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Parental Separation and Child Aggressive and Internalizing Behavior:  
An Event History Calendar Analysis

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Abstract

This study investigated the relationship between parental separation and aggressive and internalizing behavior in a large sample of Swiss children drawn from the ongoing Zurich Project on the Social Development of Children. Parents retrospectively reported life events and problem behavior for the first 7 years of the child's life on a quarterly basis ( $N = 995$ ; 28,096 time points) using an Event History Calendar. The time sequences of separation and child problem behavior were analyzed. Parental separation affected both aggressive and internalizing behavior even when maternal depression, financial difficulties, and parental conflict were included. Parental separation exerted a direct effect on child problem behavior as well as an indirect effect via maternal depression.

*Keywords:* Parental Separation; Aggressive Behavior; Internalizing Behavior; Children; Event History Calendar.

**Parental Separation and Child Aggressive and Internalizing Behavior:  
An Event History Calendar Analysis**

Both in popular belief and in the social sciences, parental separation is often seen as a cause or contributing factor to depression and aggressive problem behavior in children, as well as later delinquency. Several prior studies have shown that youth delinquents are more likely than their noncriminal peers to come from “broken homes” and to have faced parental separation [1, 2]. Children and adults suffering from depression and anxiety are more likely than those who do not suffer from depression and anxiety to come from broken homes [3, 4]. Although these and other studies suggest a direct effect of parental separation on problem behavior, several issues remain unresolved.

First, most previous work has focused on comparisons between, instead of within, individuals [5]. Although these studies have yielded valuable findings, they are beset by possible selection bias. For example, children from broken homes may share characteristics that, even though not influenced by the separation itself, still increase the propensity for problem behavior. Therefore, in the present study, we collected measurements of problem behavior that retrospectively assessed the periods before and after the separation, because we were interested in how much problem behavior increases following separation. We utilized multilevel models that allowed us to focus only on the changes that occurred within individuals. Second, we tested the validity of three key explanations proposed in the developmental and sociological literature to account for the link between parental separation and child problem behavior: maternal depression, financial problems, and parental conflict [6]. We are not aware of studies addressing these three explanations simultaneously. Third, we used a large sample of children from Switzerland to assess the relationship between separation and problem behavior during the first 7 years of the child’s life.

We also introduced a novel test instrument, the Event History Calendar (EHC), which

allowed us to investigate the specific time sequence of separation and child problem behavior. To the best of our knowledge, ours is the first study to use this methodology to test the relationship between separation and problem behavior. Our study was thus well suited to fill some of the research gaps on the effects of parental separation on children's aggressive and internalizing problem behavior. In our study, we defined parental separation as the permanent departure of one of the (previously) married or cohabitating parents who lived with the child at birth. Although in most cases this parent is biologically related to the child, this does not always need to be the case.

### **Parental Separation and Children's Aggressive and Internalizing Problem Behavior**

Numerous studies on the effects of parental separation on child problem behavior have been conducted. Existing studies have been summarized in two large meta-analyses. In their meta-analysis of 92 studies, Amato and Keith [4] revealed that the mean effect sizes for children from divorced families were 0.23 standard deviations lower for conduct problems and 0.08 lower for psychological adjustment than for children from intact families. The effects for child conduct problems (but not psychological adjustment) were significant only if the assessment occurred within two years of the divorce. In an update of the meta-analysis, Amato [3] reported approximately the same results for conduct disorder, but the effect sizes for psychological adjustment were larger than before. In both studies, the authors found variation in the effect sizes across studies that they attributed to sample differences.

Although most previous studies examining the effects of separation on child problem behavior utilized cross-sectional data, a number of recent studies collected data at multiple measurement times. The latter are generally better able to control for selection bias than cross-sectional studies. These studies found that parental separation increased behavior problems in midchildhood and (pre-) adolescence [7–10], although another study failed to find effects [11]. The time of parental separation is important: separation has been found to increase

internalizing behavior in children primarily during the first 2 years after the divorce [12]. Most of these studies examined the effects of parental separation on behavior in midchildhood, adolescence, or adulthood. However, effects have been shown to be particularly adverse for younger children, presumably because younger children are more dependent on their parents, have less extra-familial support structures, and are in a more formative state of development [13–15]. Two longitudinal studies among younger children aged 4 through 7 years indeed found effects of parental separation on behavior problems, although these effects may be stronger in boys than in girls [16] and may be found only for anxiety and depression, but not antisocial behavior [5]. Interestingly, the latter study found that compared to children from intact homes, children with divorced parents already had higher levels of internalizing and antisocial behavior prior to the divorce. Similarly, another study found that most of the variation in child behavior was not due to parental marital transitions, but to background characteristics of the child such as gender and ethnicity [17].

Although there are exceptions [5, 7, 11, 17], most studies that used multiple measurement times to investigate the relationship between parental separation and child problem behavior used only two measurement times. Studies using two times provide more robust results than cross-sectional studies, but they are still limited in the extent to which they can provide information on developmental processes before, during, and after separation. Thus, in the present study we obtained retrospective measurements of both parental separation and child behavior with multiple measurements that were administered close to one another in time.

### **The Role of Maternal Depression, Financial Difficulties, and Parental Conflict**

In addition, the previous studies typically did not include the effects of key explanatory variables that may vary before, during, and after separation [6]. The effects of separation on child problem behavior can be mediated by maternal depression and financial difficulties. Furthermore, the effects of separation may not be due to the separation event itself, but due to

the parental conflict before separation. We aimed to overcome this limitation in the present study by collecting data on these three key variables.

First, the effect of separation on child problem behavior may be mediated by the postseparation psychological adjustment of the custodial parent, usually the mother. Prior research has documented that depression is associated with parental separation [18, 19], although the effect may be short-lived [20]. In turn, maternal stress and depression are associated with negative perceptions, reduced self-esteem with regard to one's caregiving abilities, and emotional distress [21]. These symptoms can affect the quality of the parent-child relationship and the well-being of the child, potentially leading to child problem behavior [22, 23]. Depression in mothers is also associated with emotional unavailability and intrusive and insensitive parenting, which promotes their children's insecure attachment and shapes their development of emotion regulation [21, 24, 25]. A disturbed development of emotion regulation can in turn lead to problem behavior in children [26]. In the longer term, it can also lead to excessive sensitization of children's arousal systems, making it more difficult for them to regulate the arousal in social situations and increasing the potential for maladjustment [24]. Thus, maternal depression around the time of separation is a form of psychological maladjustment that can mediate the effect of parental separation on child problem behavior.

Second, divorced or separated single parents (mothers in particular) often face economic hardship [27]. Because of these hardships, children find themselves in a low socioeconomic situation that increases the risk of problem behavior [6]. Prior research suggests that separation leads to reduced parental income, especially for the mother, at least in the short term [28]. During the first year of separation, the mother's income drops to 71% of its pre-separation level [29]. After the second year of separation, the gender difference stabilizes, with mothers' income averaging about 80% of the pre-separation level and fathers' income

averaging around 95%. Economic pressure is likely to lead to maternal depression and may impair divorced or separated mothers' role coping strategies, which in turn reduces parental control and positive parenting; the latter, in turn, may increase the likelihood of child problem behavior [30]. Thus, financial difficulties may be a key mediator in the association between separation and child problem behaviour.

Third, it has been argued that in families where the level of conflict and hostility between the parents was high, the well-being of the children was seriously damaged; there is abundant evidence supporting this conclusion [6]. Negative interactions and conflicts between partners are correlated with divorce potential [31]. In turn, parental conflict diverts attention away from the child and leads to ineffective parenting, while the hostility between parents may also transfer hostility, anger and tension into parent-child interactions [32]. Children have been shown to be very sensitive to conflict, showing higher levels of anger and distress in response [21]. Parental conflict has been found to increase internalizing and aggressive problem behavior in children [32–35]. It is expected that the association between separation and child problem behavior may be reduced after parental conflict is controlled for. This was tested in the current analysis. In fact, it has been argued that the well-being of the child should *increase* after separation in situations of parental conflict [6]. Amato, Loomis, and Booth [36] found that family dissolution in situations of parental conflict indeed increased children's well-being. The authors interpreted this finding to mean that the impact of a potentially disruptive event depends on how much stress had accumulated *before* the event. Parental separation is thus likely to be less problematic, the more parental conflict the children experienced [5, 8, 9, 12, 37].

### **The Present Study**

In the present study we used an Event History Calendar (EHC) to investigate the effects of parental separation on child aggressive and internalizing behavior in a sample of Swiss 7-

year-old children. The EHC retrospectively collected information on the occurrence of parental separation and problem behavior for each quarter of a year. EHCs are better at retrieving memory of important life events than traditional questionnaires, because they encourage the sequencing and parallel retrieval of the relevant events [38]. EHCs are especially suitable for eliciting information about transitions (e.g., separation, first job), because they enable researchers to collect information continually rather than just at one time [39]. Traditional longitudinal surveys provide only snapshots of information about one's life and do not necessarily tap into the time periods between the snapshots. Their capacity to provide information about the effects of time-varying conditions on behavior is therefore limited [40].

We addressed two research questions. First, what is the role of separation on child aggressive and internalizing behavior in the first 7 years of a child's life? Second, to what extent can the effect of separation on problem behavior in children be attributed to maternal depression, financial difficulties, and parental conflict? Based on previous research, we hypothesized that parental separation increases both aggressive and internalizing problem behavior. We expected that the effect of separation on child problem behavior would be mediated by maternal depression and financial difficulties. Furthermore, we tested whether these effects occurred after parental conflict before separation was included. The resulting path model is displayed in Figure 1. For children who had experienced parental conflict before separation, we expected that separation reduced problem behavior.

Finally, we examined a secondary question. As previous research has revealed albeit modest evidence for gender differences in the effects of separation on problem behavior [3, 4], we tested for differences between boys and girls in the effects of separation.

## **Method**

### **Participants**

The data were drawn from an ongoing combined longitudinal and intervention study, the Zurich Project on the Social Development of Children (*z-proso*) [41]. The target population is all 2,520 children who entered the first grade of one of the 90 public primary schools in Zurich, Switzerland, in 2004. Because the interventions occurred at the school level, a cluster randomized approach was used for the sampling. The schools were classified by enrollment size and the socioeconomic background of the school district. Subsequently, a stratified sample of 56 schools was drawn. Thus, the final sample consisted of all 1,675 children – as well as their parents and teachers – who started primary school in one of the 56 selected schools in 2004. A total of 1,225 parents (73% of the target sample) agreed to participate in the initial interview.

The sample was 52% male. The mean age of the children at the time of the child interview was 7.45 years ( $SD = 0.39$ ). Eleven percent of the children were born outside of Switzerland, and in 46% of the cases both parents were born outside of Switzerland. All contact letters and parent interviews were translated into the nine languages most frequently spoken by the immigrant minorities. In terms of educational attainment of the parents, 24% had little to no secondary education, 32% had vocational training, 29% had attended vocational school or had earned a baccalaureate degree or advanced vocational diploma, and 16% had a university degree.

## Measures

*Event History Calendar (EHC)*. To measure study variables at 3-month intervals from birth to age 7, an EHC was given to the parents. The EHC is formatted as a large grid with rows and columns. The rows represent the patterns under investigation (e.g. family composition, problem behavior) and the columns represent the time periods for which they are recorded. In the present study each column represented a period of 3 months. The rows covered five main areas: residential history, household composition, external childcare, disruptive life events

(e.g. maternal depression, financial difficulties, parental conflict), and child aggressive and internalizing problem behavior. In EHCs, the most easily recalled themes are usually placed at the top, followed by the more difficult ones. For this study, the top row was place of residence, the bottom row was the child's behavior.

We located four studies that tested the accuracy of EHCs. Three are positive, and one is negative. To start with the last, Roberts and colleagues [42] compared EHC reports with prospective weekly self-reports of violent offending for an overlapping period of five months. The EHC interview took place 12 to 51 months after the initial weekly self-reports. In 59% of months did both data-sources elicit identical information. No effect of time passed since the administration of weekly self-reports was found on memory decay. The characteristics of the research subjects (suffering from potential cognitive impairments due to heavy substance abuse or mental health issues) were likely to have contributed to the poor results. Other studies have yielded much more promising results. First, Freedman et al. [43] compared 1980 reports from the regular interview about life history with the 1985 EHC retrospective report for the 1980 interview month. They found that identical answers were obtained in over 90% of marital and school reports, and in 72-83% of employment reports. Second, Caspi et al. [39] compared 1990 reports from a regular interview about current demographics (work, living arrangements, etc.) with the 1993 EHC retrospective reports about those same demographics during the 1990 interview month. The information from both data-sources was identical in over 90% of cases. Third, Morris and Slocum [44] compared retrospective arrest data from their EHC with official records among 351 incarcerated women. Sample characteristics included high substance abuse. The EHC covered the past three years prior to detention. In total 88% of women accurately reported the prevalence of arrest for the three years prior to detention. Approximately 55% of respondents were able to place their arrest in the exact month in which it occurred, increasing to 76% when a 2-month buffer was allowed.

Respondents accurately identified 90% of months as ‘arrest’ or ‘non-arrest’ months.

*Aggressive behavior.* Parents were asked to rate their child on the EHC for periods during which the child had been particularly aggressive or defiant or had frequent temper tantrums and fights with other children. At least one instance of aggressive behavior was reported for 10.2% of the children ( $n = 125$  of the total  $N$  of 1,225). For the total sample, the mean number of quarters during which the child behaved aggressively is 0.47 ( $SD = 2.18$ ). For those children who were reported to have behaved aggressively during at least one quarter, the mean is 4.60 ( $SD = 5.28$ ). In total, 3.8% of the children were reported to have exhibited aggressive behavior during the first 3 years, and 7.9% were reported to have exhibited aggressive behavior during the second 3 years.

*Internalizing behavior.* The parents were asked to rate their child on internalizing behavior for periods in which the child had been particularly sad or fearful, withdrew from others, or could not sleep. Nineteen percent of the children ( $n = 230$ ) experienced at least one quarter with internalizing problems. For the total sample, the mean number of quarters in which internalizing behavior occurred was 1.01 ( $SD = 3.13$ ). For the children who experienced internalizing problems in at least one quarter, the mean number of quarters was 5.37 ( $SD = 5.39$ ). In total, 8% of the children experienced internalizing problems during the first 3 years, and 14.7% during the second 3 years.

*Parental separation.* This variable was defined on the EHC as permanent departure by one of the parents who lived with the child at birth. Parental separation was experienced by 162 children (13.2%). In 161 cases, separation concerned the child’s biological parents. Most children (96%) lived full time with the mother after separation.

*Maternal depression.* This variable was defined on the EHC as the mother feeling depressed for extended periods of time, being permanently unhappy, or feeling overburdened. Depression scores were recorded regardless of whether the interviewed parent was the mother

or the father. However, because other- and self-report measures may be different, we analyzed only the EHCs by the mothers. In 250 cases (20.4%), at least one quarter of maternal depression was reported. For the entire sample, the mean number of quarters during which maternal depression occurred was 1.48 ( $SD = 4.39$ ). For those who experienced depression in at least one quarter, the mean number of quarters was 7.27 ( $SD = 7.25$ ). Twelve percent of the respondents reported depression during the first 3 years, whereas 13.4% reported such a period during the second 3 years. This information was compared with information on perinatal depression obtained in the first wave of the *z-proso* study. This comparison demonstrates convergent validity for the EHC, as mothers who indicated perinatal depression when the child was born were much more likely than other mothers to also report depression during the first 3 years ( $OR = 6.46, p < .001$ ) and the second 3 years ( $OR = 3.18, p < .001$ ).

*Financial difficulties.* This variable was defined on the EHC as whether the household had experienced long periods of substantial financial difficulty, including difficulty in paying bills. In 207 cases (16.9%), financial problems were reported to have occurred in at least one quarter. For the entire sample, the mean number of quarters in which these problems occurred was 2.32 ( $SD = 6.58$ ). Among only those respondents who reported financial problems for at least one quarter, the mean number of quarters was 13.74 ( $SD = 9.99$ ). The prevalence of financial difficulties in the first 3 years of life (10.6%) was somewhat lower than that in the second 3 years (14.8%).

*Parental conflict.* Parents reported on the EHC extended periods of serious conflict between cohabitating partners or between a caregiver and a noncohabitating partner. In 263 cases (21.5%), there was at least one quarter when parental conflict occurred. For the whole sample, the mean number of quarters in which conflict occurred was 1.58 ( $SD = 4.59$ ). For those who experienced parental conflict during at least one quarter, the mean number of quarters was 7.37 ( $SD = 7.46$ ). The prevalence of parental conflict was similar for the first

(13.6%) and the second 3 years (14.5%).

All the EHC variables were measured by single dichotomous items. The participants were asked to simply respond whether or not a behavior had occurred during the reference period. There was no further probing about the symptoms and extent of the behaviors by the interviewers. Single dichotomous items are generally considered less optimal than linear multiple-item measures (but see e.g. [45-47]). However, multiple-item measures are not practical for application in EHCs since they would have had to be asked for each of the quarters. As a result, they would be very time-consuming, repetitive, and burdensome on the respondent. Separation, maternal depression, financial difficulties, and parental conflict were lagged variables. Parental conflict was measured 3 quarters (9 months) before the quarter in which the aggressive behavior and internalizing problems were measured. Separation was measured 2 quarters (6 months) before problem behavior. Maternal depression and financial difficulties were measured 1 quarter (3 months) before problem behavior. Thus, the occurrence of aggression and internalizing behavior were assessed 6 months after the separation. This lagging procedure was adopted to gain insight into the temporal sequence of events. If separation, maternal depression, financial difficulties, and parental conflict had been measured in the same quarter as the aggression and internalizing behavior, we would not have been sure about the real sequence of events and about their causal direction. Very little is currently known about how long it takes for separation to result in a change in behavior. In the absence of definitive evidence, we chose a time delay of 6 months, because we assumed that the effects of separation on child aggressive and internalizing problem behavior would manifest within this time frame. We note that the period immediately before and after the separation in particular can be characterized as a “period of crisis.” The “crisis model” predicts that the effects of separation on problem behavior are greatest in the short-term and fade over time [20].

After excluding the EHCs completed by fathers and those describing children whose parents were temporarily absent, died, or those in which the child was raised by a single parent from birth, the final number of cases analyzed was 995. The number of measurement times was 28,096.

Eisner and colleagues [40] investigated the criterion validity of the *z-proso* EHC and found concurrent and discriminant validity of the variables. For example, risk factors such as maternal depression, parental separation, parental conflict, and financial difficulties were correlated with behavioral outcomes in the expected direction, the size-order and relative importance of early risk factors were in line with the previous literature, longer exposure was associated with an added risk, and the likelihood of problematic outcomes was related to cumulative contextual risk. In addition, Murray [48] concluded that overall agreement between the EHC and the regular wave one data ranged between 92% and 96% for household composition. Furthermore, Eisner and colleagues [40] compared data on unemployment from the EHC with city-wide official statistics on quarterly levels of unemployment and found a high correlation ( $r = .89$ ).

### **Procedure**

Written informed consent for the participation of all the children and adults was obtained from the parents. The interviews included questions about the child's behavior and social development. Computer-assisted personal child assessments lasting 45 min were conducted at the school. Computer-assisted personal parent assessments lasting 1 h were conducted at the parents' home. The parent chosen for the interviews was the primary caregiver (usually the mother, 1,152 of the 1,225 cases; we only included interviews by the mother). The child's teacher completed a questionnaire and returned it by mail. The interviewers had been intensively trained by the research team, especially in techniques for interviewing children and in administering the EHC to parents.

## Data Analysis

To make optimal use of the data, we utilized a multilevel path model [49, 50] where time-points are clustered within individuals. Multilevel path models separate the variance into components measured between individuals and components measured within individuals, the latter of which is our main interest. Given the binary nature of the dependent variables, we estimated logistic models using maximum likelihood estimation with robust standard errors in MPlus [51]. Logistic models allow for interpretation of the direct effects in terms of Odds Ratios. The fit indices that are available for these models in MPlus were as follows: Loglikelihood = -19110.045; Scaling correction factor for MLR = 6.299; AIC = 38244.091; BIC = 38343.011; and sample-size adjusted BIC = 38304.876 for aggressive behavior, and Loglikelihood = -21125.104; Scaling correction factor for MLR = 6.646; AIC = 42274.208; BIC = 42373.128; and sample-size adjusted BIC = 42334.9939 for internalizing behavior. Because we did not hypothesize the presence of random effects and did not want to unduly complicate the model, we did not use random slopes in any of the models.

We had no hypotheses that the effect of the interaction term between parental conflict and separation would be mediated. Hence, our test of the interaction term's effect on problem behavior consisted of a multilevel logistic model where the interaction term was entered alongside the control variables for separation, parental conflict, maternal depression, and financial difficulties. No mediation relationships were tested in this model. Again, the model separated the variance of the time level from the variance at the individual level. Results were interpreted in terms of Odds Ratios [52].

## Results

We present our results in two steps. First, we provide a time sequence of the main study variables, representing the timeline of events surrounding parental separation. Second, we present the effects of separation on the children's aggressive and internalizing behavior.

### **Time sequence of events**

Figure 2 displays the sequence in which the main study variables occurred and thereby provides insight into the process of separation and the development of the key events. The figure shows the average level of aggressive and internalizing problem behavior, maternal depression, parental conflict, and financial difficulties on the EHC. The plots were constructed by first centering the data according to the separation event. The figure suggests that aggressive and internalizing problem behavior began to increase well before separation, peaked around the time of separation, and decreased afterwards. Interestingly, child internalizing behavior showed a slight delay relative to separation, peaking 3 months after separation. In contrast, parental conflict increased substantially before separation, peaked right before and during the quarter of separation, and decreased rapidly directly thereafter. Maternal depression also increased before separation and peaked around the time of separation, but remained at elevated levels for a while thereafter. Interestingly, financial difficulties increased somewhat leading up to the separation, but reached particularly elevated levels right after the separation. Furthermore, they remained at almost identically high levels for the entire measurement period.

### **Effects of Separation**

*Aggressive behavior.* Table 1 displays the results for aggressive behavior. As expected, separation in a given quarter increased maternal depression ( $OR = 5.71, p < .001$ ) and financial difficulties in the subsequent quarter ( $OR = 4.46, p < .001$ ). Parental conflict was found to increase the likelihood of separation in the quarter thereafter ( $OR = 24.18, p < .001$ ).

Separation had a direct effect on aggression ( $OR = 2.34, p < .05$ ). There was no significant effect of parental conflict ( $OR = 2.00, p = .138$ ) or financial difficulties ( $OR = 0.89, p = .784$ ). Of the indirect effects, the effect of separation via maternal depression ( $p < .05$ ) but not via financial difficulties ( $p = .784$ ) was significant.

*Internalizing behavior.* Our findings for internalizing behavior are shown in Table 2. Separation had a direct effect on internalizing behavior ( $OR = 1.67, p < .05$ ). Maternal depression ( $OR = 3.77, p < .001$ ), financial difficulties ( $OR = 1.89, p < .05$ ), and parental conflict ( $OR = 1.91, p < .01$ ) also increased internalizing behavior. There was an indirect effect of separation via maternal depression ( $p < .001$ ), but the indirect effect of separation via financial difficulties was only marginally significant ( $p = .058$ ).

*Interaction between separation and parental conflict.* An interaction term between parental conflict and separation was used to predict child problem behavior. Having experienced parental conflict in the quarter before separation did not reduce aggression ( $OR = 0.95, p = .944$ ) or internalizing behavior ( $OR = 0.76, p = .627$ ).

*Sex differences.* The same path models as in the main analysis were performed separately for girls and for boys. Coefficients were compared with a  $z$ -test. None of the coefficients differed significantly between boys and girls.

## Discussion

In this study, we investigated the effects of parental separation on child aggressive and internalizing behavior and the extent to which such effects can be attributed to parental conflict, maternal depression, and financial difficulties. The primary data were collected using the EHC and consisted of information about the first 7 years of the child's life divided into 3-month segments.

Our first main finding resulted from our investigation of the time sequence of the events surrounding separation. Although child problem behavior, maternal depression, and parental conflict all peaked around the time of separation, their developmental process is somewhat different. While parental conflict increases substantially leading up to the time of separation, it decreases dramatically right after. On the other hand, maternal depression remained at elevated levels thereafter, as did child problem behavior. Moreover, the finding that all three

increased leading up to the time of separation and decreased thereafter suggests that separation should be seen as a family process rather than as a single event. This pattern was somewhat different for financial difficulties. These increase around the time of separation, but unlike the other variables remain high afterwards.

Our analyses also showed that, according to the parents, the effect of the separation on their children did not last long; both internalizing and aggressive behavior increased up to the time of the separation but leveled off quickly thereafter. This result is surprising in light of prior studies that found longer-term effects of separation (e.g., [53]), but it is consistent with the results of other studies that found the effects of separation to be most apparent in the short term (e.g., [4, 12, 20]). The pattern observed in our study theoretically supports a “crisis model”, in which parental separation is considered to be a temporary stressor that individuals adapt to over time [54]. This model seems to apply not only to the aggressive and internalizing behavior of the child, but also to the explanations for the separation-behavior relationship; recall that parental conflict peaked at the time of separation and decreased quickly thereafter, whereas maternal depression continued to be elevated for a time after the separation but then gradually decreased. Only financial difficulties remained high for a substantial period of time after the separation. This suggests that separation leads to a long-term lack of adequate financial resources in custodial families. This lack of resources may increase children’s problem behavior in the longer term, because the economic pressure it causes decreases the quality of parenting [30]. This reasoning may also explain why some studies found long-term effects of separation on child behavior and ours did not.

Our second main finding was that parental separation increased aggressive and internalizing behavior. This effect was not only direct: Separation also led to higher maternal depression, which in turn increased aggressive and internalizing behavior. In contrast, we found no indirect effects of separation via financial difficulties.

Given the hypotheses based on maternal depression, financial difficulties, and parental conflict, the direct effect of separation on aggressive and internalizing behavior was unexpected. We can think of three possible explanations. First, the mechanisms by which parental conflict, maternal depression, and financial difficulties affect child problem behavior may be more complex than we assumed. Second, the children's self-attributed blame for the separation [55] and the stress the children experienced as a result of the separation may contribute to problem behavior. Third, paternal absence may reduce positive and supportive fathering, which has been related to developmental outcomes in their children [56], especially when the mother is less supportive [57]. Paternal absence may also cause lower secure parent-child attachment [58], and less parental monitoring [59], in turn leading to child problem behavior.

Our third main finding was that the interaction between separation and parental conflict was not significant. This latter result may be attributable to the restrictiveness of our test, since we only tested parental conflict in the immediate period before separation, while the 'relief' provided by separation may be largest for children who experienced extended periods of parental conflict.

In summary, our study has extended prior research in several novel ways. Compared to previous studies, our use of an EHC provided detailed descriptions of the time sequence of the separation, child problem behavior, and the potential mediators of the two. This methodology allowed us to view parental separation as a process "characterized by a sequence of potentially stressful experiences that begin before physical separation and continue after it" [16], p. 801). Our descriptive results show that aggressive and internalizing behavior increases well before separation, as do parental conflict and maternal depression. They also show that the duration of these effects may be limited. Despite several exceptions [5, 7, 11, 17], most of the prior studies that used multiple measurement times to investigate the effects

of separation on child problem behavior had only two measurement times, but studies that use more than two are better able to capture the relevant developmental processes. Moreover, because we used an EHC, the measurement times were separated by only 3 months, thereby allowing us to track short-term effects. In addition, we included measures for maternal depression, financial difficulties, and parental conflict; after including these factors, we found that separation continued to directly affect aggressive and internalizing behavior in the children.

There are several limitations to our study. First, because the EHC reports were retrospective they may have been affected by memory bias, thereby underestimating the frequency of aggressive and internalizing behavior. Nonetheless, EHCs are still superior to measure retrospective events compared to standard survey methods in terms of measurement quality [60], and they are particularly well suited to the life events measured in our study. Our study is also among the first who have access to EHC information in relation to separation and child behavior. Because EHCs provide information about events that occur in between the particular measurement times, they offer a more continuous picture of the developmental process. As mentioned, prior studies by Freedman et al. [43], Caspi et al. [39], and Morris and Slocum [44] have been positive about the accuracy of EHCs. Second, EHC variables were measured as dichotomous, single item measures. As mentioned, linear, multiple-item measures were not deemed practical for application in EHCs. Although linear multiple-item measures are generally optimal, recent research has shown that single items are also valid, especially in depression and stress research [45-47]. Third, the EHC information was only collected among parents, and parents may answer the questions about problem behavior in children differently than other informants. Fourth, the EHC ratings of internalizing behavior were unexpectedly higher than those of aggressive behavior. In other studies, aggressive or externalizing behavior in early and midchildhood were reported to be as frequent or more

frequent than internalizing behavior [61-63], although in a German study higher mean scores were reported for anxiety and depression than for aggressive behavior [64]. One reason for this difference might be that reports of internalizing behavior are less subject to social desirability response bias than reports of aggression. Also, comparisons of rates across studies are somewhat problematic because of differences in definitions and the test instruments used. Fifth, we assumed that parental conflict *before* separation affected problem behavior. However, post-separation conflict between parents may also be an important mediator, although our data suggested that parental conflict decreases dramatically after separation. Sixth, we assumed that separation has the same valence across children. However, differences of interpretation may, in turn, lead to differences in adaptation [65]. In future studies it may be useful to examine not only the separation event per se, but also the subjective valence or meaning of the separation for the child. Future studies should also study to what extent vulnerability and resiliency resources (such as temperament) affect children's responses to parental separation [66].

Despite these limitations, our study has extended prior research on the effects of separation on child problem behavior by retrospectively collecting data over multiple short time periods of parental separation and child behavior that also provide information on maternal depression, financial difficulties, and parental conflict. Future process-oriented research on separation that collects detailed data and includes theoretically important mediators are needed to shed further light on the developmental processes affected by parental separation.

### **Summary**

This study investigated the effects of parental separation on aggressive and internalizing problem behavior among 7-year old children in Zurich, Switzerland. We utilized a novel instrument, the EHC, to collect detailed information on the timing of separation and problem behavior, allowing us to separate events in 3-month periods. We also included measures on

maternal depression, financial difficulties, and parental conflict which were expected to explain the relationship between separation and problem behavior. Results showed that this was indeed the case: besides a direct effect of separation on child problem behavior, the relationship was also mediated by maternal depression. However, results suggested that the relationship existed primarily in the short-term. The findings highlight the importance of process-oriented research on separation that utilizes detailed information on the timing of separation and problem behavior. The findings also point to the importance of collecting information on key mediators.

### References

1. Burt SA, Barnes AR, McGue M, Iacono WG (2008) Parental divorce and adolescent delinquency: Ruling out the impact of common genes. *Dev Psychol* 44:1668–1677
2. Juby H, Farrington DP (2001) Disentangling the link between disrupted families and delinquency. *Brit J Criminol* 41:22–40
3. Amato PR (2001) Children of divorce in the 1990s: An update of the Amato and Keith (1991) meta-analysis. *J Fam Psychol* 15:355–370
4. Amato PR, Keith B (1991a) Parental divorce and the well-being of children: A meta-analysis. *Psychol Bull* 110:26–46
5. Strohschein L (2005) Parental divorce and child mental health trajectories. *J Marriage Fam* 67:1286–1300
6. Amato PR (1993) Children's adjustment to divorce: Theories, hypotheses, and empirical support. *J Marriage Fam* 55:23–38
7. Cherlin AJ, Chase-Lansdale PL, McRae C (1998) Effects of parental divorce on mental health throughout the life course. *Am Sociol Rev* 63:239–249
8. Morrison DR, Coiro MJ (1999) Parental conflict and marital disruption: Do children benefit when high-conflict marriages are dissolved? *J Marriage Fam* 61:626–637

9. Hanson TL (1999) Does parental conflict explain why divorce is negatively associated with child welfare? *Soc Forces* 77:1283–1316
10. Magnuson K, Berger LM (2009) Family structure and transitions: Associations with children's well-being during middle childhood. *J Marriage Fam* 71:575–591
11. Pagani L, Tremblay RE, Vitaro F, Kerr M, McDuff P (1998) The impact of family transition on the development of delinquency in adolescent boys: A 9-year longitudinal study. *J Child Psychol Psyc* 39:489–499
12. Jekielek, SM (1998). Parental conflict, marital disruption and children's emotional well-being. *Soc Forces* 76:905–936
13. Allison PD, Furstenberg FF (1989) How marital dissolution affects children: Variations by age and sex. *Dev Psychol* 25:540–549
14. Lansford JE (2009) Parental divorce and children's adjustment. *Perspect Psychol Sci* 4:140–152
15. Rogers KN (2004) A theoretical review of risk and protective factors related to post-divorce adjustment in young children. *J Divorce Remarriage* 40:135–147
16. Morrison DR, Cherlin AJ (1995) The divorce process and young children's well-being: A prospective analysis. *J Marriage Fam* 57:800–812
17. Aughinbaugh A, Pierret CR, Rothstein DS (2005) The impact of family structure transitions on youth achievement: Evidence from the children of the NLSY79. *Demography* 42:447–468
18. Johnson DR, Wu J (2002) An empirical test of crisis, social selection, and role explanations of the relationship between marital disruption and psychological distress: A pooled time-series analysis of four-wave panel data. *J Marriage Fam* 64:211–224
19. Menaghan EG, Lieberman MA (1986) Changes in depression following divorce: A panel study. *J Marriage Fam* 48:319–328

20. Meadows SO, McLanahan SS, Brooks-Gunn J (2008) Stability and change in family structure and maternal health trajectories. *Am Sociol Rev* 73:314–334
21. Cummings EM, Davies PT (1994). Maternal depression and child development. *J Child Psychol Psyc* 35:73–112
22. Boyle MH, Pickles AR (1997) Influence of maternal depressive symptoms on ratings of childhood behavior. *J Abnorm Child Psych* 25:399–412
23. Sturge-Apple ML, Davis PT, Cummings EM (2006) Impact of hostility and withdrawal in interparental conflict on parental emotional unavailability and children's adjustment difficulties. *Child Dev* 77:1623–1641
24. Elgar FJ, McGrath PJ, Waschbusch DA, Stewart SH, Curtis LJ (2004) Mutual influences on maternal depression and child adjustment problems. *Clin Psychol Rev* 24:441–459
25. Field T (1994) The effects of mother's physical and emotional unavailability on emotion regulation. *Monogr Soc Res Child* 59:208–227
26. Chang L, Schwartz D, Dodge KA, & McBride-Chang C (2003) Harsh parenting in relation to child emotion regulation and aggression. *J Fam Psychol* 17:598–606
27. Hilton JM, Kopera-Frye K (2004) Patterns of psychological adjustment among divorced custodial parents. *J Divorce Remarriage* 41:1–30
28. Bianchi SM, Subaiya L, Kahn JR (1999) The gender gap in the economic well-being of nonresident fathers and custodial mothers. *Demography* 36:195–203
29. Gadalla TM (2009) Impact of marital dissolution on men's and women's incomes: A longitudinal study. *J Divorce Remarriage* 50:55–65
30. Hilton JM, Desrochers S (2000) The influence of economic strain, coping with roles, and parental control on the parenting of custodial single mothers and custodial single fathers. *J Divorce Remarriage* 33:55–76
31. Stanley SM, Markman HJ, and Whitton SW (2002) Communication, conflict, and

- commitment: Insights on the foundations of relationship success from a national survey. *Fam Process* 41:659–675
32. Gerard JM, Krishnakumar A, Buehler C (2006) Marital conflict, parent-child relations, and youth maladjustment: A longitudinal investigation of spillover effects. *J Fam Issues* 27:951–975
  33. Buehler C, Anthony C, Krishnakumar A, Stone G, Gerard JM, Pemberton S (1997) Interparental conflict and youth problem behaviors: A meta-analysis. *J Child Fam Stud* 6:233–247
  34. Pagani LS, Japel C, Vaillancourt T, Côté S, Tremblay RE (2008) Links between life course trajectories of family dysfunction and anxiety during middle childhood. *J Abnorm Child Psychol* 36:41–53
  35. Rhoades KA (2008) Children's responses to interparental conflict: A meta-analysis of their associations with child adjustment. *Child Dev* 79:1942–1956
  36. Amato PR, Loomis LS, Booth A (1995) Parental divorce, marital conflict, and offspring well-being during early adulthood. *Soc Forces* 73:895–915
  37. Wheaton B (1990) Life transitions, role histories, and mental health. *Am Sociol Rev* 55:209–223
  38. Belli RF (1998) The structure of autobiographical memory and the event history calendar: Potential improvements in the quality of retrospective reports in surveys. *Memory* 6:383–406
  39. Caspi A, Moffitt TE, Thornton A, Freedman D, Amell JW, Harrington H, et al. (1996) The life history calendar: A research and clinical assessment method for collecting retrospective event-history data. *Int J Meth Psych Res* 6:101–114
  40. Eisner M, Murray J, Ribeaud D, Topcuoglu T, Kazemian L, Besemer S (2009) The event history calendar as an instrument for longitudinal criminological research. *Monatssch*

Kriminol St 92:137–159

41. Eisner M, Ribeaud D (2005) A randomised field experiment to prevent violence. *Eur J Crime Crim L & Crim Just* 13:27–43
42. Roberts J, Mulvey EP, Horney J, Lewis J, Arter ML (2005) A test of two methods of recall for violent events. *J Quant Crim* 21:175–193
43. Freedman D, Thornton A, Camburn D, Alwin D, Young-DeMarco L (1988) The life history calendar: A technique for collecting retrospective data. *Sociol Methodol* 18:37–68
44. Morris N, Slocum LA (2010) The validity of self-reported prevalence, frequency and timing of arrest: An evaluation of data collected using a life events calendar. *J Res Crime Delinq* 47:210–240
45. Chochinov HM, Wilson KG, Enns M, Lander S (1997) "Are you depressed?" Screening for depression in the terminally ill. *Am J Psychiat* 154:674–676
46. Littman AJ, White E, Satia JA, Bowen DJ, Kristal AR (2006) Reliability and validity of 2 single-item measures of psychosocial stress. *Epidemiology* 17:398–403
47. Watkins CL, Lightbody CE, Sutton CJ, Holcroft L, Jack CIA, Dickinson HA, et al. (2007) Evaluation of a single-item screening tool for depression after stroke: A cohort study. *Clin Rehabil* 21:846–852
48. Murray J. (2007) Event History Calendars in z-proso. Zurich: Z-proso (internal report).
49. Preacher KJ, Zhang H, Zyphur MJ (2011) Alternative methods for assessing mediation in multilevel data: the advantages of multilevel SEM. *Struct Equ Modeling* 18:161–182
50. Preacher KJ, Zyphur MJ, Zhang H (2010) A general multilevel SEM framework for assessing multilevel mediation. *Psychol Methods* 15:209–233
51. Muthén LK, Muthén BO (1998-2010) *Mplus User's Guide*. Sixth Edition. Muthén & Muthén, Los Angeles, CA
52. Buis ML (2010) Stata tip 87: Interpretation of interactions in non-linear models. *Stata J*

10:305–308

53. Amato, PR, Keith, B (1991b) Parental divorce and adult well-being: A meta-analysis. *J Marriage Fam* 53:43–58
54. Amato PR (2000) The consequences of divorce for adults and children. *J Marriage Fam* 62:1269–1287
55. Healy JM, Stewart AJ, Copeland AP (1993) The role of self-blame in children's adjustment to parental separation. *Pers Soc Psychol B* 3:279–289
56. DeKlyen M, Speltz ML, Greenberg MT (1998). Father and early onset conduct problems: Positive and negative parenting, father-son attachment, and the marital context. *Clin Child Fam Psych* 1: 3–21
57. Martin, A., Ryan, R. M., and Brooks-Gunn, J. (2007). The joint influence of mother and father parenting on child cognitive outcomes at age 5. *Early Child Res Q* 22:423–439
58. Woodward L, Fergusson DM, and Belsky J (2000) Timing of parental separation and attachment to parents in adolescence: Results of a prospective study from birth to age 16. *J Marriage Fam* 62:162–174
59. Cookston JT (1999) Parental supervision and family structure: Effects on adolescent problem behaviors. *J Divorce Remarriage* 32:107–122
60. Roberts J, Horney J (2010) The life event calendar method in criminological research. In: Piquero AR, Weisburd D (eds) *Handbook of quantitative criminology*. Springer, New York, pp. 289–312
61. Bongers IL, Koot HM, Van der Ende J, Verhulst FC (2003) The normative development of child and adolescent problem behavior. *J Abnorm Psychol* 112:179–192
62. Briggs-Gowan MJ, Carter AS, Skuban EM, McCue Horwitz S (2001) Prevalence of social-emotional and behavioral problems in a community sample of 1- and 2-year-old children. *J Am Acad of Child Psy* 40:811–819

63. Lemery-Chalfant K, Schreiber JE, Schmidt NL, Van Hulle CA, Essex MJ, Goldsmith HH (2007) Assessing internalizing, externalizing, and attention problems in young children: Validation of the MacArthur HBQ. *J Am Acad Child Psy* 46:1315–1323
64. Furniss T, Beyer T, Guggenmos J (2006) Prevalence of behavioural and emotional problems among six-year-old preschool children. Baseline results of a prospective longitudinal study. *Soc Psych Psych Epid* 41:394–399
65. Riessman CK (1989) Life events, meaning and narrative: The case of infidelity and divorce. *Soc Sci Med* 29:743–751
66. Sentse M, Ormel J, Veenstra R, Verhulst FC, Oldehinkel AJ (2011) Child temperament moderates the impact of parental separation on adolescent mental health: The TRAILS study. *J Fam Psychol* 25:97–106

Table 1

*Effects of Separation on Children's Aggressive Behavior*

	Odds Ratio	Unstandardized coefficient	SE
<i>Effects on mediators</i>			
Separation to maternal depression	5.71	1.74**	0.18
Separation to financial difficulties	4.46	1.50**	0.17
<i>Parental conflict to separation</i>			
Conflict to separation	24.18	3.19**	0.16
<i>Direct effects on aggression</i>			
Maternal depression to aggression	2.34	0.85*	0.41
Financial difficulties to aggression	0.89	-0.11	0.41
Parental conflict to aggression	2.00	0.70	0.47
Separation to aggression	2.34	0.85*	0.34
<i>Indirect effects on aggression</i>			
Separation to maternal depression to aggression		1.48*	0.71
Separation to financial difficulties to aggression		-0.17	0.61
Number of person-quarters		28096	
Number of persons		995	

\* $p < .05$ . \*\* $p < .01$ . Two-tailed.

Table 2

*Effects of Separation on Children's Internalizing Behavior*

	Odds Ratio	Unstandardized coefficient	SE
<i>Effects on mediators</i>			
Separation to maternal depression	5.73	1.75**	0.18
Separation to financial difficulties	4.47	1.50**	0.17
<i>Parental conflict to separation</i>			
Conflict to separation	24.18	3.19**	0.16
<i>Direct effects on internalizing behavior</i>			
Maternal depression to internalizing behavior	3.77	1.33**	0.26
Financial difficulties to internalizing behavior	1.89	0.64*	0.32
Parental conflict to internalizing behavior	1.91	0.65**	0.24
Separation to internalizing behavior	1.67	0.51*	0.24
<i>Indirect effects on internalizing behavior</i>			
Separation to maternal depression to aggression		2.32**	0.53
Separation to financial difficulties to aggression		0.95	0.50
Number of person-quarters		28096	
Number of persons		995	

\* $p < .05$ . \*\* $p < .01$ . Two-tailed.

Figure Caption

Figure 1. Path model.

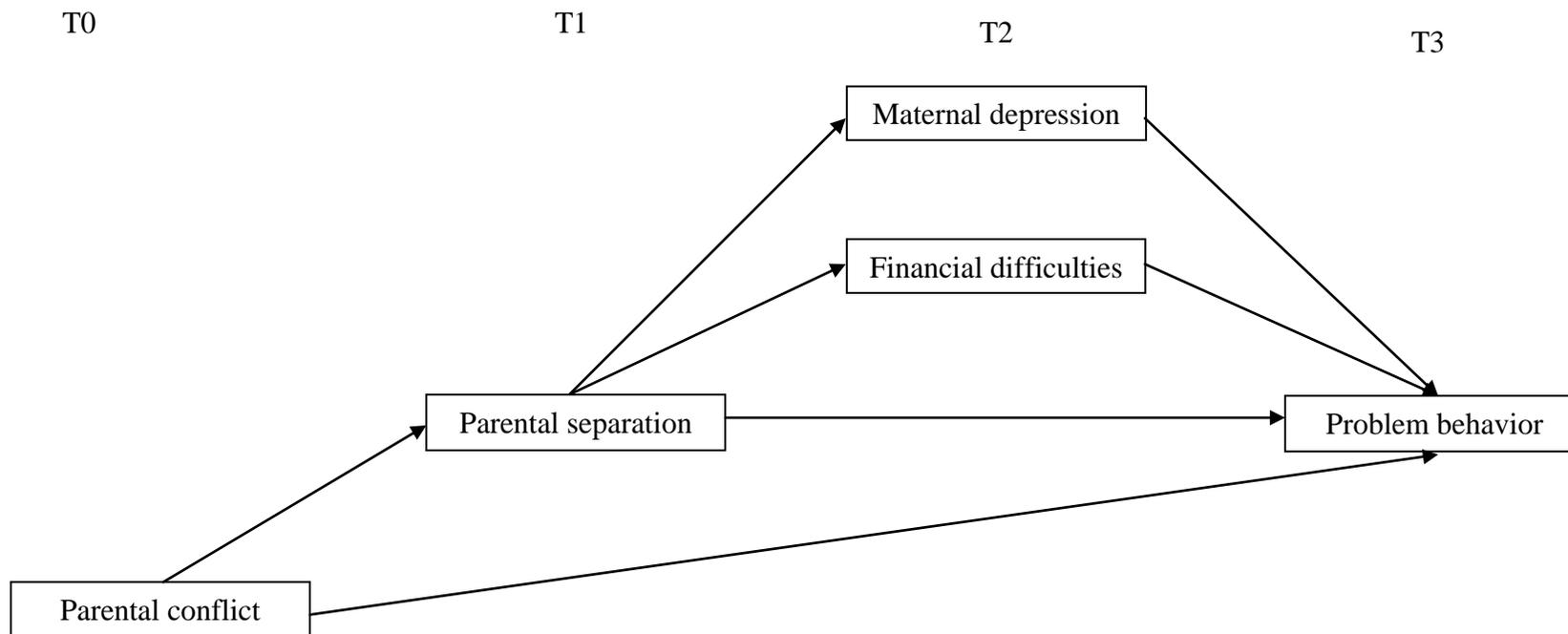
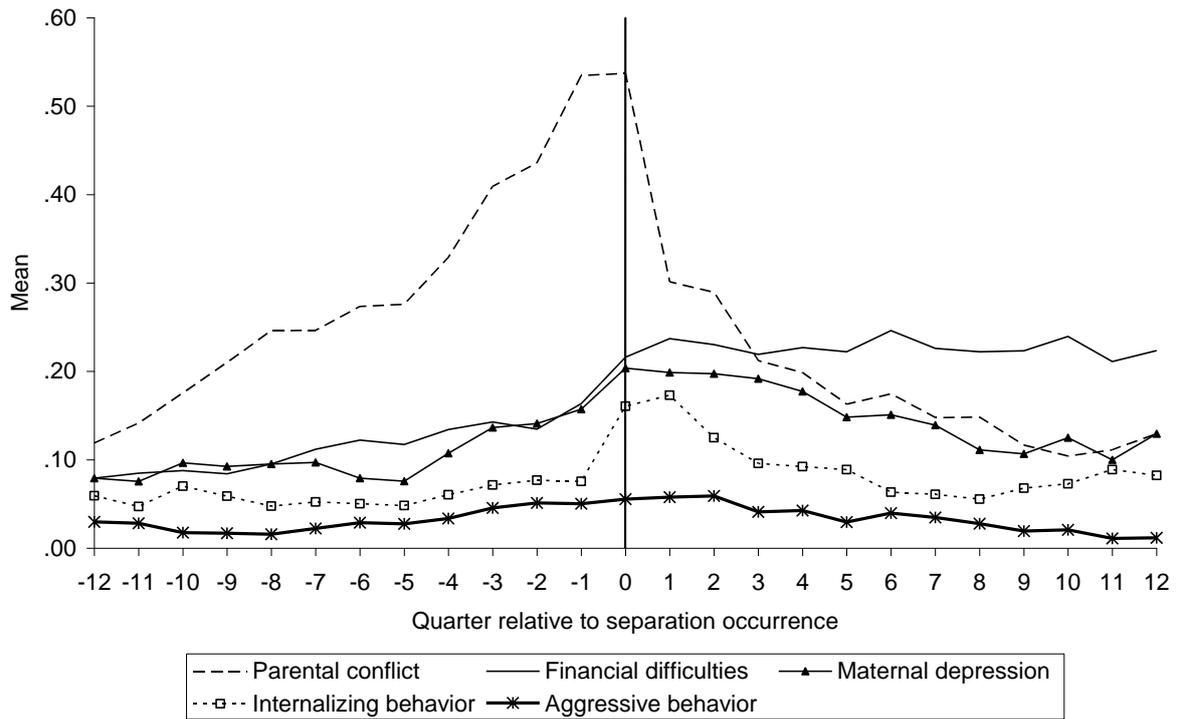


Figure Caption

Figure 2. Time sequences for the effects of separation on maternal depression, financial difficulties, parental conflict, and children’s aggressive and internalizing behavior



Note. Separation occurs when the “quarter relative to separation occurrence” (x-axis) is zero.