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Parental Divorce and Initiation of Alcohol Use in Early Adolescence

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Abstract

Parental divorce/separation is among the most commonly endorsed adverse childhood events and has been shown to increase subsequent risk of alcohol dependence and problems across adolescence and early adulthood, but its influence on early stages of alcohol involvement has only recently been explored. The present study examined whether time to first full drink was accelerated among youth who experienced parental divorce/separation. To determine specificity of risk, models controlled for perceived stress as well as family history of alcoholism, current parental drinking, and internalizing and externalizing problems. Developmental specificity in terms of timing of both parental divorce and first drink was also examined. Participants were 931 middle-school students who were enrolled in a prospective study on drinking initiation and progression (52% female; 23% non-White, 11% Hispanic). Students indicated whether and at what age they had consumed a full drink of alcohol. Parental divorce/separation was coded from a parent-reported life events inventory and was grouped based on age experienced (ages 0–5, ages 6–9, age 10+). Cox proportional-hazard models showed increased risk for onset of drinking as a function of divorce/separation, even controlling for stress, parental alcohol involvement, and psychopathology. There was no evidence for developmental specificity of the divorce/separation effect based on when it occurred nor in timing of first drink. However, the effect of parental divorce/separation on initiation was magnified at higher levels of parental drinking. Given the rates of parental divorce/separation and its association with increased risk of early drinking, investigation of the mechanisms underlying this link is clearly warranted.

Keywords

divorce; childhood; adolescence; alcohol; initiation

Introduction

Adversity during the first two decades of life has lasting detrimental effects on mental health and other health problems, including new disorder onsets and greater chronicity and severity of lifetime psychiatric disorders (Keyes, Hatzenbuehler, & Hasin, 2011; Kessler et al., 2010) and later heavy alcohol consumption, problems, and dependence (e.g., Benjet, Borges, Medina-Mora, & Mendez, 2012; Lloyd & Turner, 2008; Miller, Downs, & Testa, 1993). Childhood adversity encompasses a wide range of life events that include physical and sexual abuse, witnessing violent events, environmental deprivation, and parental divorce/separation. Multi-item childhood life event inventories mix relatively common occurrences such as a change in residence with more traumatic events such as abuse and victimization, which may differ significantly in their impact on mental health, and thus may be better examined independently. National data indicate that divorce/separation is one of the most commonly endorsed adverse childhood events (Green et al., 2010; Rothman et al., 2008), and youth who experience parental divorce/separation show elevated alcohol involvement into adulthood, including heavy drinking and alcohol-related problems as well as (lifetime) alcohol abuse and dependence (Dube et al., 2002; Huurre et al., 2010; Pilowsky, Keyes, & Hasin, 2009; Strine et al., 2012; Roustit, Chaix, & Chauvin, 2007; Thompson, Lizardi, Keyes, & Hasin, 2008; Thompson, Alonzo, Grant, & Hasin, 2013).

Somewhat surprisingly, the influence of parental divorce/separation on early stages of alcohol involvement has only recently been addressed, as the extant literature has primarily focused on consequent problems during adulthood and more severe outcomes such as alcohol dependence. Adolescent children of divorced parents report more alcohol and other substance use than children of married parents/intact families (Jeynes, 2001; Krikstjansson et al., 2009; Neher & Short, 1998). Studies examining a somewhat related potential risk factor, family structure, have shown that adolescents in non-intact families (single-parent families or stepfamilies) are more likely than those in intact families to begin drinking at a young age (Donovan & Molina, 2011), to consume (any) alcohol (Flewelling & Bauman, 1990) and to report frequent drinking, heavy drinking, and drunkenness (Barrett & Turner, 2006; Bjarnason et al., 2003; Kuntsche & Kuendig, 2006; Vanassche, Sodermans, Matthijs, & Swicegood, 2014), and substance use disorders (Fergusson, Horwood, & Lynskey, 1994). Given that early use of alcohol is prognostic of a host of adverse outcomes (e.g., Hingson et al., 2000; McGue et al., 2001; Stueve & O'Donnell, 2005; Swahn, Bossarte, & Sullivent, 2008), these findings are notable, but do not resolve whether exposure to the parental divorce/separation itself during childhood – as opposed to exposure to the range of risk factors for early drinking that are associated with growing up in a non-intact family – is a critical life event associated with increased risk of early alcohol use.

Several studies have examined the influence of parental divorce on drinking initiation, largely using retrospective reports from adult samples. Rothman et al. (2008) showed that current/former adult drinkers (mean age 30) who reported adverse childhood experiences, with the most commonly reported event being parental separation/divorce, were more likely to retrospectively report initiation by age 14. Dube et al. (2006) likewise found increased odds of initiating alcohol use by age 14 among adults (mean age 56) who reported parental divorce by age 18 and Sartor et al. (2007) found in an offspring-of-twin sample of young

adults (mean age 20) that parental divorce predicted a younger age of first drink. Using both a young adult and an adolescent offspring-of-twins sample, Waldron and colleagues replicated this finding using a time-varying covariate to represent parental separation, thus eliminating the potential misattribution of risk to parental separation in cases where it followed the onset of the substance use outcome. Findings indicated that parental separation prior to age 18 was associated with earlier onset of drinking and alcohol intoxication (Waldron et al., 2014a; 2014b), even controlling for family background characteristics and history of psychopathology and abuse (although in the sample that included African Americans, the association was found only in European Americans). Grant et al. (2015) applied the same approach to the examination of three stages of alcohol use in a combined sample drawn from two offspring of twin studies and also found an association between parental separation and elevated risk for early alcohol use initiation. However, in all of these studies that drew from twin and offspring-of twin samples, data were collected retrospectively. The influence of parental divorce on drinking initiation has not been examined prospectively, which minimizes bias in the recall of age of first drink.

Role of other Family Influences

Family history of alcoholism—One important consideration in investigating the relationship between parental divorce and offspring alcohol use is that parents with alcohol problems are more likely to have relationships that end in marital separation or divorce (Becoña et al., 2012), suggesting that any association between divorce/separation and drinking outcomes may simply index familial drinking risk (Arkes, 2013). Studies that control for familial history of alcoholism, however, still show robust associations between child adversity and adult risk for alcohol use disorders (AUDs) (Pilowsky et al., 2009), and specifically, associations between parental divorce/separation and lifetime alcohol dependence (Thompson et al., 2013). Both Sartor et al. (2007) and Waldron et al. (2014a; 2014b) demonstrate that associations between parental divorce/separation and age of first drink remain significant even when controlling for family history of alcohol dependence. Associations between family history of alcoholism and lower-level consumption measures tend to be of smaller magnitude and less consistently observed, however, than associations with alcohol dependence (Jackson & Sher, 2005).

Exposure to parental alcohol use—Parental drinking may be influential upon offspring alcohol involvement through social modeling of drinking behavior (White, Johnson, & Buyske, 2000) (social learning theory; Bandura, 1977). Early drinking initiation is associated with parental alcohol use (Donovan & Molina, 2011; Handley & Chassin, 2013; Vermeulen-Smit et al. 2012), with evidence that the transmission may be due to parent-child communication favoring alcohol use (Handley & Chassin, 2013). The association between family structure and adolescent alcohol involvement appears to hold when controlling for current parental drinking (Brown & Rinelli, 2010) and when controlling for perception of excessive drinking in the family (Kuntsche & Kuendig, 2006). However, one study demonstrated that change in marital status during the first five years of the child's life was significantly associated with drinking initiation prior to age 15 but not when controlling for maternal alcohol consumption (drinker vs abstainer) measured when the offspring was five years old (Hayatbakhsh et al., 2008).

Perceived stress—Stress-coping models of addiction suggest that substances are commonly used to cope with life stress and function to reduce negative affect (self-medication) (Hussong et al., 2001; Wills & Hirky, 1996). It is the perception of an event that determines whether it will lead to distress (transactional stress theory; Lazarus & Folkman, 1984), with perceived stress partly accounting for elevated drinking in adolescents (Chassin et al., 1996; Hussong & Chassin, 2004). Family structure differences in substance use may also be due in part to differential exposure to stress, whereby the risk of experiencing stressors varies by family composition (Gore et al., 1992). Indeed, one study indicated that elevated rates of substance use problems among youth from single-parent families were partly attributable to exposure to stress (Barrett & Turner, 2006). The extent to which this is true for parental separation/divorce, however, is not yet known.

SES—Economic deprivation may be responsible for some of the negative influences of marital disruption on children (Sun & Li, 2002). Levels of parental income may affect children of divorce through downward residential mobility, which may provide youth with more opportunities to experiment due to reduced parental monitoring and parental involvement and greater access to alcohol. The effects of family-level SES on adolescent alcohol use are inconsistent; greater access to alcohol may be facilitated by greater resources in high SES households (Casswell, Pledger & Hooper, 2003), but at the same time, youth living in disadvantaged neighborhoods appear to have greater access to alcohol (Crum, Lillie-Blanton, & Anthony, 1996; Romley, Cohen, Ringel, & Sturm, 2007). Although the role of SES in adolescent substance use is complex, there is consistent evidence that parental divorce and household composition are still significantly predictive of adolescent substance use controlling for SES (Barrett & Turner, 2006; Jaynes, 2001).

Developmental Framework

When examining the role of childhood life events such as parental divorce/separation on adolescent alcohol use, the developmental context must be considered. One might speculate that there is a “window of vulnerability” whereby childhood risk is greater if experienced at a very young age. Early exposure may initiate a series of events that render youth susceptible to psychopathology, including early or problem substance use. In addition, family crises such as parental separation/divorce may become less influential on risk behavior as adolescents become more autonomous and peer-oriented and less reliant on family ties and parental support (Malone et al., 2004; Sun & Li, 2007). Early adolescent (age 12) hyperactive behavior and physical aggression tended to be greatest among youth who experienced parental divorce before age 8 as compared to youth whose parents divorced later (Pagani, Boulerice, Tremblay, & Vitaro, 1997). Similarly, the effects of stress on alcohol use tend to weaken as adolescents age into young adulthood (Aseltine & Gore, 2000). However, it is also possible that youth who are already undergoing the stresses associated with adolescence are vulnerable to any additional stress caused by family dissolution (Sun & Li, 2007).

Differences in adolescent outcomes by age at the time of parental divorce also may be due to a greater salience of recent vs. more distal events, such that the immediate distress surrounding parental separation fades with time. That is, parental divorce/separation is more

of an acute stressor or “crisis” than a chronic strain with lasting effects (Amato, 2000). Low et al. (2012) note that the divorce process itself, i.e., parental conflict, may be most important. They examined the timing of parental divorce and alcohol use in adolescents, including whether the impact on alcohol use subsides, persists, or escalates over time and found that alcohol use increased the most in the two years following the divorce, but was also significantly predictive in later periods two to six years after divorce. Jeynes (2001) found that 8th graders who experienced divorce somewhat recently (within previous 4 years) drank in greater quantities those who experienced divorce less recently, but that rates of lower-level consumption did not differ as a function of timing.

A final developmental consideration is whether parental divorce has a differential effect on alcohol use initiation in pre- to early adolescence compared to mid to late adolescence. Dube et al. (2006) suggest that as use of alcohol becomes increasingly normative across adolescence, weaker relationships between life events and alcohol use would be expected during late adolescence and early adulthood. However, their findings indicate that parental divorce is associated with the initiation of alcohol use throughout adolescence, although effects are greater for early initiation (by age 14) than for later initiation (by age 17 or by age 20). Sartor et al. (2007) also found that the contribution of parental divorce to initiation of alcohol use was not consistent over time, conferring the greatest risk for drinking when drinking was initiated prior to age 13 and after age 15. A similar pattern of results was found in the studies by Waldron et al. (2014a, 2014b) and Grant et al. (2015) that examined variability in the degree of influence of parental separation by age at parental separation and by age at alcohol use initiation. Their findings revealed that parental separation effects were greater for drinking that occurred in early versus later adolescence.

Overview

The present study addressed the question of whether time to first full drink is accelerated among youth who experience parental divorce/separation. We attempted to disentangle risk specific to parental separation/divorce from family history of alcoholism and parental drinking, which are more common in non-intact families and might confer risk for alcohol use via environmental and genetic influences (D’Onofrio et al., 2007; Zucker, 2006). In addition to testing for sex differences in the association between parental separation/divorce and drinking onset given the evidence for sex differences in drinking rates (Chen & Jacobson, 2012) and adverse outcomes of parental divorce (Huurre, Junkkari, & Aro, 2006), we aimed to identify developmental specificity in terms of timing of both parental divorce and first drink. Building on recent work by Waldron et al. (2014a; 2014b) and Grant et al. (2015), we also tested whether there were additive (or even synergistic) effects whereby risk for early initiation of alcohol use was greatest among those with both parental divorce/separation and parent drinking. In an extension of this line of research, we considered the previously unexamined role of perceived stress as potentially exacerbating risk for early initiation conferred by parental divorce/separation.

Method

Sample

Data were taken from an ongoing study on drinking initiation and progression (see Jackson et al., 2014; Jackson et al., 2015). Participants were 931 students who were enrolled into the study in 6th, 7th, and 8th grades (33%; 32%; 35%, respectively). The study sample is 52% female, 23% non-White (4% Black, 3% Asian, 2% American Indian, 7% mixed race, 6% other), and 11% Hispanic. Mean age at baseline was 12.2 years (range: 10–15, $SD = 0.98$). Based on school-level data (Information Works, 2009), the sample was largely representative of the schools from which they were drawn with respect to sex and grade, but was more racially diverse than the school populations but also less disadvantaged. At Wave 1, 6.3% of the sample (59/931) reported having consumed a full drink of alcohol.

Procedure

Participants ($n=1023$) were recruited from six local middle schools. Study information and informed parental consent forms was distributed by faculty and were also mailed to each student's home based on the school roster. Incentives were provided to students to return a signed consent form regardless of whether consent to participate in the study was granted. Across the schools, 39% (1,778/4,582) of students returned a consent form, 65% (1,156/1,778) of the forms returned were consents allowing for participation, and 88% (1,023/1,156) of these individuals were enrolled into the study. Interested youth from whom we had written parental consent attended a two-hour in-person group orientation and completed a 45-minute computerized baseline survey (Wave 1). Participants were assessed over a three-year period, with a total of five semi-annual web-surveys across two years and a follow-up web-survey one year later. Multiple alerts and reminders (via mail, email, text, and phone) indicated when a survey was available. Participants received \$25 for the baseline survey and a \$20 gift card for each follow-up survey. Response rates were 92% at Wave 2, 88% at Wave 3, 85% at Wave 4, 83% at Wave 5, and 83% at Wave 6, but because data were taken across several timepoints, all participants (who had a parent report) contributed data to the present study.

In addition, one self-selected parent independently completed a 30-minute paper-and-pencil survey at baseline and one-year following; parents received a \$30 grocery store gift card for completing each survey. Parent report was obtained by 92% (938/1023) of the sample (86% were the biological mother). We limited the current study sample to those students who had parent report data. We further excluded seven students who reported a full drink prior to the age of divorce/separation, ensuring temporal precedence between drinking and divorce/separation for all participants, resulting in a final sample size of 931. Compared with students whose parents did not participate, students with participating parents were more likely to be non-Hispanic White ($p = .04$); there was no difference by age or sex. Parents of participants who reported ever consuming a full drink at baseline were less likely to complete the parent report (92.5% vs 82.3%, $p = .002$); however, there were no differences when taking into account drinking reports over the entire study (as was done in analyses). There were no differences as a function of youth-reported perceived stress.

All procedures were approved by the university institutional review board and a Certificate of Confidentiality was obtained from NIAAA to preserve participant confidentiality.

Measures

Table 1 shows descriptive statistics for each of the measures, stratified by family divorce/separation.

Demographic factors—Students reported date of birth (used to calculate age) and sex.

Age at first drink—Students indicated at each survey whether they had ever consumed a full drink of alcohol and provided the age at which this happened. We took the minimum age reported across all waves.¹ Based on concerns about the validity of responses indicating consumption at an extremely young age, age was bottom coded as “six and under” ($n=3$). The mean age of first drink was 13.2 years ($SD=1.9$; range 6–17); 25.0% (230/931) reported consuming a full drink (28.7% of girls, 20.3% of boys).

Parental Divorce/Separation—Parents were asked to indicate if a set of 34 important life events happened to his/her child (or his/her family) during the child’s lifetime; items were taken from the Coddington Life Events Questionnaire for the Elementary Age Group (Coddington, 1972). Parents who endorsed a response then indicated the age at which their child experienced the event. This measure was administered twice, one year apart. If an event was endorsed on both surveys, we took the maximum (most recent) of the two reported ages. From these items, we coded responses indicative of parental divorce or separation, including “My child’s parents were divorced” and “My child’s parents experienced a marital separation”. The variable was a binary indicator of either or both items endorsed. If both separation and divorce were endorsed, we used the younger of the two reported ages. We grouped these based on the age at which they were experienced, creating three a priori groupings (ages 0–5, ages 6–9, age 10 or older).

Perceived stress—Students were asked to indicate how much of a stress each of six domains were at each time point. The domains included school, their friends, their future, their parents/family, their job, and money. Response options included: None (0), Small/Minor Stress (1), Medium Stress (2), and Large/Major Stress (3). We summed the number of medium or large stress domains endorsed at each wave and took the mean over all waves (range: 0 to 6).

Family history of drinking problems—Parents completed an assessment at baseline and again one year later. In this assessment, they were asked to indicate whether the child’s biological mother and/or biological father have/had ever had a drinking problem at either time point. Since different parents could have responded to the two surveys, we combined responses such that an affirmative response for either parent at either time point is coded as a lifetime parent drinking problem.²

¹There were 102 kids with two or more reported ages for age of first drink. Among these, 42 had a range of two or more years across the different reports of ages. Ancillary analyses were conducted using the first-reported age of first drink; substantive findings were very similar.

Parent drinking—Parents completed the 10-item Alcohol Use Disorders Identification Test (AUDIT, Saunders et al., 1993). This measure screens for excessive alcohol consumption, drinking behavior, adverse psychological reactions, and alcohol related problems. One additional item was added to the survey, “Have you felt you have a drinking problem?” All responses were summed. Parents were also asked to respond to the same set of items asking about their partner. Responses to both sets of items at both time points were averaged.³

SES—Our analyses controlled for a measure of SES, whether the child received lunch subsidy (reduced- or free-lunch) at either timepoint.⁴

Child psychopathology—Given that internalizing problems (e.g., depression and anxiety) and externalizing disorders such as conduct disorder are associated with both parental separation (Amato, 2001; Fergusson et al., 1994) and early initiation of alcohol use (King, Iacono, & McGue, 2004; Kuperman et al., 2005) we included the internalizing and externalizing scales from the Child Behavior Checklist (CBCL; Achenbach, 1979) in our adjusted models. Parents reported on this at both time points (retest $r=.67$ for internalizing and $r=.81$ for externalizing). We calculated the mean of the two reports.

Analytic Strategy

The hazard of initiating alcohol use was estimated using survival analysis (Cox proportional hazard models; Cox, 1972; Singer & Willett, 2003), using `proc phreg` in SAS. Survival analyses handle right censoring due to failure to consume a full drink because of attrition or study end. We handled ties in the dataset using `ties=exact`, which computes the exact conditional probability under the assumption that tied event times occur before censored times of the same value or before larger values.

In addition, we tested the proportional hazards assumption that risk remains constant over time, which tests whether the predictor variables have the same effects at all points in time (i.e., an interaction with time). This test permitted us to explore whether the contribution of a given risk factor to initiation of alcohol use is greater at certain developmental stages than others, e.g., whether its effects are specific to early initiation. This was assessed using the Grambsch and Therneau test of the Schoenfeld residuals (Grambsch & Therneau, 1994).

Finally, we tested for group differences in hazard functions. Covariate effects are expressed in hazard ratios (HR; e.g., difference in log hazard initiation for boys vs. girls, or for youth who experienced a parental divorce/separation vs. did not). We also tested interactions

²Eighteen kids were missing on parent alcoholism, which we conservatively set to No (0). We conducted ancillary analyses setting it to Yes (1) or missing. No substantive differences were observed for the hazard ratios. The non-significant parent alcoholism effect in the fully adjusted model (HR=1.20; 95% CI: 0.90, 1.60; see Table 2) remained non-significant: when parent alcoholism was set to Yes, HR=1.22 (95% CI: 0.92, 1.62); when set to missing, HR=1.18 (95% CI: 0.88, 1.58).

³Three kids were missing on parent drinking; all three had yes (1) values on parent alcoholism. We set their values to the mean value obtained for all kids with yes values on parent alcoholism (2.98). No substantive differences were observed for the hazard ratios. The marginally significant parent drinking effect in the fully adjusted model (HR=1.04, 95% CI: 1.00, 1.09) remained marginally significant for the three alternative values assigned: when parent drinking was set to 0, HR=1.04 (95% CI: 1.00, 1.09); when set to the overall mean, HR=1.04 (95% CI: 1.00, 1.09); and when set to missing, HR=1.04 (95% CI: 1.00, 1.09).

⁴We also looked at salary (using a cutpoint at \$25K and also at \$50K) and college attendance (either parent, college or grad school) and found findings very similar to those using lunch subsidy.

between divorce/separation and perceived stress, family history of drinking problems, and parent drinking as well as interactions of each of these variables with sex in predicting drinking onset.

Results

Time to First Drink

Figure 1 shows a graph of the product-limit survival curves for first drink, where survival corresponds to failure to consume a full drink. The survival curves are presented separately for those experiencing parental separation/divorce and those who did not. The top panel of the graph shows that 21% of adolescents who did not experience parental separation/divorce consumed a full alcoholic drink. The bottom panel of the graph shows that 32% of adolescents who experienced parental separation/divorce consumed a full alcoholic drink. Figure 2 shows the survival curves separately by age of when separation/divorce occurred.

Table 2 presents the unadjusted, partially adjusted, and fully adjusted Cox proportional hazard models of the risk for onset of drinking as a function of divorce/separation. The unadjusted models revealed that the estimated odds of consuming a full drink were greater for girls than for boys and increased with age. For girls, the odds of consuming a full drink were 49% higher (HR=1.49; 95% CI: 1.14, 1.94) the odds for boys, and the odds increased by 31% (HR=1.31; 95% CI: 1.14, 1.52) with each year of age. Importantly, youth who experienced divorce/separation were at significantly greater risk of initiation than those who did not (HR=1.65; 95% CI: 1.26, 2.14). This association remained significant in adjusted models controlling for sex, age, and SES (HR=1.55; 95% CI: 1.17, 2.05).

Even after additionally adjusting for psychopathology, perceived stress, family history of drinking problems, and current parent drinking, divorce/separation significantly increased odds of initiation (HR=1.45; 95% CI: 1.10, 1.92). Additionally, perceived stress, internalizing, and externalizing were all significant predictors. Neither family history of drinking problems nor parent drinking significantly predicted age of first drink.

Developmental specificity

We explored developmental specificity of the divorce/separation effect by separating divorce/separation by when it occurred (< age 6, ages 6–9, age 10+) (see Table 3). In both unadjusted and models controlling for sex, age, and SES, the experience of parental divorce/separation increased odds of initiation for each of the three age groups: for adjusted models, under age 6 (HR=1.48; 95% CI: 1.01, 2.17), age 6–9 (HR=1.61; 95% CI: 1.02, 2.55), and age 10 or older (HR=1.58, 95% CI: 1.04, 2.38). In the fully adjusted model, however, experiencing divorce/separation was not a significant predictor of age of first drink individually for any of the three age groups.

We also examined developmental specificity for the timing of age of first drink by testing the proportional hazard assumptions for the models. For all models presented in Tables 2 and 3, there were no interactions with time, indicating that none of the assumptions were violated, and from a substantive standpoint, that there were no apparent differences in the association between any of the predictors and initiation as a function of the timing of first drink.

Interactions between Divorce/Separation and Stress and Parent Drinking

There were no significant interactions between parental divorce/separation and perceived stress (HR=0.88, 95% CI: 0.71, 1.09), nor between parental divorce/separation and family history of drinking problems (HR=0.81, 95% CI: 0.47, 1.42). However, there was a significant interaction between divorce/separation and parent drinking (HR=1.10, 95% CI: 1.01, 1.19). Findings indicate that the hazard ratio increased as parent drinking scores increased, with non-significant values at AUDIT values less than 2.5 but significant and increasingly large values with higher AUDIT scores; Figure 3 presents the hazard ratios as a function of different AUDIT values).

Tests of interactions between sex and each of the predictors were non-significant (HRs from 0.78 to 0.94, *ns*). There were also no apparent sex differences in the effect of divorce/separation across each of the three developmental stages: under age 6 (HR=0.59, 95% CI: 0.28, 1.25), between ages 6 and 9 (HR=1.14, 95% CI: 0.45, 2.87), or age 10 or older (HR=0.85, 95% CI: 0.37, 1.96).

Discussion

Using a prospective sample of young adolescents, the present study showed that the experience of parental divorce/separation was associated with earlier initiation of alcohol use, over and above perceived stress and current and prior parental alcohol involvement, suggesting there is specificity of risk beyond several important family level risk factors. In fact, the experience of divorce/separation in childhood was the strongest predictor of age of drinking onset among all of the constructs examined. Perceived stress and child psychopathology were also associated with initiation, but neither family history of drinking problems nor current parental drinking showed significant associations. Of greatest interest, findings demonstrated that the effect of parental divorce/separation on drinking initiation was strongest at higher levels of parental drinking.

Developmental Specificity

There was no evidence of developmental specificity in terms of timing of parental divorce, as experiencing divorce/separation at all ages was significantly associated with elevated risk of drinking initiation; these associations held when controlling for demographic variables (sex, age, and SES), although not in models further accounting for perceived stress, familial alcohol involvement, and psychopathology. Thus, study findings did not support pronounced risk at a time when children are more reliant on family ties and parental support nor a “window of vulnerability” during early childhood: regardless of when experienced, parental divorce/separation seems to be a critical life event associated with increased risk of early alcohol use. However, it may still be that the experience of early divorce/separation is linked to early alcohol use through a different pathway of risk than divorce/separation during later childhood. Future work exploring the mechanisms underlying the association between divorce/separation and adolescent drinking should consider differences across development.

We failed to find evidence of developmental specificity in terms of the timing of the first drink – that is, there were no apparent differences in the association between divorce/

separation or any of the other predictors and initiation as a function of the age at first drink. The inconsistency with prior studies by Waldron et al. (2014a, 2014b) and Grant et al. (2015), in which risk conferred by parental separation/divorce was most pronounced in the pre- to early adolescent years, may in part be due to the younger age of the current sample, for whom onset of drinking occurred (by definition) at a young age. Subsequent studies either with older adolescent samples or with additional follow-up of this sample may reveal different relationships between divorce and alcohol use for earlier versus later ages of initiation.

Our study provided evidence that divorce/separation had stronger effects on drinking initiation at higher levels of parental drinking. This finding extends findings by Thompson and colleagues (Thompson et al., 2008; 2013) showing that experiencing parental divorce and maternal and/or paternal alcohol problems increased the likelihood of alcohol dependence, and supports the notion that children fare worst when exposed to both parental divorce and parental substance use. We failed to detect an interaction between parental divorce/separation and family history of alcoholism, and likewise found no support for stress-sensitization, as the interaction between perceived stress and parental divorce/separation was non-significant. Although there were sex differences in the hazard of initiation such that girls were more likely to initiate, we did not find evidence that the association between parental divorce/separation and alcohol use differs by sex.

Possible Mechanisms

Several mechanisms have been offered regarding the elevated risks for deviant behavior associated with parental divorce/separation. A reduction in child supervision and parental involvement may follow divorce (Størksen, Røysamb, Moum, & Tambs, 2005; Wolfinger, 1998), consistent with social control theory (Hirschi, 1969) which proposes that deviant behavior is produced by low levels of attachment and commitment to institutions such as family. Parental absence in turn may lead to a decrease in parenting effectiveness (Amato & Keith, 1991) and increased access to alcohol and hence increased opportunity to drink (Rothman et al., 2008).

In addition, poor parental monitoring may lead to greater affiliation with substance-using peers, as youth turn to peers to have emotional needs met (Barrett & Turner, 2006; Neher & Short, 1998). Kuntsche and Kuendig (2006) found that the risk of drinking associated with being in a single-parent family was greatly reduced when controlling for peer drinking, suggesting that deviant peer affiliation may mediate the effects of parental divorce/separation on alcohol use. Thus, experiencing divorce/separation might set up a developmental cascade where early adverse events lead to reduced monitoring, which leads to deviant peers/increased access to alcohol and ultimately earlier initiation with drinking.

Another putative mediator of the association between divorce/separation and alcohol use is family conflict (Kristjansson, Sigfusdottir, Allegrante, & Helgason 2009), although it is unclear if the conflict precedes marital dissolution or is a result of the divorce (Kelly, 2000) and in some cases, children may be better off after a parental divorce that reduces conflict (Amato & Keith, 1991). Stress from the family disruption and conflict may also be a factor (Barrett & Turner, 2006), as youth may drink to cope with distress, although this may be less

likely for lower levels of drinking (e.g., Low et al., 2012). Other potential mechanisms include downward mobility and a change in household resources, although this notion has not been consistently supported (Dube et al., 2002). The present study is unable to test these mechanistic theories, but we hope it stimulates future work to better understand these processes.

Strengths and Limitations

Our study benefited from a prospective design that minimized the possibility that adolescent drinking contributed to likelihood of marital disruption, given that most participants (92.7%) had not consumed a full drink of alcohol prior to the experience of divorce/separation. Our prospective follow-up of young sample also reduced likelihood of retrospective recall bias, especially the forward telescoping bias, the tendency to report events to have occurred closer to the assessment than is true (Johnson & Schultz, 2005). We were also able to obtain a measure of current parental drinking during adolescents at a point proximal to the time of drinking initiation, which is an improvement on retrospective reports of parental drinking. Our parental reports provided a measure of child life events (including divorce/separation) that was at least partially independent of adolescents' self-report on alcohol use. Parent reports may not adequately identify events that are salient to the child, however. In addition, events were reported retrospectively, as was the age experienced. Reports of experiences that do not rely heavily on judgment and interpretation tend to have greater validity in general; however, recall of the timing of adverse experiences may be biased (Hardt & Rutter, 2004).

We examined a low risk sample of middle school youth, with a focus on very early onset of drinking. Thus, our results may not generalize to later ages of initiation. Consistent with epidemiological data showing that the average age of initiation among underage drinkers is 16 (Substance Abuse and Mental Health Services Administration, SAMHSA, 2011), a good portion of our sample had not yet consumed a full drink, and the hazard of initiating drinking continued to rise with sample age.

In addition, we did not gather information on the reason for divorce, which might be perceived as a positive life event (e.g., in the case of an abusive parent or parent with a substance use disorder). Our measure of perceived stress may not have preceded the first drink for earlier onsetters; when possible, it is important to assess proximal factors that are closely spaced in time to a given event. Although we selected youth for whom divorce did not precede drinking onset, it is still possible that the negative effects of the divorce process were already present in the years leading up to the divorce (Arkes, 2013).

Future Directions

As the sample ages, we will explore associations between divorce/separation and indices of risky drinking and dependence for a wider age range. Given the racial/ethnic differences in both the timing of alcohol use initiation (Faden, 2006; Malone et al., 2012) and the associations among risk factors associated with parental separation/divorce (Waldron et al., 2014b), recruitment of large racially/ethnically diverse samples will be critical to furthering our understanding of the contributions of parental separation/divorce to early alcohol involvement. Another logical next step in this line of research is the consideration of

recurrence of parental separation, as parents may separate and return to living in the same household – or reside with other partners - at multiple points in time. Finally, as the family environment preceding parental divorce/separation may also confer risk for adolescent alcohol use, it will be important for future studies to collect information from parents about parenting behaviors at the time of, and preceding, the divorce.

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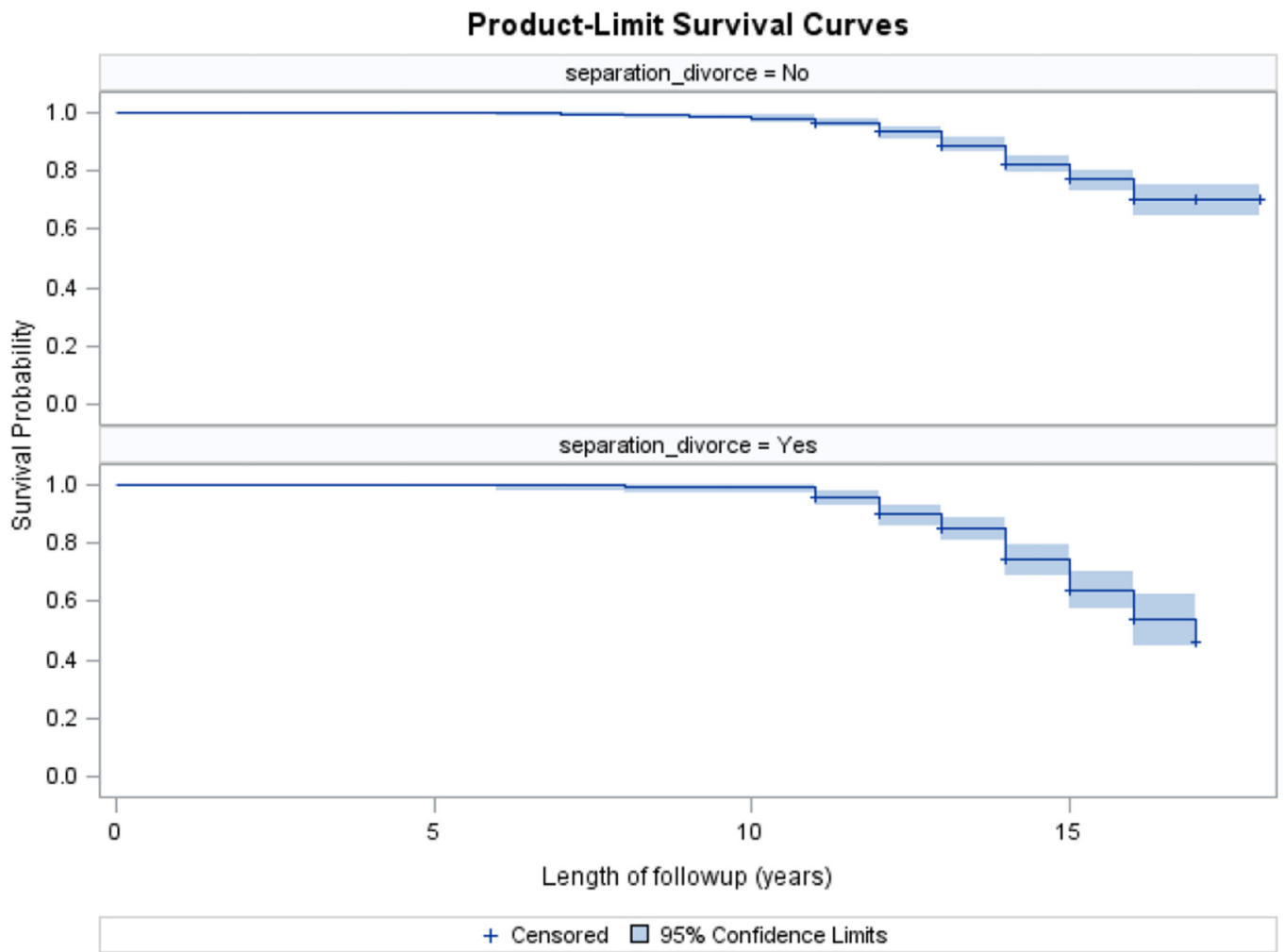


Figure 1. Survival curves for participants who did not experience parental separation/divorce (top panel) and did experience parental separation/divorce (bottom panel).

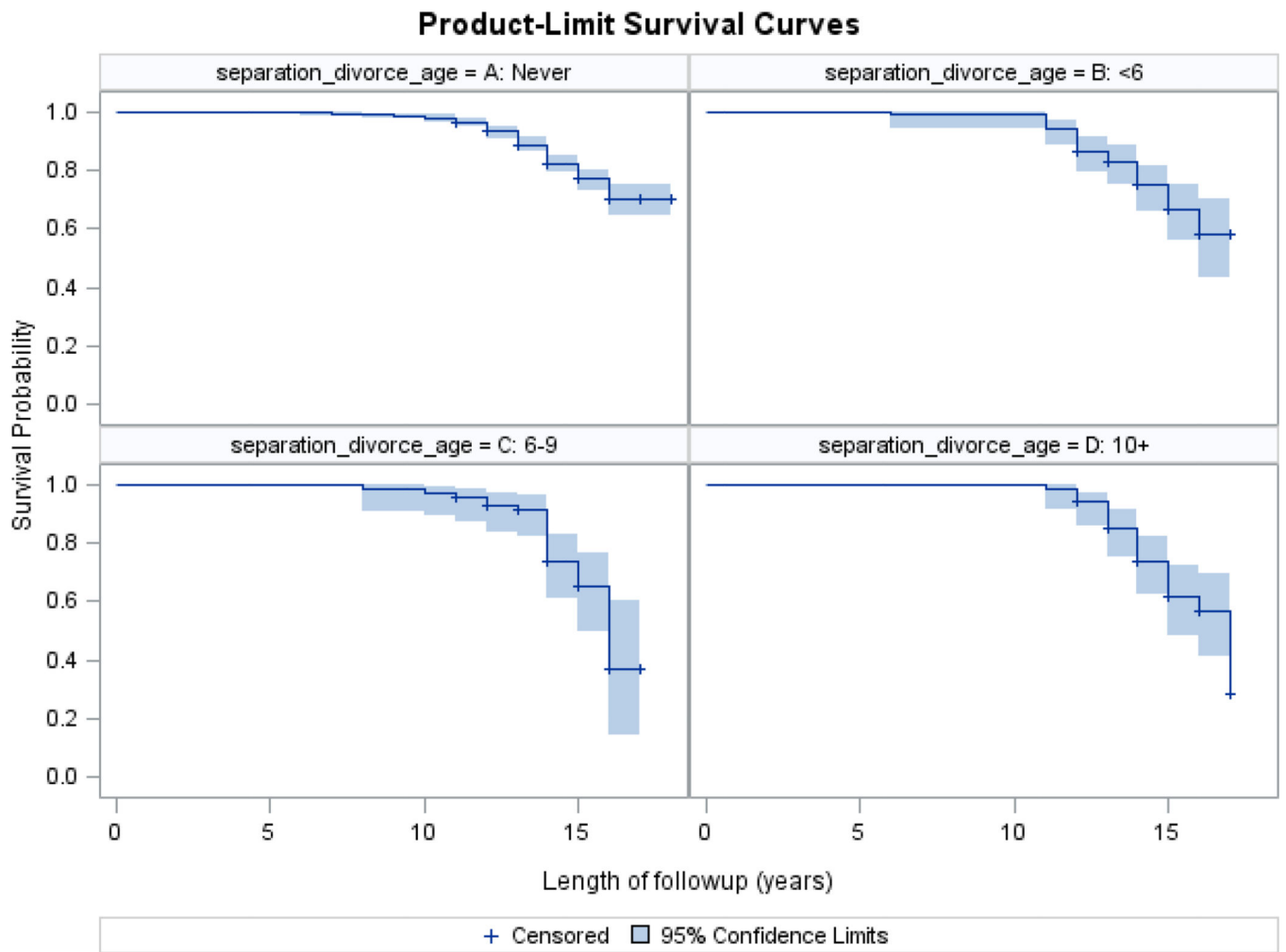


Figure 2. Survival curves by age at which parental separation/divorce was experienced.

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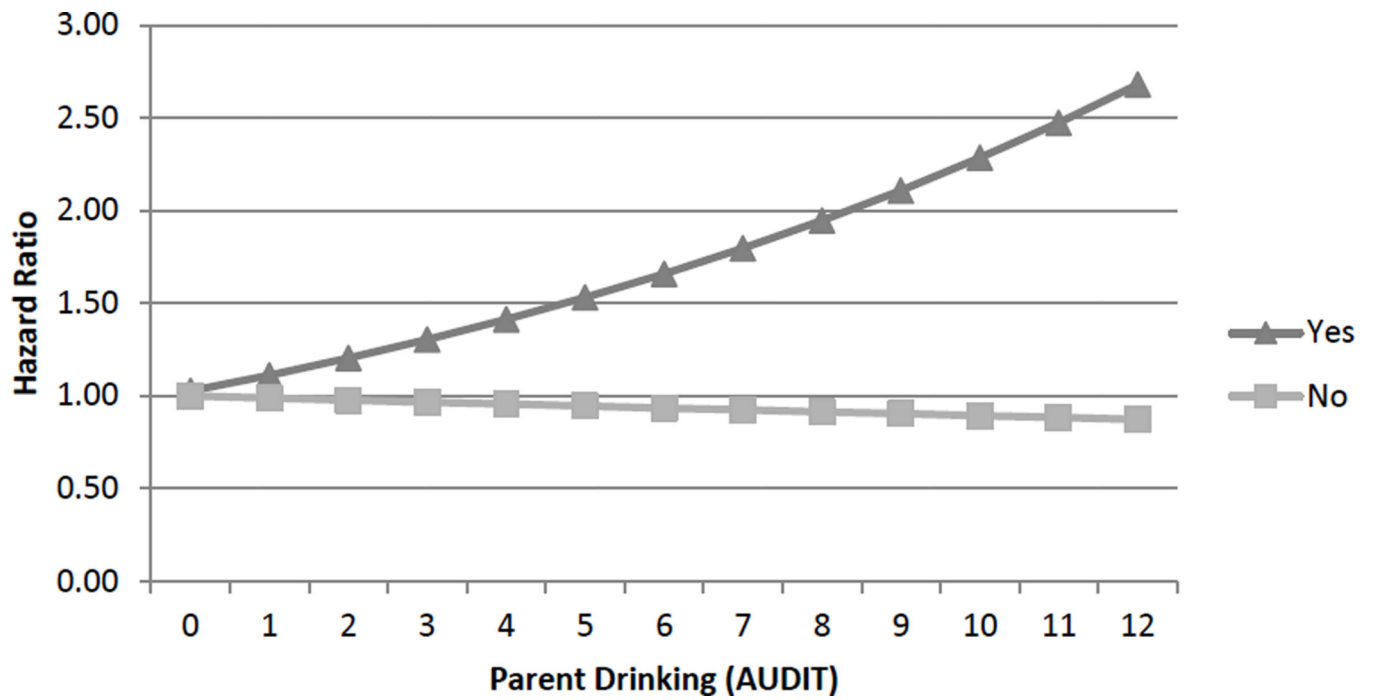


Figure 3.
Hazard ratios for the prediction of age of first full drink by divorce/separation (Yes versus No) at different levels of parental drinking.

Table 1

Descriptive characteristics

Measures	Parental divorce/separation		Test statistic and significance value for group differences
	No (N=637)	Yes (N=294)	
Sex			
Female	50.39%	56.80%	
Male	49.61%	43.20%	$\chi^2(1)=3.31, p=.07$
Age			
At baseline (range: 10–15)	12.22 (0.98)	12.21 (1.00)	$t(929)=0.15, p=.88$
At last completed survey (range: 11–18)	14.77 (1.14)	14.77 (1.20)	$t(929)=0.07, p=.95$
At first drink ¹ (range: 6–17)	13.08 (2.04)	13.35 (1.76)	$t(228)=-1.04, p=.13$
Ever consumed a full drink	21.35%	31.97%	$\chi^2(1)=12.20, p=.0005$
Parental divorce/separation			
Neither	100%	--	
Separation only	--	30.27%	
Divorce only	--	7.48%	
Both separation and divorce	--	62.24%	
Age experienced parental divorce/separation			
Never	100%	--	
Birth to 5	--	45.00%	
6–9	--	25.36%	
10 or older	--	29.64%	
Perceived stress	1.68 (1.22)	1.80 (1.19)	$t(929)=-1.45, p=.15$
Family history of drinking problems	24.02%	48.64%	$\chi^2(1)=56.23, p<.0001$
Parent drinking	2.73 (2.39)	2.52 (2.78)	$t(500.76)=1.14, p=.26$
Receive lunch subsidy	26.06%	56.80%	$\chi^2(1)=82.75, p<.0001$
Child psychopathology			
Internalizing	4.56 (5.19)	5.61 (5.26)	$t(927)=-2.84, p=.005$
Externalizing	4.11 (5.73)	6.50 (7.42)	$t(458.97)=-4.87, p<.0001$

¹Using minimum reported age

Table 2

Hazard ratios and 95% Confidence Intervals (CI) for the prediction of age of first full drink of alcohol for divorce/separation, perceived stress, and parent drinking problems, controlling for sex, Time 1 age, receipt of lunch subsidy, internalizing, and externalizing.

Predictor	Univariate		Partially adjusted		Fully adjusted	
	HAZARD RATIO	95% CI	HAZARD RATIO	95% CI	HAZARD RATIO	95% CI
Divorce/separation	1.65 ^{***}	(1.26, 2.14)	1.55 ^{**}	(1.17, 2.05)	1.36 [*]	(1.02, 1.81)
Sex (female)	1.49 ^{**}	(1.14, 1.94)	1.48 ^{**}	(1.13, 1.93)	1.43 [*]	(1.08, 1.88)
Age	1.31 ^{***}	(1.14, 1.52)	1.33 ^{***}	(1.15, 1.54)	1.22 ^{**}	(1.05, 1.41)
Lunch subsidy	1.33 [*]	(1.03, 1.73)	1.16	(0.88, 1.53)	1.07	(0.79, 1.43)
Internalizing	1.01	(0.99, 1.04)			0.95 ^{**}	(0.92, 0.98)
Externalizing	1.05 ^{***}	(1.03, 1.06)			1.06 ^{***}	(1.04, 1.08)
Perceived stress	1.36 ^{***}	(1.23, 1.50)			1.29 ^{***}	(1.16, 1.43)
Family history of drinking problems ^a	1.52 ^{**}	(1.16, 1.98)			1.20	(0.90, 1.60)
Parent drinking ^b	1.04	(0.997, 1.09)			1.04	(0.996, 1.09)

^{***} Note. $p < .001$

^{**} $p < .01$

^{*} $p < .05$

^a One or more biological parents with a drinking problem

^b AUDIT score, averaged across parents

Table 3

Hazard ratios and 95% Confidence Intervals (CI) for the prediction of age of first full drink of alcohol for divorce/separation at three developmental stages, perceived stress, and parent drinking problems, controlling for sex, Time 1 age, receipt of lunch subsidy, internalizing, and externalizing.

Predictor	Univariate ^a			Partially adjusted			Fully adjusted		
	HAZARD RATIO	95% CI		HAZARD RATIO	95% CI		HAZARD RATIO	95% CI	
No divorce/separation	1.00	(ref)		1.00	(ref)		1.00	(ref)	
Divorce/Separation (< age 6)	1.55*	(1.08, 2.23)		1.48*	(1.01, 2.17)		1.35	(0.92, 1.98)	
Divorce/Separation (age 6–9)	1.67*	(1.06, 2.62)		1.61*	(1.02, 2.55)		1.30	(0.82, 2.08)	
Divorce/Separation (age 10)	1.69*	(1.13, 2.54)		1.58*	(1.04, 2.38)		1.32	(0.86, 2.00)	
Sex (female)				1.46**	(1.11, 1.91)		1.38*	(1.04, 1.83)	
Age				1.32***	(1.14, 1.53)		1.20*	(1.03, 1.40)	
Lunch subsidy				1.16	(0.87, 1.54)		1.05	(0.78, 1.42)	
Internalizing							0.94***	(0.91, 0.98)	
Externalizing							1.06***	(1.04, 1.09)	
Perceived stress							1.31***	(1.18, 1.46)	
Family history of drinking problems ^b							1.25	(0.94, 1.68)	
Parent drinking ^c							1.03	(0.99, 1.08)	

****p* .001

***p* .01

**p* .05

^aValues for sex through parent drinking are identical to those presented in Table 2.

^bOne or more biological parents with a drinking problem

^cAUDIT scores is the average for both parents