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Chapter VI. Developmental Trajectories of Children's Anxiety and Depression After the Birth of a Sibling

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Because the depression and anxiety syndrome scale of the CBCL assesses young children's anxiety and fear related to separation from adults (e.g., clings to adults or too dependent) and general nervousness and self-consciousness (e.g., too fearful or anxious), this chapter will focus predominantly on young children's separation anxiety, and increases in attachment behaviors resulting from the potential separation from and loss of attachment figures. Separation anxiety is a normal developmental phase during early childhood in which a young child experiences distress brought on by separation or fear of separation from the primary caregivers (usually the parents). The child displays clinginess to the parent and extreme distress upon separation from the parent and may appear fearful, anxious, or high-strung.

For some children, the birth of a new baby increases children's anxiety not only because of the stressful nature of the transition, but also because of the significant changes in the mother-firstborn relationship (Volling, 2012). Declines in maternal attention and increases in harsh discipline that accompany the transition may evoke children's fear of separation and loss of the parent to the new baby. Prior research indicates an increase in separation anxiety and attachment behaviors (e.g., clinginess, tearfulness) after the birth of a sibling for many children (Dunn & Kendrick, 1982; Kojima, Irisawa, & Wakita, 2005; Stewart et al., 1987), but these behaviors decrease over the first year following the birth (Kojima et al., 2005; Stewart et al., 1987). Thus, it is possible that children experience an adjustment and adaptation response whereby their feelings of anxiety and attachment behaviors increase soon after the sibling's birth, but decline once the initial period of stress has passed, a family routine has been established, and children feel more secure in their relationships with their parents.

Development of Separation Anxiety in Early Childhood

In typically developing children, signs of separation anxiety (e.g., clinginess, tearfulness) emerge toward the end of the first year of life and extend into toddlerhood. Separation anxiety decreases with age during early childhood (Carter et al., 2010; Kearney, Sims, Pursell, & Tillotson, 2003) and is stable during middle childhood (Broeren, Muris, Diamantopoulou, & Baker, 2013)). Through the development of object permanence and the child's increasing sense of independence and exploration, separation anxiety naturally diminishes as children mature and is unlikely to be prolonged unless there is a major life event or stressor. Additionally, separation anxiety may emerge intermittently when the child is in a stressful situation or unfamiliar environment but, even then, it is typically short-lived and a brief reaction to some sort of stressful life event or change (i.e., moving into a new daycare room).

Individual Differences in Young Children's Anxiety

With respect to different pathways, one study reported significant variation in initial levels of separation anxiety symptoms (e.g. becoming distressed when separated from a parent) and found three stable trajectories (low, medium, high) over a two-year period using growth mixture modeling (Broeren et al., 2013). Following children from ages 4 to 11, the researchers categorized the majority of the community sample as stable-low (63.4%) and normative, whereas a small percentage had consistently high symptoms of separation anxiety (6.3%). Significant individual differences in initial level of separation anxiety symptoms and in rate of change were found in a stratified random sample of children between the ages of 12 and 23 months whose symptoms were measured annually for three years (Carter et al., 2010), with a significant decrease in separation anxiety symptoms occurring over time. Two other studies have examined trajectories of anxiety symptoms from 18 months to elementary school-age and reported similar findings with four different trajectory groups: low stable/persistent, low increasing, high decreasing, and high increasing (Battaglia et al., 2016; Feng, Shaw, & Silk, 2008). Similar to Broeren et al. (2013), the low stable/persistent groups were the largest and comprised the majority of the children, whereas the high-increasing groups were the smallest and less than 10% of the sample (Battaglia et al., 2016; Feng, Shaw, & Silk, 2008). Based on these initial studies, we also expected individual differences in children's anxiety after the birth of an infant sibling, with most children in the current community-based sample falling into a large, normative class that would be low and stable over the course of the year following the infant's birth. Although we did anticipate some smaller, riskier trajectory groups where children may have higher initial levels of anxiety and depression than the group of low-stable children, we did not have specific *a priori* predictions about the rate and direction of change (i.e., decrease or increase) of these group trajectories.

Risk and Protective Factors in the Prediction of Separation Anxiety

Using a developmental ecological systems model can be helpful in examining and understanding the risk and protective factors that contribute to the development of separation anxiety symptoms after the birth of a second child with a focus on child, parent, and family characteristics. Child characteristics include difficult child temperament, which has been operationalized through numerous constructs, such as negative emotionality, withdrawal, and adaptability, and has consistently been associated with increased separation anxiety throughout early and middle childhood. For example, difficult temperament in infancy (i.e., adaptability, intensity) predicted an increase in separation anxiety when children were 2 and 3 years old (Warren & Simmens, 2005). Shaw and colleagues (Shaw et al., 1997) reported that negative emotionality at 2 years predicted the development of anxiety and depressive symptoms by the time the children were 5.

Other aspects of child temperament, such as increased shyness and behavioral inhibition, are also associated with increased separation anxiety symptoms (Broeren et al., 2013; Carter et al., 2010; Feng et al., 2008; Paulus, Backes, Sander, Weber, & Gontard, 2015). Higher levels of behavioral inhibition predicted increased anxiety symptoms (Feng et al., 2008; Paulus et al., 2015) with children high in separation anxiety more behaviorally inhibited than children

low in separation anxiety. Higher levels of behavioral inhibition and internalizing difficulties (e.g., emotional symptoms and peer problems) also predicted membership in the stable-high class relative to the stable-low class of children's anxiety (Broeren et al., 2013). Changes in behavioral inhibition over time were associated with corresponding changes in separation anxiety, such that toddlers and preschoolers with slowly decreasing behavioral inhibition were more likely to experience an increase in separation anxiety symptoms into middle childhood (Carter et al., 2010).

Parent characteristics that have been related to young children's anxiety include the quality of parenting behavior and parental mental health. Maternal depression, in particular, appears to be a risk factor for the development of separation anxiety symptoms in children (Battaglia et al., 2016; Herba et al., 2013; Warren & Simmens, 2005). Higher levels of maternal depression during infancy and toddlerhood predicted higher anxiety and increasing anxiety trajectories into the preschool and early elementary school years (Battaglia, et al., 2016; Herba et al., 2013; Warren & Simmens, 2005).

Family dynamics also predicted increased separation anxiety in young children. Exposure to interparental conflict (Shaw et al., 1997) and family conflict (Kearney et al., 2003) increased 5- to 7-year-old children's anxiety, particularly when children were rated by mothers as high in negative emotionality (Shaw et al., 1997). The mother-child attachment relationship has also been related to separation anxiety symptoms, with insecurely-attached children displaying more separation anxiety at 6 years than securely-attached children (Dallaire & Weinraub, 2005).

Based on this literature, we predicted that maternal depressive symptoms, children's behavioral inhibition, negative emotionality, insecure maternal-child attachment, and interparental conflict would predict separation anxiety trajectories, with children at greater risk of developing anxiety and depression after the transition when mothers were more depressed, children had insecure attachments to their parents, were more behaviorally inhibited and negatively emotional, and parents engaged in marital conflict.

Sibling Relationships and Early Separation Anxiety

We did not propose specific *a priori* hypotheses about the links between children's separation anxiety after the birth of a sibling and the subsequent development of sibling relations at the end of the first year because of the lack of research in this area. Based on mothers' previous reports that older children displayed increased separation anxiety behavior over this period (Dunn & Kendrick, 1982; Kojima et al., 2005; Richardson, 1983; Stewart et al., 1987) and that children's initial reactions within the first months after birth predicted sibling interactions at 14 months (e.g., initial withdrawal predicted poorer sibling relations), we considered whether there were differences in sibling relationship quality as a result of the different anxiety and depression trajectories, expecting that children higher on anxiety may have less positive and more avoidant sibling relationships than children with lower levels of anxiety and depression.

Results

Individual Differences in Trajectories of Anxiety and Depression

The latent linear growth model was used in the GMM based on earlier findings of the unconditional models in Chapter III. The GMM revealed a three-class model with a linear growth factor was the best-fitting model based on fit indices; the three-class model had a lower BIC, BIC = 2983.16, than the two-class, BIC = 3006.65, and four-class models, BIC = 2986.20. The AIC was lowest for the four-class model, AIC = 2920.96, and similar to the three-class model, AIC = 2928.23, while the two-class model had the highest AIC, AIC = 2962.01. The three-class model also had the highest entropy (.872) compared to the two (.799) and four (.825) class models. Table 8 presents estimates and standard errors for the fixed effects for each of the three classes and Figure 6 shows the different trajectory patterns for the three classes.

Results were consistent with theoretical patterns of linear change and stability (Figure 1). The largest class was labeled the *low-decreasing* class and comprised 68.5% of the sample ($n = 157$). This class showed low levels of anxiety symptoms at the prenatal timepoint, with a moderate linear decrease throughout the 12 months. The second class was labeled the *mid-stable* class and represented 27.5% of the sample ($n = 63$). Children in this class showed moderate levels of anxiety symptoms at the onset (intercept) which remained stable throughout the first year after the birth. Finally, the third, smallest class, 3.9% of the sample ($n = 9$), displayed a *high-increasing* trajectory, and showed the highest levels of anxiety symptoms at the onset with a linear increase throughout the first year after the birth of the sibling.

Once again, we examined the spaghetti plots for each individual trajectory for all children by class membership using the normative mean, borderline clinical range cut-off, and clinical range cut-off for the CBCL anxiety subscale (see Figure 2 in supplemental materials). The low-decreasing class, or majority of the children, fell below the normative mean at all timepoints, with the exception of a few children who started within the borderline clinical range at the prenatal timepoint, but were below the normative mean at all other timepoints. Children in the mid-stable class had trajectories that were higher than the low-decreasing class, but children were either in the normative range or borderline clinical range, with no children in the clinical range at any timepoint. The smallest class, the high-increasing class, consisted of children who all had trajectories in the borderline clinical range. Once again, the smallest class may have been few in number, but the fact that all children fell within the borderline clinical range indicates that the resulting GMM classes reflected meaningful individual differences.

Predicting Anxiety and Depression Trajectories

Four candidate variables were identified from the variable selection procedure: children's negative emotionality, children's behavioral inhibition, children's age, and parents' reports of negative marital relationship quality. The full multinomial regression model with all interactions was not significantly better than the reduced main effect model, $LR \text{ Chisq } (df =$

22) = 32.40, $p = .071$, thus the reduced main effect model is used for interpretation of effects.

Results from the multinomial logistic regression using the low-decreasing class as the reference class are presented in Table 9 and reveal significant effects for children's negative emotionality, behavioral inhibition, and age, as well as parents' report of negative marital relationship quality. Children with greater negative emotionality and whose parents reported higher levels of negative marital relationship quality were significantly more likely to be in the mid-stable class or high-increasing class relative to the low-decreasing class. Behaviorally inhibited children were significantly more likely to be in the high-increasing class than the low-decreasing reference class. Older children were more likely to be in the mid-stable class than the low-decreasing reference class.

We also wanted to determine if there were differences between the mid-stable and high-increasing classes, and conducted an additional exploratory multinomial logistic regression with the mid-stable class as the reference class. Negatively emotional children were more likely to be in the high-increasing class than the mid-stable class, $b = 1.994$, $z = 2.287$, $OR = 7.341$, $p = .022$, as were children who were behaviorally inhibited, $b = 2.122$, $z = 2.530$, $OR = 8.351$, $p = .011$, and children whose parents reported higher levels of negative marital quality, $b = .881$, $z = 2.141$, $OR = 2.14$, $p = .032$.

Consequences of Anxiety and Depression for Sibling Relationships at One Year

Results of the regressions to examine whether sibling relationship quality at 12 months was predicted by separation anxiety trajectory classes revealed no significant differences relative to low-decreasing reference class.

Discussion of Children's Anxiety and Depression Trajectories

In this chapter, we examined the overall pattern of anxiety and depression in children after the birth of a sibling, as well as subgroups of trajectories that captured individual differences within the overall sample. Additionally, we explored the predictors of these trajectories and tested whether distinct trajectory subtypes were associated with differences in sibling relationship quality when the younger sibling was one year of age.

Overall, the unconditional model indicated no overall change in children's anxiety and depression from the prenatal period to 12 months after their sibling's birth, although there was significant variability in the sample, suggesting that children have differing initial levels of anxiety symptoms and patterns of change within the sample. Both of these findings were similar to and support previous research on young children's separation anxiety, finding heterogeneity in initial levels and change in children ages 4 to 11, in addition to children's separation anxiety symptoms remaining stable over time (Broeren et al., 2013).

To further examine heterogeneity within the sample, analyses revealed three trajectories: low-decreasing, mid-stable, and high-increasing. The low-decreasing class was the largest (68.5%), with children displaying low prenatal levels of separation anxiety and attachment behaviors that decreased over the year. The second class, mid-stable (27.5%) consisted of

children whose initial separation anxiety was higher than the low-decreasing class and was stable over time. The low-decreasing and mid-stable classes comprised over 95% of the sample and it should be noted that both were below the clinical cut-off for anxiety and depression. It is quite likely that these results reflect the age-normative pattern of decreasing separation anxiety reported by others. The birth of a new infant sibling does not appear to alter this trajectory substantially. Considering the average age of the children (31 months) at the time of the younger sibling's birth, it is not surprising that children had low levels of separation anxiety because separation anxiety emerges in children around 12 months and peaks during the second year of life. With the development of object permanence and an emerging sense of independence, separation anxiety is typically infrequent by the time the child reaches preschool age. Even so, a small percentage of children (4%) did evince high levels of anxiety and depression symptoms that increased after the birth and placed them in the borderline clinical range. These children were already high on anxiety and depression before the birth and continued to increase over the year. Although small in number, these children are probably the children whose families may be most in need of assistance to manage the stresses associated with the transition after the birth of a sibling.

Our results differ in some respects from previous studies that reported an increase in children's anxiety and clinginess following the birth of a sibling (Dunn & Kendrick, 1982; Kojima et al., 2005; Stewart et al., 1987). We found an increase in anxiety symptoms over time for only a small portion of children. Testing for an adjustment and adaptation response in the unconditional model revealed that the unconditional linear model fit the data better, suggesting that for the sample as a whole there was no significant adjustment and adaptation period for children, nor was there any evidence of change over time. Study design differences may account for the differing results across this and earlier studies. We used a longitudinal design incorporating several timepoints that used parents' reports of children's anxiety symptoms on a well-validated measure of children's behavioral and emotional adjustment over time, rather than relying on the mothers' retrospective memory after the birth (Kojima et al., 2005) or collecting information on children's behavior after the birth with no pre-birth information for comparison (Stewart, 1990). For instance, Kojima and colleagues (2005) asked mothers at six months postpartum to remember their children's behavior during the last trimester of pregnancy and at one, three, and six months postpartum. Similarly, Stewart and colleagues (1987) asked mothers at the one- and four-month timepoints if any behavior problems were new or continued since the prenatal period, but did not ask the mothers about their children's behavior at the prenatal timepoint. As our findings underscore, differences in children's anxiety across the trajectory classes were already apparent before the birth and not necessarily a result of the birth, further attesting to the need for longitudinal research designs that track changes in children's adjustment over the transition.

Even though most children did not present with clinical levels of anxiety, we should note that the 9 children of the high-increasing class did fall in the borderline clinical level even before the birth and continued to increase in their behavior over time. Thus, it is these children and what predicts this group of high-increasing children that becomes of interest when making recommendations for potential intervention. Children in the high-increasing class were more likely to have higher levels of behavioral inhibition and negative

emotionality, and had parents reporting higher levels of negative marital relationship quality even before the infant's birth. Behavioral inhibition was operationalized as shyness in relation to new experiences and people, and our findings support previous research that has found that behavioral inhibition differentiates between low and high trajectories of separation anxiety symptoms (Broeren et al., 2013; Feng et al., 2008). There was also more negative marital relationship quality for children with higher anxiety symptoms, highlighting the role of family dynamics in children's emotional adjustment (Shaw et al., 1997). Our results are consistent with earlier studies finding that exposure to interparental conflict over child-rearing disagreements was a significant risk factor for the development of preschool children's internalizing disorders, particularly for those children high in negative emotionality (Shaw et al., 1997). Our findings are also in line with the emotional security hypothesis (Davies & Cummings, 1994), which proposes that interparental conflict causes children's insecurity and anxiety about family relationships and may help explain why negative marital relationship quality and children's negative emotionality were both predictors of the trajectories of children's anxiety after the birth of a sibling.

The mid-stable class consisted of children who were older, with an average age of just under three years old ($M = 34$ months), and were more negatively emotional and had higher behavioral inhibition than those in the low-decreasing class, who were just over two years of age ($M = 28$ months). Almost all of the parents reported some sort of preparation with the older sibling regarding the impending birth in the form of media, books, or discussion (see Table 1), and it is possible that older children were more aware of the impending physical and household changes (e.g., mother's growing stomach, nursery preparation). For the older children, some awareness of the change may have resulted or compounded existing individual characteristics, such as emotional negativity and behavioral inhibition before the birth of the younger sibling than the low-decreasing group, who may not have been able to understand the life transition that was about to occur to the extent that the older children did. It should be noted, however, that children's social-cognitive understanding as assessed with theory-of-mind and emotional understanding tasks did not emerge as a predictor of their anxiety and depressive symptoms so continuing research is needed to clearly elucidate what role children's age plays in the stability and change in children's anxiety across the transition to siblinghood. Because separation anxiety peaks in toddlerhood and many of the children in the current study were older than 2 years of age, this may explain why most children did not experience changes over time. Children's temperament, in the form of both negative emotionality and behavioral inhibition, were, however, significant predictors of the trajectory classes, which is clearly consistent with a body of research finding associations between difficult child temperament and increased anxiety and the development of internalizing problems (Broeren et al., 2013; Feng et al., 2008; Shaw et al., 1997; Warren & Simmens, 2005).

Overall, our findings found support for the role of children's temperament and interparental conflict in predicting children's anxiety and depression trajectories after the birth of an infant sibling. Although maternal depression was hypothesized to predict separation anxiety trajectories based on earlier studies, maternal depression did not emerge from our variable selection procedures as a predictor of the trajectory classes. This may be due to the characteristics of our low-risk community-based sample, in which most parents were not

depressed. A different situation might exist with samples of clinically depressed parents or mothers at risk for post-partum depression and we must be cautious about concluding that parental depression is not a risk for children's anxiety across the transition to siblinghood and the perinatal period until more studies can address this possibility in more clinically diverse samples. In addition, the sample consisted of two-parent families, so even if a mother was depressed, the support of the father may have buffered the effect of maternal depression and decreased the likelihood that children would experience separation anxiety. Fathers may have taken a more active caregiving role in response to maternal depression and future research is needed to address this possibility further (Mezulis, Hyde, & Clark, 2004). Social mores with respect to father involvement have changed significantly since the publication of the original Dunn and Kendrick (1982) work in which changes in the mother-child relationship were profound and fathers were not as involved and available.

It was also surprising that the children's attachment security to either mother or father was not a significant predictor of trajectory patterns of anxiety given earlier links between insecure attachment and children's separation anxiety (Dallaire & Weinraub, 2005), although others have not found an association between attachment and young children's anxiety (Feng et al., 2008). Differences in results may be due to different methods employed in the Family Transitions Study and the age of children across studies. For instance, we measured attachment security using the Attachment Q-Sort whereas others have used the strange situation to assess attachment (Dallaire and Weinraub, 2005; Feng et al., 2008).

In conclusion, we found that the majority of children experienced low levels of anxiety over the transition period and that children in the mid-stable group of anxious children tended to be older. These results are in sharp contrast to popular beliefs that children increase in their clinginess and anxiety after the birth of a sibling. Further, we found no evidence that the trajectories predicted differences in sibling relationship quality at the end of the first year. Finally, children high on anxiety and depression before and after the birth were more negatively emotional and behaviorally inhibited prior to the birth of the sibling, which is consistent with a large literature finding links between children's emotional temperament and the development of internalizing problems (Gilliom & Shaw, 2004; Leve et al., 2005; Shaw et al., 1997). Because negative marital relationship quality was also a significant predictor of children with higher anxiety symptoms, a focus on the interparental relationship may help decrease the likelihood of anxiety and clinginess throughout the transition period for some families.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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FIGURE 1.
Theorized trajectory patterns of change reflecting adjustment and adaptation, stability, and linear increase.

Figure 2.
Theorized curvilinear trajectory patterns reflecting sudden persistent change, delayed impact, and growth and maturity.

Figure 6.
Trajectory classes for anxiety and depression from Growth Mixture Model ($n=230$).

Table 8

Growth Mixture Model Results for Anxiety and Depression: Parameter Estimates and Standard Errors for Fixed Effects

Classes	Low-decreasing	Mid-stable	High-increasing
Parameters	n = 157 (68.5%)	n = 63 (27.5%)	n = 9 (3.9%)
Intercept	1.073 *** (.080)	2.541 *** (.154)	4.268 *** (.282)
Linear slope	-.051 *** (.014)	.042 (.034)	.203 ** (.072)

Note. Standard errors in parentheses. The random effect (variance) of intercept est. = .430, *SE* = .093, *p* < .001; the random effect of linear slope est. = .008, *SE* = .004, *p* = .050.

*
p < .05,

**
p < .01,

p < .001.

Table 9

Results of Multinomial Logistic Regression Analysis Examining Class Differences for Anxiety and Depression with the Low-Decreasing Class as the Reference Class

Predictor	Low-decreasing vs.	<i>b</i>	<i>SE</i>	<i>z</i>	<i>p</i>	<i>OR</i>
Child negative emotionality	Mid-stable	0.80	0.29	2.78	0.005	2.23
	High-increasing	2.80	0.88	3.17	0.001	16.43
Child behavioral inhibition	Mid-stable	0.39	0.18	2.14	0.033	1.47
	High-increasing	2.51	0.84	2.97	0.003	12.30
Child age	Mid-stable	0.06	0.02	3.41	< .001	1.06
	High-increasing	<0.01	0.05	0.08	ns	1.00
Negative marital relationship quality	Mid-stable	0.27	0.18	1.51	ns	1.30
	High-increasing	1.15	0.41	2.78	0.005	3.15

Note. *OR* = Odds Ratio.