2.744	.76	.45	-1.999	.55	.58
negative control	.106	.49	.63	1.251	.66	.51	-2.440	.63	.53	-2.574	.66	.51
positive affect	-.078	.90	.37	.621	.14	.86	-3.128	.88	.38	-3.080	.86	.39
negative affect	-.018	.78	.44	-2.219	.14	.89	-2.331	.66	.51	-2.373	.67	.51
responsiveness	-.333*	2.24	.03	1.552	.55	.58	-4.160	1.05	.30	-3.641	.89	.38
on task	-.073	1.02	.31	3.183	.61	.55	-2.752	.77	.45	-2.518	.69	.49
verbalizations	-.032	.22	.83	2.811	1.10	.28	-2.803	.78	.44	-2.713	.76	.45

Note. $^{+}p < .10$, * $p < .05$.

Table 4.24

Summary of Mediation Analysis for Study 2 (child behaviors) (N = 97)

	Paths											
proposed mediators	a			b			c			c'		
	B	*t*	*p*	*B*	*t*	*p*	*B*	*t*	*p*	*B*	*t*	*p*
positive affect	-.125	1.52	.13	8.198^{+}	1.79	.08	-2.458	.67	.50	-1.430	.39	.70
negative affect	-.086*	2.27	.03	4.132	.41	.68	-2.395	.66	.51	-2.037	.55	.59
responsiveness	-.300*	1.99	.05	-3.406	1.20	.23	-7.024^{+}	1.71	.09	-8.048^{+}	1.92	.06
on task	.075	.97	.33	-5.163	1.17	.24	-1.459	.45	.66	-1.071	.33	.74
noncompliance	-.184	1.49	.14	.307	.10	.92	-2.848	.83	.41	-2.791	.79	.43
autonomy	.101	.47	.64	-2.089	1.19	.24	-3.118	.87	.39	-2.907	.81	.42
activity	-.204	1.36	.18	3.145	1.27	.21	-2.712	.76	.45	-2.068	.57	.57
verbalizations	.049	.31	.76	6.803**	3.03	.00	-2.906	.81	.42	-3.242	.94	.35
oppositional defiant	-.112^{+}	1.76	.08	4.249	.73	.47	-2.038	.58	.57	-1.559	.43	.67

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

Table 4.25

Summary of Mediation Analysis for Study 2 (mother-child interaction) (N = 97)

	Paths											
proposed mediators	a			b			c			c’		
	B	*t*	*p*	*B*	*t*	*p*	*B*	*t*	*p*	*B*	*t*	*p*
reciprocity	-.194	1.04	.30	2.896	1.42	.16	-1.849	.51	.61	-1.287	.35	.72
conflict	-.052^{+}	1.72	.09	9.558	.80	.42	-1.018	.30	.77	-.516	.15	.88
cooperation	-.076	.38	.71	1.160	.61	.54	-3.752	1.02	.31	-3.663	.99	.32

Note. $^{+}p < .10$.

Chapter 5

DISCUSSION

The main purpose of the current study was to investigate the association of the birth of a sibling with externalizing behaviors of the children in Turkey. In this study, quantitative data from a representative sample from Turkey was used to examine the association of the birth of a sibling with externalizing behaviors. Also, qualitative data was used from a subsample to test this association. The association of sibling birth with parental resources, characteristics of the children and the family, and externalizing behaviors was studied. Also, the association of sibling birth with real time interactions and externalizing behaviors was studied.

5.1 Summary of the Findings

Consistent with most previous research, Study 1 showed that sibling birth predicted responsiveness of the mother and the academic stimulation provided to the older child (β = -.110 for responsiveness, and β = -.089 for academic stimulation). That is, a decline in responsiveness of mother and the academic stimulation followed the birth of a sibling. This result is consistent with the Resource Dilution Theory (Blake, 1981) which indicated that parental resources are finite and as the number of children in the family increases, the availability of parental resources for each child decreases (Downey, 2001).Although the finding about the decline in emotional resources was supported by previous studies (Kowaleski-Jones & Dunifon, 2004), there were inconsistent findings about the cognitive

resources after the birth of a sibling. The finding of the current study was consistent with the study of Menaghan and Parcel (1995) that after the birth of a sibling, there was a decrease in academic stimulation. However, in the study of Kowaleski-Jones and Dunifon (2004) an increase in cognitive stimulation was found after the birth of a sibling. The age of the older children in the samples might be related to the discrepancy between the findings of these studies. As the child grows older, the parents need to increase the level of cognitive stimulation that they provide to their children, especially after the children start school. In the study of Kowaleski-Jones and Dunifon (2004), the children in the sample were either going to school or had started school during the study. However, in the current study, most of the children in the sample started school at the last two waves of study and the highest percent of children (29.2%, See Table 4.1) experienced the birth of a sibling when they were between the ages of 3 and 4. The average age of the children in this sample was 71.37 in months when they experienced the birth of a sibling. Also, in the study of Menaghan and Parcel (1995), the children were between the ages of 3 and 6, similar to the current study.

The findings of Study 1 also showed that some control variables predicted parental resources and maternal depression after sibling birth. An increase was predicted at learning materials after sibling birth by birth order (β = .075) and presence of extended family member (β = .067). That is, if the child was first born or there was a female relative at home who might be taken care of the child, after sibling birth an increase was predicted for learning materials that were provided to the older child. The results of Study 1 also showed that the older child's starting school during inter-survey interval had positive influence on mothers. While a decline was predicted at maternal depression for mothers of children who started school during inter-survey interval (β = -.140), an increase was predicted for responsiveness of the mother (β = .133) for same children. Also, it was found that the presence of a female extended family member for childcare predicted an increase at maternal depression (β =

.082). When all these results were gathered they showed that the child's going to school after the birth of a sibling might be the key factor for mothers to be effective in parenting. This result also supported the Ecological Systems Theory (Bronfenbrenner, 1994) which indicated that while the system in which the children live influences them, they influence their environment as well. That is, while sibling birth influenced their parental resources, they influenced their mothers in a positive way by going to school after sibling birth.

In Study 2, the findings indicated that sibling birth predicted a decline in the older child's negative affect and older child's responsiveness during real time interactions. However, actually an increase was expected in older child's negative affect after the sibling birth based on the findings of previous research. Dunn, Kendrick, and MacNamee (1981) found that after the birth of a sibling, there was an increase in negative behavior towards the mother. The decline in the negative affect after the birth of a sibling might be due to two reasons. First, as children grow up, their behaviors differ. They might not show negative affect toward their mother during real time interactions because they might be aware of that they should control their behaviors in some conditions. Second, the decline in older child's negative effect might be due to the effort that older child showed to gain the mother's attention because sibling birth predicted a decline in mother's responsiveness when the characteristics of family and the child were controlled (See Table 4.20).

The results of Study 1 showed that sibling birth did not predict externalizing behaviors of children. However, in the previous literature a link between sibling birth and externalizing behaviors was found. Baydar, Hyle, and Brooks-Gunn (1997) found that after the birth of a sibling the older children's behavior problems increased. Similarly, in the study of Kolak and Volling (2013), they found that there was a significant increase in externalizing behaviors of children after the birth of a sibling. There might be two reasons for the discrepancy between the findings of previous studies and the current study. For example, the age of the participants

was different in those studies. The children were at preschool and early grade school years in the study of Baydar, Hyle, and Brooks-Gunn (1997) and the age range of the sample in study of Kolak and Volling (2013) was from 12 months to 69 months. However, the age range of the children in the current study was from 3 to 7. That is, sibling birth seems to have a detrimental effect when they were either too young (e.g. 12 months old) or too old (e.g. 8 years old).

In addition to the age of the participants, the cultural context that the children lived in might be a reason for the discrepancy. According to the Ecological Systems Theory (Bronfenbrenner, 1994), human development can be understood by considering the entire ecological system in which the development occurs. The participants of the studies of Baydar, Hyle, and Brooks-Gunn (1997) and Kolak and Volling (2013) were from U.S. However, the participants of the current study were from Turkey. While in U.S. individualism is prevalent; in Turkey a collectivistic culture is dominant. Therefore, the family contexts were expected to be different in those two countries. Even though it was not a large percent (24.5 %), in the sample of Study 1, there were other family members living in the home with the nuclear family which is labeled as structurally extended families. The help of other family members to mother after the birth of a sibling was expected in Turkish culture. In families where extended family members do not live with the nuclear family but may carry out family functions such as childcare, this is labeled as functionally extended family (Georgas et al., 2006). Even in the cases where no extended family co-resided, their support may alleviate some of the negative effects of the birth of a sibling on the mothers and on the children. Thus, this might be a reason that the sibling birth did not result in an increase in externalizing behaviors in the current sample.

In the current study, it was tested whether some children were at risk for being negatively influenced by the sibling birth more than other children. The association of sibling

birth with parental resources and with children's externalizing behaviors was expected to be stronger for children who were at developmental risk due to other factors. The children who were considered to be at risk in the current study consisted of four subgroups: being between the ages of 3 and 4 at the baseline as opposed to being between the ages of 4 and 5, 5 and 6, and 6 and 7, being highly reactive, having low parental resources at baseline and living in a family with low economic well-being. When the association of sibling birth with parental resources was investigated for these four subgroups, the findings showed that sibling birth had an effect on some parental resources that were provided to the children at Time 2.

The sibling birth significantly predicted the parental resources provided at Time 2 for children who lived in a family with low economic well-being. Except for harsh discipline, all parental resources (learning materials, responsiveness, variety of experiences, and academic stimulation) were found to decline after the sibling birth for those children. For the children who were highly reactive, sibling birth significantly predicted maternal responsiveness. The results showed that there was a decline in maternal responsiveness after the sibling birth for highly reactive children. Responsiveness is the parental resource that is most vulnerable after the birth of a sibling and this was even more threatened for highly reactive children who might be in need of responsiveness the most.

One of the high risk groups in the current study was the group of children who were between the ages of 3 and 4 during baseline and they were named as "younger children". When the association of sibling birth with parental resources at Time 2 was investigated for this group, it was found that only academic stimulation was predicted by sibling birth. The birth of a sibling, predicted a decline in the academic stimulation at Time 2 that was provided for younger children. The younger group was the only group that the sibling birth did not predict a decline in responsiveness. This might be due to that children between the ages of 3 and 4 still need their mother around them, need their attention, and so the mothers respond

these needs. Another subgroup consisted of children who were provided low parental resources at Time 1. Sibling birth predicted a significant decline in learning materials and responsiveness, and a significant increase in harsh discipline for this group. This showed that sibling birth threatened the parental resources of children who were already at a disadvantage in terms of parental resources before the birth of a sibling.

In Study 1, the mediational role of parental resources in the link between the sibling birth and externalizing behaviors was investigated. However, it was found that the parental resources that appeared to be affected by the birth of a sibling (e.g. responsiveness) were not the ones that mediated the effects of the sibling birth on externalizing behaviors of children. Among the parental resources, only the variety of experiences that parents provided to the older child mediated the relationship between the sibling birth and externalizing behaviors of the children. The findings indicated that the presence of the variety of experiences after the birth of a sibling was associated with lower externalizing behaviors.

5.2 Implications

The current study was conducted in a social-cultural environment that sharply differed from the previous studies in: (1) strong family bonds (collectivism); (2) functionally extended families; (3) mothers who were the sole caretakers of the children (i.e., not much paid or unpaid child care and not much maternal employment). Below, I explained how these differences could associate with childbirth.

First, as I explained above, the data of the current study came from a Turkish sample. Compared to the previous studies that conducted in European countries and U.S., in Turkey collectivism is dominant. A few common traits of collectivistic cultures include strong family bonds and working as a group. In every culture, childbirth is welcomed. However, after the birth of a child the mother might be more strongly supported by family members in

collectivistic cultures compared to individualistic cultures. This difference between these cultures might be one of the reasons that attenuate the anticipated negative effects of sibling birth. As it was found in the current study, there was a decline in parental resources after sibling birth. Therefore, after sibling birth the presence of female relatives such as grandmothers or aunts of the child might compensate the negative effects of this decline. While the mother takes care of the baby, the grandmother/aunt might take care of the older child (e.g. take out, play games, read a book).

In the current study, the mothers were the sole caretakers of the 91.8% of children when they were at the age of 3. 90.9% of mothers in the sample were not working and 89.1% of them identified themselves as housewives. The children in the sample were also at home and not going to school. 98.2% of children were not going to day care center at the age of 3. These factors might play a role in the lack of negative effects of sibling birth. The mothers and the children spend their time together. The potential negative effects of sibling birth might be buffered because there was enough time for mother-child interaction which might play an important role in reducing the negative effects.

5.3 Methodological Factors

In the current study, a matched control methodology and a longitudinal pre-post design were simultaneously used in order to control for the confounding effects of self-selection on the estimates of sibling birth (See Section 3.1.2). In previous studies of the effects of sibling birth, a similar level of control over confounding was not achieved. Different procedures were done for Study 1 and Study 2 in order to identify matched controls. In the previous studies, comparisons were done between the children who experienced the birth of a sibling and those who did not (e.g. Baydar, Hyle, & Brooks-Gunn, 1997). In the study of Kolak and Volling (2013), children's externalizing behaviors were compared pre- to

post-birth. In short, the comparison in that study was between time periods. Similarly, Meneghan and Parcel (1995) examined the changes in home environment of children over 2 years after the birth of a sibling and did not compare them with any other group of children who did not experience the birth of a sibling. Also, in the study of Kowaleski-Jones and Dunifon (2004), the children were not compared to a control group, but the responses were measured before, during and after the birth of a sibling.

5.4 Contributions

According to UNICEF (2011), 80-85% of children in Turkey have at least one sibling, and one-child families are a minority in Turkey. Therefore, using Turkish data could contribute to the previous studies almost all of which used data from U.S. Also, the influence of mother-child relationship on children in Turkey is important because non-maternal care or preschool education is rare in Turkey (TurkStat, 2012). Therefore, using data from Turkey is important because it allows us to validate previous findings in a substantially different social and cultural context.

The child's behaviors, mother's behaviors, and mother-child interactions were studied by an observational method (PARCHISY) with a standardized coding system in Turkish culture for the first time. The Turkish version of PARCHISY was developed and applicability of this coding system was demonstrated for the Turkish families.

Another important contribution of this study is that both quantitative and qualitative data were used to investigate the child and the mother's behaviors. Thus, findings based on quantitative and qualitative measures for the child and the mother behaviors could be compared. The answers that mothers gave during interviews may be biased because the information they provided is the general tendency of their children's behavior. The

observational data gives direct and objective information about the child's and the mother's behaviors but it is specific to a single time and place.

5.5 Limitations

Despite the important contributions, this thesis had a number of limitations. First, the sample size of the Study 1 was large when compared to other studies, but the sample size of Study 2 was small. Thus, the effects of sibling birth on real time interactions had limited statistical power.

Second, birth intention status of the sibling (intended, mistimed or unwanted) was not studied in the current study. The intention status of the birth of a new sibling was not asked of the mothers in this study but the preconception birth intentions were found to be related to parental resources in previous research that emotional resources to older children decreased after the birth of a mistimed sibling and unintended births led to decreased parental resources for older children in the household (Barber & East, 2009). There was no data on the intention status of birth in the current study, but it was found that certain parental resources were likely to decline after sibling birth especially if the resources were low to begin with.

Third, similar to all observational data, these observational data were obtained from video recordings of the mother and the child but that information is partly situational. That is, during video recordings the mothers and the children might behave differently if the observation was conducted in another place or time.

5.6 Future Studies and Suggestions

The current study suggests two important issues for the future studies: (1) investigation of the sibling birth at predetermined times and (2) investigation of the relationship between the father figure and the older child.

This study showed that sibling birth was not associated with externalizing behaviors. In previous studies, evidence was found for the effects of the birth of a sibling on behavioral problems (Baydar, Hyle, & Brooks-Gunn, 1997). However, it was suggested that the behavioral problems were temporary and were expected to decrease within about a year. The data of the post-birth interview which was used in the current study was collected between the months of June and September. For this reason, while some children might have already experienced the birth of a sibling for almost a year before the post-birth interview, the other children might have experienced the sibling birth about a month before the post-birth interview. That is why the post-birth interviews should be done at times relative to the time of the birth of a sibling.

The other avenue for future studies is about the investigation of the relationship between the father figure and the older child.. The current study mostly based on mother-child interaction. However, the pattern of father-child interaction before and after the birth of a sibling is also important. The parenting role of the father might play an important role in the association of the birth of a sibling and externalizing behaviors.

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APPENDIX A

Anne Kodları

1. Olumlu yönlendirme/denetleme: Övme, açıklama yapma ve açık uçlu soru sorma
    1) Hiç olumlu yönlendirme/denetleme davranışı göstermedi.
    2) Sadece bir kere olumlu yönlendirme/denetleme davranışı gösterdi, geriye kalan zamanda komut ("tak, koy, çıkart vb.") kullandı.
    3) Yarıdan az sürede olumlu yönlendirme/denetleme davranışı gösterdi; daha çok komutlara dayanarak çocuğu kontrol etti.
    4) Yarıdan fazla sürede olumlu yönlendirme/denetleme davranışı gösterdi; arada bir komut kullandığı da oldu (çoğunlukla çocuğu övgü, açıklama ve açık uçlu sorularla yönlendirdi).
    5) Hemen hemen bütün dakika boyunca çocuğu övgü, açıklama ve açık uçlu sorularla yönlendirdi.

2. Olumsuz yönlendirme/denetleme: Legoları veya çocuğun hareketlerini fiziksel olarak kontrol etme veya çocuğu olumsuz yorumlarla yönlendirme
    1) Hiç olumsuz yönlendirme/denetleme davranışı göstermedi.
    2) Sadece bir kere olumsuz yönlendirme/denetleme davranışı gösterdi.
    3) Yarıdan az sürede olumsuz yönlendirme/denetleme davranışı gösterdi.
    4) Yarıdan çok sürede olumsuz yönlendirme/denetleme davranışı gösterdi; eleştiri yaptı ("Hayır, çok çirkin oldu") ve/veya fiziksel müdahalede bulundu.
    5) Hemen hemen bütün dakika boyunca çocuğu eleştirdi (ayıplama içerebilir), yapılacak etkinliği fiziksel olarak devraldı, legoları ve/veya çocuğun elini/kolunu/vücudunu fiziksel olarak kontrol etti (fiziksel cezalandırmalar içerebilir).

3. Olumlu duygu gösterme - sıcaklık/içtenlik/gülme ve gülümseme/sözel sevgi ifadesi kullanma
    1) Hiç olumlu duygu göstermedi.
    2) Sadece bir kere olumlu duygu gösterdi.
    3) Yarıdan az sürede olumlu duygu gösterdi.
    4) Yarıdan çok sürede olumlu duygu gösterdi.
    5) Hemen hemen bütün dakika boyunca olumlu duygu gösterdi.

4. Olumsuz duygu gösterme – dışlama: Kızgın yüz ifadesi, sert ya da soğuk sözel ifade kullanma
    1) Hiç olumsuz duygu göstermedi.
    2) Sadece bir kere olumsuz duygu gösterdi.
    3) Yarıdan az sürede olumsuz duygu gösterdi.
    4) Yarıdan çok sürede olumsuz duygu gösterdi - kaşlarını çattı, sert baktı, soğuk/sert ses tonu kullandı.
    5) Hemen hemen bütün dakika boyunca olumsuz duygu gösterdi – somurtarak/kaşlarını çatarak baktı, hep sert bir ses tonu kullandı.

5. Çocuğun konuşmalarına (sorularına, yorumlarına) ve davranışlarına karşı duyarlılık
    1) Anne hiç karşılık vermedi; çocuğun yorumlarını, sorularını ve davranışlarını görmezden geldi.
    2) Sadece bir kere çocuğun konuşmasına veya davranışına karşılık verdi.
    3) Yarıdan az sürede çocuğa karşılık verdi - çocuğun yorumlarının, sorularının, davranışlarının yarısından azına karşılık verdi, bazı karşılıklar gecikmeli gelmiş olabilir.
    4) Yarıdan çok sürede çocuğun sözlerine veya davranışlarına karşılık verdi - yalnızca bir veya iki kere gecikmeli karşılık verdi, çocuğun bazı yorumlarına katkıda bulundu.
    5) Bütün dakika boyunca çocuğun yorumlarına, sorularına ve davranışlarına gecikme olmadan karşılık verdi, çocuk tarafından yapılan yorumlar üzerine konuştu.

6. Etkinliğe odaklanma, verilen etkinliğe bağlı kalma
    1) Anne etkinliğe hiç ilgi göstermedi, katkıda bulunmadı.
    2) Anne etkinliğe bir kez ilgi gösterdi, diğer zamanlarda açıkça çocuğun yaptıklarına ilgi göstermediğini belli etti.
    3) Anne etkinliğe yarıdan az sürede ilgi gösterdi ve/veya yarıdan az sürede bir şeyler kattı.
    4) Yarıdan fazla sürede etkinliğe odaklandı ve/veya bir şeyler kattı, sadece bir veya iki kere etkinlik dışı davranışlarda bulundu.
    5) Hemen hemen bütün dakika boyunca etkinliğe katkıda bulundu ve sürekli olarak etkinlik ile ilgilendi.

7. Sözel ifade kullanımı
    1) Hiç sözel ifade kullanmadı.
    2) Sadece bir kere sözel ifade kullandı.
    3) Yarıdan az sürede sözel ifade kullandı.
    4) Yarıdan çok sürede sözel ifade kullandı.
    5) Hemen hemen bütün dakika boyunca çocukla konuşmayı sürdürdü, sessizliğin olduğu belirli bir an olmadı.

Çocuk Kodları

8. Olumlu duygu gösterme – sıcaklık: içtenlik/gülme ve gülümseme, sevgi gösterme
    1) Hiç olumlu duygu göstermedi.
    2) Sadece bir kere olumlu duygu gösterdi.
    3) Yarıdan az sürede olumlu duygu gösterdi.
    4) Yarıdan çok sürede olumlu duygu gösterdi.
    5) Hemen hemen bütün dakika boyunca olumlu duygu gösterdi.

9. Olumsuz duygu gösterme – dışlama: Kızgın yüz ifadesi, sert ya da soğuk sözel ifade kullanma
    1) Hiç olumsuz duygu göstermedi.
    2) Sadece bir kere olumsuz duygu gösterdi.
    3) Yarıdan az sürede olumsuz duygu gösterdi.
    4) Yarıdan çok sürede olumsuz duygu gösterdi.
    5) Hemen hemen bütün dakika boyunca olumsuz duygu gösterdi.

10. Annenin sorularına, yorumlarına, davranışlarına karşılık verme/yanıtlama - karşılıklar sözel veya davranış şeklinde olabilir
    1) Çocuk hiç karşılık vermedi; annenin yorumlarını, sorularını ve davranışlarını görmezden geldi.
    2) Sadece bir kere anneye karşılık verdi.
    3) Yarıdan az sürede anneye karşılık verdi, bazı karşılıklar gecikmeli olabilir.
    4) Yarıdan çok sürede anneye karşılık verdi - yalnızca bir veya iki kere gecikmeli karşılık verdi.
    5) Bütün dakika boyunca annenin yorumlarına, sorularına ve davranışlarına gecikme olmadan karşılık verdi, anne tarafından yapılan yorumlar üzerine konuştu.

11. Etkinliğe odaklanma, verilen etkinliğe bağlı kalma
    1) Çocuk etkinliğe hiç ilgi göstermedi, katkıda bulunmadı.
    2) Çocuk etkinliğe bir kez ilgi gösterdi, diğer zamanlarda açıkça etkinliğe ve annenin yaptıklarına ilgi göstermediğini belli etti.
    3) Çocuk etkinliğe yarıdan az sürede ilgi gösterdi ve/veya yarıdan az sürede bir şeyler kattı.
    4) Yarıdan çok sürede etkinliğe odaklandı ve/veya bir şeyler kattı, sadece bir veya iki kere etkinlik dışı davranışlarda bulundu.
    5) Hemen hemen bütün dakika boyunca etkinliğe katkıda bulundu ve sürekli olarak etkinlik ile ilgilendi.

12. İtaatsizlik
    1) Etkinlik boyunca annesinin istediklerini yaptı.
    2) Sadece bir kere itaatsizce davrandı.
    3) Yarıdan az sürede itaatsizce davrandı.
    4) Yarıdan çok sürede itaatsizce davrandı.
    5) Hemen hemen bütün dakika boyunca itaatsizce davrandı; ondan istenen şeyleri yapmayı reddeti veya istenenin aksi şeyler yaptı; hiçbir isteğe itaat etmedi.

13. Özerklik/bağımsızlık – göreve çocuğun öncülük etmesi ve etkinliği kendisi yapması/yönlendirmesi; etkinlik dışı davranışları göz önüne almayın
    1) Çocuk özerklik/bağımsızlık göstermedi; etkinlik boyunca anne öncülük etti.
    2) Sadece bir kere çocuk özerklik gösterdi.
    3) Yarıdan az sürede çocuk özerklik gösterdi.
    4) Yarıdan çok sürede çocuk özerklik gösterdi; yarıdan fazla zamanda etkinlik çocuğun kontrolündeydi.
    5) Hemen hemen bütün dakika boyunca çocuk tamamen özerk davrandı, etkinlik baştan sona çocuğun kontrolündeydi.

14. Hareketlilik – enerji: bütün küçük (kollarını oynatma, legoyu veya verilen resmi gösterme) ve büyük (hoplayıp zıplama, ayağa kalkıp oturma) vücut hareketlerini içerir, legoları takıp çıkarırken yaptığı ince motor hareketleri göz önüne almayın.
    1) Çocuk son derece halsiz veya yorgundu; hiç hareketlilik göstermedi (legoları takıp çıkarmak dışında).
    2) Sadece bir kere hareketlilik gösterdi.
    3) Yarıdan az sürede hareketlilik gösterdi.
    4) Yarıdan çok sürede hareketlilik gösterdi.
    5) Hemen hemen bütün dakika boyunca çocuk hareketliydi, çocuk çok aktif ve enerjikti, kıpır kıpırdı, hareketleri hızlıydı.

15. Sözel ifade kullanımı
    1) Hiç sözel ifade kullanmadı.
    2) Sadece bir kere sözel ifade kullandı.
    3) Yarıdan az sürede sözel ifade kullandı.
    4) Yarıdan çok sürede sözel ifade kullandı.
    5) Hemen hemen bütün dakika boyunca anneyle konuşmayı sürdürdü, sessizliğin olduğu belirli bir an olmadı.

16. Karşı gelme/karşı çıkma
    1) Çocuk anneye hiç karşı gelmedi.
    2) Çocuk sadece bir kere anneye karşı geldi.
    3) Çocuk yarıdan az süre boyunca anneye karşı geldi.
    4) Çocuk yarıdan çok süre boyunca anneye karşı geldi.
    5) Hemen hemen bütün dakika boyunca çocuk annesinin önerilerine veya komutlarına karşı geldi.

İkili Kodlar

17. Karşılıklı ilişki (birliktelik): Olumlu bir duyguyu birlikte yaşama, birbirinin yüzüne bakma, karşılıklı/sırayla konuşmayı ya da oynamayı içeren etkileşim
    1) Hiç karşılıklı ilişki gözlenmedi.
    2) Sadece bir kere karşılıklı ilişki gözlendi.
    3) Yarıdan az sürede karşılıklı ilişki gözlendi (olumlu duygu paylaşımı veya birbirine bakma).
    4) Yarıdan çok sürede karşılıklı ilişki gözlendi (olumlu duygu paylaşımı ve/veya birbirine bakma).
    5) Hemen hemen bütün dakika boyunca yoğun karşılıklı bir ilişki gözlendi – sürekli olarak birlikte yaşanan olumlu bir duygu vardı ve anne-çocuk birbirilerine sık sık baktılar, "birliktelik" neredeyse hiç bozulmadı.

18. Çatışma/çekişme: Küçük veya büyük anlaşmazlık – karşılıklı veya birlikte olumsuz duygu yaşama, tartışma, oyunun kontrolü için mücadele etme, vb.
    1) Etkinlik sırasında hiç çatışma veya çekişme gözlenmedi.
    2) Sadece bir kere çatışma/çekişme gözlendi.
    3) Yarıdan az sürede çatışma veya çekişme gözlendi.
    4) Yarıdan çok sürede çatışma veya çekişme gözlendi.
    5) Hemen hemen bütün dakika boyunca çatışmalı ve çekişmeli bir etkileşim gözlendi.

19. İşbirliği - verilen etkinliğin nasıl ilerletileceğine veya sonlandırılacağına dair konuşma ve anlaşmaya varma
    1) Etkinlik esnasında hiç işbirliği gözlenmedi.
    2) Sadece bir kere işbirliği gözlendi.
    3) Yarıdan az sürede işbirliği gözlendi.
    4) Yarıdan çok sürede işbirliği gözlendi.
    5) Hemen hemen bütün dakika boyunca işbirliğine dayanan bir etkileşim gözlendi.

APPENDIX B

Anne Kodları	ID	Anne ad soyadı	Çocuk ad soyadı	Wave	Coder
1- Olumlu yönlendirme/denetleme: Övme, açıklama yapma ve açık uçlu soru sorma	Hiç olumlu yönlendirme/ denetleme davranışı göstermedi	Sadece bir kere olumlu yönlendirme/denetleme davranışı gösterdi, geriye kalan zamanda komut (“tak, koy, çıkart vb.”) kullandı	Yarıdan az sürede olumlu yönlendirme/denetleme davranışı gösterdi; daha çok komutlara dayanarak çocuğu kontrol etti	Yarıdan fazla sürede olumlu yönlendirme/denetleme davranışı gösterdi; arada bir komut kullandığı da oldu (çoğunlukla çocuğu övgü, açıklama ve açık uçlu sorularla yönlendirdi)	Hemen hemen bütün dakika boyunca çocuğu övgü, açıklama ve açık uçlu sorularla yönlendirdi
Dakika	1	2	3	4	5
1’					
2’					
3’					
4’					
5’					
6’					
7’					
8’					
9’					
10’					

Çocuk Kodları	Anket no	Anne ad soyadı	Çocuk ad soyadı	Wave	Coder
8- Olumlu duygu gösterme – sıcaklık: İçtenlik/gülme ve gülümseme/sözel sevgi ifadesi kullanma	Hiç olumlu duygu göstermedi	Sadece bir kere olumlu duygu gösterdi	Yarıdan az sürede olumlu duygu gösterdi	Yarıdan çok sürede olumlu duygu gösterdi	Hemen hemen bütün dakika boyunca olumlu duygu gösterdi
Dakika	1	2	3	4	5
1’					
2’					
3’					
4’					
5’					
6’					
7’					
8’					
9’					
10’					

İkili Kodlar	Anket no	Anne ad soyadı	Çocuk ad soyadı	Wave	Coder
17- Karşılıklı ilişki (birliktelik): Olumlu bir duyguyu birlikte yaşama, birbirinin yüzüne bakma, karşılıklı/sırayla konuşmayı ya da oynamayı içeren etkileşim					
	Hiç karşılıklı ilişki gözlenmedi	Sadece bir kere karşılıklı ilişki gözlendi	Yarıdan az sürede karşılıklı ilişki gözlendi (olumlu duygu paylaşımı veya birbirine bakma)	Yarıdan çok sürede karşılıklı ilişki gözlendi (olumlu duygu paylaşımı ve/veya birbirine bakma)	Hemen hemen bütün dakika boyunca yoğun karşılıklı bir ilişki gözlendi – sürekli olarak birlikte yaşanan olumlu bir duygu vardı ve anne-çocuk birbirilerine sık sık baktılar, "birliktelik" neredeyse hiç bozulmadı
Dakika	1	2	3	4	5
1’					
2’					
3’					
4’					
5’					
6’					
7’					
8’					
9’					
10’					