Patterns of Family Connectedness and Trajectories of Problem Drinking

DISSERTATION

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By

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Abstract

In 2011, 38.7% of high school students reported the consumption of at least one alcoholic drink within the past 30 days. Furthermore, 21.9% reported binge-drinking at least once within the past 30 days (Centers for Disease Control and Prevention, 2012). While not all of those who abuse alcohol in adolescence and young adulthood chronically struggle with alcohol problems, a significant portion do. Research indicates that family dynamics can significantly influence the trajectory of adolescent substance use. From a Bowenian perspective, the development of alcohol problems during adolescence and young adulthood indicate the family experiences difficulty balancing autonomy and connectedness. However, much of the substance use research rooted in a family-based framework neglects to consider the role of the sibling relationship and family processes such as differential treatment. The present study examined how parent-adolescent connectedness, sibling relationship quality, and parental differential treatment during adolescence influences trajectories of problem drinking in a sample of 492 full-sibling pairs from the National Longitudinal Study of Adolescent Health Outcomes. Three waves of panel data were analyzed using a dyadic two-level model for longitudinal data. The results confirm the non-independence of sibling problem drinking. Parent-adolescent relationships that are “too close” or “too distant” were associated with marked curvilinearity and trajectories of more chronic problem drinking, respectively. Parental differential treatment was associated with higher problem drinking scores in adolescence.
and predicted a slightly more chronic course of problematic alcohol use for Sibling 2. Furthermore, the finding that separateness and connectedness in one parent–adolescent relationship predicted variability in a sibling’s overall trajectory corroborate the notion that parent–child relationships do not take place in isolation of the larger family system (Atzaba-Poria & Pike, 2008). The findings provide further support for a family systems approach to researching, assessing and treating problematic alcohol use.
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CHAPTER 1: INTRODUCTION

Excessive alcohol use among Americans cost the United States $223.5 billion in 2006 alone. Twenty-seven billion dollars of this was the result of alcohol use among those under 21 years of age (Bouchery, Harwood, Sacks, Simon & Brewer, 2011). In the most recent installment of the Monitoring the Future study, almost half of 8th, 10th, and 12th graders report having consumed alcohol within the past year, and over one-quarter of these youth report having been drunk within the past year (Johnston, O’Malley, Bachman, & Schulenberg, 2012). While experimentation with substances is generally considered a normal part of adolescence, (Chassin, Hussong, & Beltran, 2009) it is also a vulnerable time in which the problematic patterns for later alcohol dependence are developed (Chartier, Hesselbrock, & Hesselbrock, 2010).

Most problem drinking has its roots in adolescence (Chassin et al., 2009), and relationships among family members can significantly influence the trajectory of adolescent substance use problems (Liddle, 1999). Existing research provides support for the association between certain parent–adolescent relational dynamics and adolescent substance use. Specifically, parental emotional overinvolvement, as well as low parent–adolescent bonding or emotional disconnection, are associated with higher rates of alcohol use in adolescence, and alcohol abuse and dependence in adulthood (Bray, Adams, Getz, Baer, 2001; Hawkins, Catalano, & Miller, 1992; Stanton & Todd, 1982).
According to Bowen Family Systems theory, well-functioning families offer its members the opportunity to experience both individual autonomy as well as connection to others (Allison & Sabatelli, 1988), and problems occur when members are not able to successfully balance these dynamics. One way in which this difficulty may be manifested is through alcohol use. The present study will explore the premise that adolescent substance use reflects the family’s difficulty in negotiating the developmental task in adolescence of maintaining connection with the family of origin while allowing for increased autonomy for the adolescent. Furthermore, the family’s failure to negotiate a developmentally appropriate balance of separateness and togetherness will have an enduring influence beyond adolescence, such that alcohol abuse and dependence will continue into adulthood (Stanton & Todd, 1982). In sum, it is proposed that family connectedness during adolescence will be associated with trajectories of alcohol use.

Systems theory suggests that all family members play a role in the development and maintenance of seemingly individual symptoms (Bowen, 1978). That is, adolescent substance use is an individual behavior that reflects underlying dysfunction in the family (Stanton et al., 1982). However, researchers examining family dynamics and substance use have generally neglected to consider the influence of the adolescent’s relationships with other important family members, such as siblings. Specifically, research on siblings and substance use in adolescence is largely limited to the consideration of the influence of sibling substance use upon a target individual, yet some research suggests that the quality of the sibling relationship is related to adolescent substance use (East & Khoo, 2005). Furthermore, evidence suggests that close, positive sibling relationships may at
least partially compensate for deficits in warmth and closeness within the parent-adolescent relationship (East, 2009; Whiteman, McHale, & Soli, 2011). Thus, from a family systems perspective, it is essential to consider the influence of multiple relationships within the family when attempting to model and understand individual outcomes.

Finally, little is known about the relational processes that may account for differential sibling outcomes. Specifically, research has not systematically examined why one adolescent in a family develops substance use problems while another sibling appears to be relatively symptom-free, despite a shared family environment. The expectation that these siblings may experience the parent-adolescent relationship differently and thus exhibit different outcomes is proposed by Bowen Family Systems Theory. Specifically, the family projection process (Bowen, 1976/1978), whereby a child is the focus of the parents’ anxiety, suggests that both parent(s) and child behave in ways that undercut attempts to emotionally separate (Kerr & Bowen, 1988). It may be only one child among the siblings that bears the brunt of the family projection process. This child is singled out and becomes the symptom bearer for the parents’ anxiety around the fusion in their relationship. This child has the least emotional separation from the family, and is thus the child most likely to develop symptoms. Bowen conjectured that some siblings would be more likely to suffer the consequences of the family projection process than others. The likelihood that a child will be the focus of the parent(s)’ anxiety is based on several factors, including the child’s physical resemblance to other important family members, relational issues between the parents during pregnancy, and any physical and
emotional difficulties and complications the mother may have experienced before the child’s birth (Bowen, 1976). This child may be treated differently than other children in the family.

Bowen also conjectured about sibling positions or sibling profiles, in which, regardless of chronological age and position, the child that bears the brunt of the projection process is emotionally the “youngest” in the family, has the least emotional separation from the family, and tends to be treated as the “baby” (Bowen, 1976). Thus it may be the case that one way the family projection process is manifest is through differential treatment, with one sibling being “favored” over another. Perception of differential treatment from parents is associated with adolescent externalizing behaviors (Richmond, Stocker, & Rienks, 2005; Tamrouti-Makkink, Dubas, Gerris, & van Aken, 2004). In sum, family theories may shed light on within-family environmental influences that may account for differential outcomes among siblings.

Prior research examining parent–adolescent connection, sibling relationship dynamics, and alcohol use has largely been limited to the use of a single perspective. Advancements in methodology and statistical analysis make it now possible to test more complex models using multiple perspectives. Dyadic data analysis methods will permit the estimation of trajectories of change while also accounting for the inter-dependence of observations (Lyons & Sayer, 2005). Furthermore, multilevel modeling will be employed to examine parent–child connectedness and qualities of the sibling relationship as predictors of change in alcohol use during adolescence, emerging adulthood, and beyond. The longitudinal nature of the data will allow for the possibility
of determining the direction of the relationship between family dynamics and problematic drinking.

In addition, research that has sought to test the explanatory utility of family theories of adolescent substance use is limited in their generalizability by the characteristics of the sample and the utilization of samples of convenience. Research on sibling relationships in particular has been criticized for its reliance on White, middle-class samples (East, 2009; Whiteman, Becerra, & Killoren, 2009). The present study will extend the generalizability and applicability of findings with the use of a large sample, filling a gap in adolescent alcohol use research (Barnes, Reisman, Farrell, Dintcheff, 2000).

As fields, family science and couple and family therapy continue to struggle with assessing family characteristics. David Olson and others have suggested that families can be dysfunctional when there is too much closeness or not enough closeness (Olson, 2000). However, how to assess what is too much and what is not enough has been problematic. Theoretically, adolescence and emerging adulthood would necessitate a renegotiation of connectedness and separateness, and when this renegotiation breaks down, symptoms would appear. In this study, it is hypothesized the inability to tolerate both emotional connection as well as increased autonomy would indicate a difficulty in renegotiating the distance regulation patterns in the family during this developmental period. It is expected that it is in the families that exhibit these difficulties that more problems with alcohol will develop.
It has also been proposed that substance use in general, and alcohol use more specifically leads to or is part of a cycle of intimacy dysfunction in the family (Klagsbrun and Davis, 1977). That is, alcohol use initially leads to more “intimacy” or functions as a “social lubricant.” However, with further use during one incident or over time, alcohol use leads to less intimacy and processes within the family that lead to an inability to experience intimacy more generally. This again leads to the proposition that problems with alcohol use will more likely be present in families unable to balance separateness and connectedness.

This study will examine the relationship between family connectedness and trajectories of adolescent alcohol use in the National Longitudinal Study of Adolescent Health (AddHealth) dataset. Specifically, it is expected that adolescents in families where parent-child relationships are characterized by higher levels of both connection and autonomy will engage in lower rates of problem drinking. In addition, differences in alcohol use between siblings over time will be influenced by between–sibling differences in parent-child connection. Furthermore, the present study will examine the association between sibling relationship quality and alcohol use. Finally, these relationships will be investigated while accounting for sociodemographic factors, including parent education level and income, and adolescent biological sex, age, ethnicity, sex constellation of the sibling dyad, and pubertal maturation.

The results of this study will inform intervention and prevention efforts by focusing strategies at the family level rather than the individual level. Many of the prevention strategies used around decreasing alcohol use during adolescence focus on
individuals, typically presenting programs in school that are focused on resisting peer influence (i.e. DARE). However, these programs may not provide enough of a difference to make a difference for family distance regulating processes (Bartle-Haring, Lotspeich-Younkin & Day, 2012). If alcohol or other substance use in an adolescent somehow maintains the distance regulating processes in the family, then prevention and intervention programs will need to focus on families rather than individuals. It has been found that family therapy is the most effective treatment for adolescent substance use (Carr, 2009; Williams & Chang, 2000). However, it is unclear how this treatment works, or what processes are influenced by the treatment. The results of this study could provide evidence that the target for intervention needs to be around the family’s distance regulating processes, which may in fact be what is changing due to family therapy, and is less impacted due to individual treatment for substance abuse in adolescence.
CHAPTER 2: LITERATURE REVIEW

There is a paucity of research linking relational dynamics among family members and specific patterns of problem drinking, such as binge-drinking and getting drunk. The present study will fill this gap. Filling this gap is important, as it has been suggested that family relationships and family interaction patterns have more of an influence on the development of substance using patterns and problematic use among adolescents, while peers may have more of an influence on the occasional use of substances (Fishman, Stanton, & Rosman, 1982). Thus, even though peers and peer relationships take on greater importance during adolescence and emerging adulthood, it does not mean that parents and family relationships become less important or less influential (Laursen & Collins, 2009; Wood, Read, Mitchell, & Brand, 2004).

Sabatelli and Bartle (1995) note that many family theories use different constructs to describe what may be the same phenomenon. For example, a major premise underlying Bowen’s Family Systems theory is that all relationships involve a process of balancing separateness and connectedness. Similarly, Olson (2000) refers to cohesion as a dimension of family functioning and notes that families with “balanced levels of cohesion (separated and connected) make for optimal family functioning” (Olson, 2000, p. 145). These theories will guide the premise that high levels of both connection and autonomy will predict a decreased likelihood of binge drinking.
Family systems theory proposes that an individual problem or symptom reflects underlying dysfunction in the family as a whole (Bowen, 1978). While many researchers purportedly espouse this perspective in the design of research and development of treatment and interventions for adolescent substance use, they fail to consider the role of sibling relationships. No study to date has simultaneously investigated dynamics of the parent-adolescent relationship and sibling relationship quality in understanding individual symptoms such as problem drinking. Thus, in order to provide an empirical context for the current study, it is necessary to review separate literatures: literature about substance use during adolescence in general; literature linking family relationships to adolescent substance use; literature linking the quality of the sibling relationship during adolescence with substance use, as well as research on nonshared environmental differences such as parental differential treatment.

Alcohol Use

Epidemiological researchers note a curvilinear nature to lifetime use of alcohol. That is, experimentation with alcohol begins in adolescence and peaks during the period of emerging adulthood (ages 18–25), followed by a decrease as individuals transition into adult roles (Arnett, 2005; Chassin, Hussong, & Beltran, 2009; Maggs & Schulenberg, 2004/2005). Social changes within the past 60 years have resulted in the advent of a new developmental period known as 'emerging adulthood' characterized by exploration and the postponement of adult responsibilities. It is during this period that emerging adults engage in the highest rates of alcohol and drug use and associated risky behaviors. Arnett (2005) has noted the higher rates of use in this developmental period.
can obscure attempts to distinguish individuals who are developing a chronic pattern from those who will “mature out” of problem drinking (O’Malley, 2004/2005). Thus, longitudinal studies than can identify predictors of variability in the normative trajectory are needed.

Binge – drinking has been the focus of increasing national attention in recent years. The Centers for Disease Control and Prevention (2012) estimate that youth consume over 90% of the alcohol that they do drink through binge – drinking. This is of concern since there is evidence that a substantial proportion of adolescents who report binge drinking continue to do so in emerging adulthood (McCarty, Ebel, Garrison, DiGiuseppe, Christakas, & Rivara, 2004) and that most people who suffer from chronic substance use problems throughout adulthood began using substances in adolescence (Dennis & Scott, 2007). While experimentation with substances during adolescence and emerging adulthood is considered normative, it is not without its consequences. Binge – drinking in particular is associated with a host of lifetime social, psychological, and physical health problems, as well as cognitive and neurological consequences. The effects are particularly pronounced if the binge drinking begins in adolescence (Boden & Fergusson, 2011; Chassin et al., 2009; Clark, 2004; Witt, 2010). In addition, there is evidence that adolescents who binge drink are at greater risk for engaging in other risky behaviors than adolescents who consume alcohol but do not binge drink. For example, adolescents who reported binge drinking within the past 30 days were also more likely to have gotten in a car with a driver who has been drinking, and to have used alcohol or drugs prior to engaging in sexual activity during the past month than adolescents who
also drink but do not binge drink (Miller, Naimi, Brewer & Jones, 2007). Furthermore, these negative outcomes appear to extend to adulthood. Specifically, youth who binge-drink during adolescence were more likely to have experienced homelessness, have criminal involvement, and achieved less education 10 and 30 years later, even after accounting for gender and socioeconomic factors (Tucker, Orlando, & Ellickson, 2003; Viner & Taylor, 2007). In sum, binge drinking during adolescence is associated with a host of negative consequences. While many researchers acknowledge the importance of the family in child symptomatology, understanding the relational dynamics that are associated with problem drinking is necessary to identify appropriate targets of intervention.

**Theoretical Conceptualization**

Substance use is an individual behavior that reflects underlying dysfunction in the family (Klagsbrun & Davis, 1977; Stanton et al., 1982). The family is an emotional system, and the functioning of its individual members are deeply intertwined (Bowen, 1978). According to Bowen Family Systems theory (Bowen, 1978), there are two counterbalancing forces that operate in all relationships: separateness and togetherness (Kerr & Bowen, 1988). In healthy families, there is a balance of separateness and togetherness, such that individual members can experience closeness with other members while also pursuing interests outside the family. Families that can effectively balance separateness and togetherness will be able to respond to the changing needs of its members. Problems occur when families have difficulty regulating distance, such that families pursue either intimacy or separateness at the expense of the other.
Olson’s Circumplex model proposes three dimensions of family functioning. One of these dimensions is cohesion, or how families balance separateness and togetherness (Olson, 2000). Olson’s most recent model proposes five categories of cohesion: three that are more balanced and promote optimal functioning, and two that are more unbalanced (Olson & Gorall, 2003). The more extreme categories promote either individual autonomy or family togetherness and connection at the expense of the other.

The main hypothesis from the Circumplex Model is that balanced families will function better and be more adaptive to change than unbalanced families (Olson & Gorall, 2003). This proposal has been referred to as the curvilinear hypothesis and is one of the most widely debated theories in family studies (Cluff, Hicks, Madsen, 1994). Some research shows that very disengaged or disconnected families, as well as families that are connected at the expense of independence show the worst functioning (Manzi, Vignoles, Regalia, & Scabini, 2006; Yahav, 2002). Specifically, Manzi and colleagues (2006) found that U.K. adolescents in their final year of compulsory education who scored higher on a self-report measure of family enmeshment reported more depressive symptoms and more anxiety regarding the upcoming transition to adulthood.

Furthermore, Yahav (2002) found that Israeli parents who fell in the ‘disengaged’ realm of the Circumplex model based on their responses on the FACES III (Olson, Portner, & Lavee, 1985) had children who endorsed more items on externalizing subscale of the Youth Self-Report (Achenbach & Edelbrock, 1987). The parents of children who scored high on the internalizing subscale were most likely to fall in the ‘enmeshed’ or ‘disengaged’ domains (Yahav, 2002). But others have not found support for the
curvilinear hypothesis (Anderson & Gavazzi, 1990; Farrell & Barnes, 1993; Perosa & Perosa, 2001). Furthermore, each of these studies utilized a version of Olson’s FACES or another measure that queried one family member’s perspective of how the “family” behaves. In sum, this debate has not been settled, suggesting further research is needed.

**Alcohol use and binge drinking as a distance regulator.** Alcohol abuse and dependence may function to resolve the autonomy/separateness imbalance in families. The alcohol or drug use enables the person to be independent and distant, but also disables the user and increases their dependence on the family because they cannot function as an autonomous, self-supporting individual and meet his/her own basic needs (Stanton et al., 1982). In their observations and experiences treating adult substance users and their families, Stanton and colleagues (1982) noted a pattern whereby whenever the substance using individual began to experience success in an aspect of life, whether it be reducing use, or obtaining and maintaining employment, some sort of family crisis would occur that precipitated a relapse or the development of an additional problem that would underscore the substance user’s inability to function as an autonomous individual. Furthermore, others have noted that even the substance used serves to regulate distance. For example, alcohol use is a distance regulator in that the initial effects of alcohol may increase attempts to communicate and interact with others, but with time and continued use, the depressant and sedating effects of alcohol set in, and the individual may withdraw from others (Levine, 1985; Searight, Manley, Binder, Krohn, Rogers, & Russo, 1991).
Adolescence. According to Bowen (1978), developmental transitions such as adolescence require families to negotiate a new balance of autonomy and relatedness. For optimal family and individual functioning, the family needs to maintain connection with the youth while allowing for increased autonomy (Bowen, 1978). Similarly, Olson states that families have to adapt their balance of separateness and togetherness in order to deal with stressful events and developmental changes among its members (Olson & Gorall, 2003). Families develop problems when they are unable to effectively regulate their distance during these transitions (Bowen, 1978). Thus, considering that alcohol use is a distance regulator, it follows that problematic drinking during adolescence reflects a way to attain “pseudoindependence” from the family of origin. Accordingly, it makes sense that most substance use problems have their roots in adolescence (Chassin et al., 2009) as families struggle to negotiate a new balance of separateness and togetherness.

Family projection process. Family members’ reactions to changes in the balance of separateness and togetherness can increase the level of anxiety in a family (Kerr & Bowen, 1980). All families have chronic anxiety (Bowen, 1976), but families and individuals in families with higher levels of anxiety seek to alleviate that anxiety. The level of anxiety will determine the level of impairment that is manifested. One way in which the anxiety may be alleviated is through projection onto a child. The child that is the focus of the projection will be the most impaired in their functioning. If the anxiety is too much for one child to bear, the parents may direct some of their anxiety to another child, who then may also become symptomatic (Bowen, 1976). The projection process starts whereby the parents are fused in their relationship and unable to handle the
subsequent anxiety, one child may respond anxiously to the parents, which the parents interpret as some sort of the problem in the child. This may be more likely to occur during adolescence, when a previously very close parent–child relationship is disrupted by the adolescent’s striving towards autonomy and independent functioning. This exacerbates the anxiety in the family, and the parents respond as if something is wrong with the child. The parent(s) may then expend more energy and attention into the child (Bowen, 1976). Thus, one way in which the family projection process may be manifested is through parental differential treatment. Researchers and clinicians consistently note that not all children in a family are treated the same (Bowen, 1978; Daniels & Plomin, 1985; Plomin & Daniels, 2011; Stanton, 1985; Stanton et al., 1979) and these differences in treatment may explain differences in substance use between siblings in a family. This may offer insight as to why not all siblings use alcohol or drugs with the same frequency.

**Parent – Adolescent Relationships**

Research consistently shows that more positive parent-adolescent relationships are associated with lower rates of substance use during adolescence. Specifically, greater bonding and attachment to parents delays initiation of substance use. Adolescents who have more positive relationships with their parents and greater closeness with their parents report less frequent substance use (Hawkins, Miller & Catalano, 1992). Habib, Santoro, Kremer, Toumbourou, Leslie, and Williams (2010) found that Australian adolescents who reported greater “emotional closeness” with their fathers were less likely to indicate they had engaged in binge-drinking in the prior two weeks. The benefits of
family connectedness extend to adulthood, such that youth who reported higher levels of family cohesion during adolescence were significantly less likely to endorse criteria for alcohol abuse and dependence at a three-year follow up (Reinherz, Giaconia, Paradis, Novero, & Kerrigan, 2008). Furthermore, female adolescents in a British cohort survey who reported getting along well with their parents at age 16 reported less alcohol use within the previous week when assessed again at 23 years of age. Both male and female adolescents who reported getting along better with their parents at age 16 reported significantly fewer lifetime alcohol problems at age 42 (Maggs, Patrick, & Feinstein, 2008).

Conversely, emotional disconnection or lack of warmth or support between parent and adolescent is associated with more frequent substance use (Hawkins et al., 1992) and increases the likelihood of development of a substance use disorder later in life (Brook, Brook, Zhang, & Cohen, 2009). Furthermore, adolescents who reported greater emotional distance from their parents showed significantly greater increases in alcohol use during adolescence over a three-year period (Bray, Adams, Getz, & Baer, 2001). In sum, it appears the quality of parent–child relations and connectedness in adolescence has implications for problem drinking in emerging adulthood and beyond.

While there is considerable research linking closer and more positive parent–adolescent relationships with better health and psychosocial outcomes in adolescence and adulthood (i.e. Reinherz et al., 2008), theory and research suggest increasingly higher levels of connection may not always be beneficial. Specifically, Bowen Family Systems Theory and Olson’s Circumplex Model propose that extremes in connectedness, such as
emotional overinvolvement, will also be problematic for family members. Researchers consistently observe patterns of emotional overinvolvement or enmeshment among families with a substance–using member. Specifically, researchers and clinicians note that a typical family pattern whereby the substance–using child has an overinvolved, almost “symbiotic” relationship with one parent and a distant, emotionally cutoff relationship with the other parent (Klagsbrun & Davis, 1977; Stanton & Todd, 1979; Stanton et al., 1982).

There is a paucity of research linking relational dynamics with specific patterns of problematic alcohol use such as binge–drinking and getting drunk. However, the few studies that exist support the hypothesis that the balance of separateness and connectedness in adolescence will predict trajectories of problem drinking. In a sample of Italian adolescents, adolescents from families categorized as “Unbalanced” based on their responses to Olson’s FACES measures were more likely to binge–drink than adolescents from families categorized as “Balanced” (Laghi, Baiocco, Lonigro, Capacchione, & Baumgartner, 2012). Furthermore, the researchers categorized the sample into three groups based on the extent of their self–reported drinking: social drinkers, binge–drinkers, and heavy drinkers. Binge–drinkers had 1 to 8 binge drinking episodes per month, while heavy drinkers engaged in binge–drinking more than 8 times per month. Heavy drinkers scored lower on the cohesion subscales and higher on the disengaged subscales than the other two groups. In addition, heavy drinkers scored higher on the enmeshed subscale than the other two groups (Laghi, Baiocco, Lonigro, Capacchione, & Baumgartner, 2012). This suggests that adolescents who engage in
particularly frequent binge drinking come from families that have difficulty regulating distance.

According to Bowen theory, allowing the adolescent greater autonomy within the context of emotional support and connection should be associated with the best functioning. Specifically, Tuttle (1995) found that adolescents who reported greater emotional autonomy from parents within the context of greater family social support also reported the least frequent and severe substance use. Similarly, Bray, Adams, Getz, and Baer (2001) found that adolescents who showed increases in emotional autonomy from parents as well as an increase in family cohesion over a three-year period reported the least alcohol use. Adolescents who showed increases in “separation” (which they believed represented emotional detachment or cutoff) exhibited significantly greater increases in alcohol use over time (Bray et al., 2001).

In sum, research links extremes in connectedness within the parent–child relationship with greater alcohol use. This suggests that a balance of separateness and togetherness is optimal and is associated with better functioning for all family members, as well as the family as a whole. However, the conclusions that can be drawn from these studies are limited by the methodologies employed. Family substance use researchers overwhelmingly employ retrospective or cross-sectional methodology, which prohibits researchers from drawing conclusions about temporal associations. Thus, longitudinal studies are needed.
Sibling Theories

Considerable research has been devoted to examining similarities in sibling outcomes. Several areas that have received significant attention are adolescent substance use, sexual activity, and teen parenthood. Specifically, adolescent sexual risk-taking and substance use are often studied concomitantly as these behaviors are highly correlated (East & Khoo, 2005). Older sibling substance use is predictive of younger sibling substance use (Windle 2000). Younger siblings of adolescents who become pregnant or a parent during their teen years are more likely to become sexually active at a young age or become teen parents themselves (East, Reyes, & Horn, 2007; Whiteman et al., 2009).

Much of the research examining concordance in sibling outcomes employs a social learning perspective, which proposes that individuals learn behaviors through their observation of the behavior and its consequences as experienced by others (East & Khoo, 2005; Whiteman et al., 2009). Furthermore, an individual will be more likely to learn and repeat a behavior if they view the person modeling the behavior as having positive characteristics (Whiteman et al., 2011). However, much of this research infers social learning processes without operationalizing integral concepts such as modeling, and invokes social learning theory as an ad hoc explanation for their findings (Whiteman & Christiansen, 2008; Whiteman, Jensen, & Maggs, 2013). From a family systems perspective, it is imperative to examine the relationship, and social learning theories largely overlook this aspect. A competing line of research suggests the quality of the sibling relationship is integral to sibling outcomes.
**Sibling Relationships**

While research acknowledges the role of the family and family relationships in alcohol use, it has largely ignored other important relationships, such as sibling relationships, despite the fact that the sibling relationship is perhaps the most enduring, lifelong relationship (East, 2009; East & Khoo, 2005). When siblings have been included in research examining adolescent substance use, researchers almost exclusively only consider whether the other siblings uses alcohol or drugs or not (i.e. Windle, 2000), and neglect to consider how the quality of the sibling relationship may play a role in alcohol use.

Major theorists have noted in their observations of family dynamics with an adult child substance user that siblings play a role in the family dynamics that are linked with the maintenance of alcohol and drug use (Stanton et al., 1982). Specifically, research suggests that more negative or conflictual sibling relationships are associated with poorer outcomes and adjustment for adolescents (East, 2009). Hall, Henggeler, Ferreira, and East (1992) were among the first researchers to link sibling relational dynamics with alcohol and drug use during adolescence. More recently, East and Khoo (2005) found that adolescents who reported greater conflict and less warmth within the sibling relationship reported more frequent alcohol and drug use at follow up several years later. Similarly, Samek and Rueter (2011) found that younger siblings who reported greater closeness with their elder siblings engaged in less frequent substance use three and half years later. Longitudinal studies have linked positive sibling relationships,
specifically sibling warmth during adolescence, with less substance use several years later (East & Khoo, 2005; Yeh & Lempers, 2004).

Some studies suggest that siblings can develop close, warm, supportive relationships, despite antagonistic relations between parents or between parents and children (Dunn, Slomkowski, & Beardsall, 1994; Whiteman et al., 2011). Specifically, close sibling relationships may provide the support and emotional connection lacking in the parent–child relationship (Whiteman et al., 2011). East and Khoo (2005) found that daughters of single mothers were significantly more likely to report greater closeness with their sisters, and that this close sibling relationship predicted less substance use. This suggests that a close sibling relationship may compensate for the effects of an emotionally absent or distant parent (East, 2009; McGuire & Shanahan, 2010).

However, close sibling relationships may not be universally beneficial. Stanton and Todd (1982) noted in their clinical treatment of families with a substance using adolescent that sometimes a sibling of the identified patient acted as a surrogate parent to the “addict”. Stanton and Todd (1982) have also noted that siblings may take on parent-like roles that may replicate the parent–adolescent relationship whereby both parent and sibling are emotionally overinvolved. This finding suggests that close sibling relationships may not be universally advantageous, and recommends further investigation.

Hall and colleagues did conclude that sibling conflict significantly predicted adolescent substance use independently of both family and parent-child relational measures (Hall et al., 1992). This suggests that the quality of the sibling relationship has
a unique contribution to adolescent substance use. Hall and colleagues (1992) concluded there is a need for the simultaneous and systematic study of all these relationships in predicting adolescent alcohol and drug use. This call has not been answered, as no research has simultaneously considered multiple family relationships (i.e. both parent-adolescent relations and sibling relations). If the family is considered to function like a system, and its members are interrelated, it is essential to consider both parent-child and child-child relationships when studying individual symptoms. The current investigation will clarify relationships among these family variables.

**Parental Differential Treatment**

While substantial research shows that adolescents are more likely to use substances if a sibling also uses, the correlation of substance use disorders among siblings is lower than one might expect. One study found a correlation of 0.30 between biologically related siblings raised together and a 0.22 correlation for adopted siblings raised together for substance use disorders (Buchanan et al., 2009). This suggests there is considerable variability in the substance use outcomes of siblings within the same family. Few studies have examined the reasons for these differences (Whiteman & Christiansen, 2008), and some researchers argue that social learning theories do not account for dissimilarity between siblings in alcohol use and alcohol problems (Windle, 2000). Social learning theorists have proposed the existence of a process called sibling deidentification, whereby siblings intentionally and unintentionally seek to distinguish themselves from their siblings in skills, achievement, and personal qualities. However, even proponents of a socialization perspective of sibling similarities concede that sibling
deidentification has been offered as a post hoc justification (Whiteman et al., 2009) and the construct of sibling deidentification has neither been operationalized nor tested.

The ability to explain differential outcomes between siblings can identify the specific family dynamics that are linked with the development and maintenance of substance use problems. Plomin and Daniels (1987/2011) argue that nonshared environmental influences account for most of the variability in psychosocial outcomes between siblings reared in the same family. One aspect of nonshared environmental influences is parental differential treatment (Daniels & Plomin, 1985; Plomin & Daniels, 2011). The concept of parental differential treatment refers to differences in parental emotional closeness, discipline, and attention given to children (Suitor, Sechrist, Plikuhn, Pardo, & Pillemer, 2008). It is well established in research that parents treat children within the same family differently (Baumrind, 1980; East, 2009). While this may partly be in response to varying behaviors, temperaments, and developmental needs (Suitor et al., 2008) it may have negative implications for overall family relations, as well as individual functioning.

Parental differential treatment is associated with a higher incidence of adjustment problems in children. Specifically, in families where there is differential treatment, children are more likely to exhibit internalizing and externalizing symptoms (Volling & Elins, 1998) and report lower self-esteem (Hale, Updegraff, Jackson-Newsom, Tucker, & Crouter, 2000). For example, parents who reported differences in the discipline of their children also perceived that their child exhibited more internalizing and externalizing symptoms (Volling & Elins, 1998). Research shows the relationship
between differential treatment and parent report of children’s symptoms is stronger for externalizing problems than it is for internalizing problems (Boyle et al., 2004) possibly because externalizing behaviors are more visible to others. Regarding the present study, a review of the literature revealed only a single study that investigated the link between differential treatment and adolescent substance use. Hall, Henggeler, Ferreira, and East (1992) found that adolescents who perceived their siblings to receive preferential treatment from parents were more likely to report lifetime illicit drug use. No research has investigated the link between parental differential treatment and binge-drinking. While the impact of parental differential treatment on child and adolescent adjustment is well documented, research has not investigated the long-term impact of parental differential treatment. Specifically, no research has examined how parental differential treatment during adolescence may influence adjustment and well-being in young adulthood.

Parental differential treatment may influence the functioning of the family as a whole. Boyle and colleagues (2004) are critical of earlier research in that it focuses on differences between children in a family as opposed to how differential parenting may affect the whole family. Boyle and colleagues (2004) used mothers’ report of her interactions and behavior with each child to calculate an overall score that reflected the overall disparity in parenting. In their investigation, the researchers found that families in which the differential parenting level was higher, the mothers rated their children higher in externalizing problems (Boyle et al., 2004). That is, in between-family comparisons, children in families where there were higher levels of differential parenting showed more
externalizing problems than children in families where there was less or lower levels of differential parenting (Boyle et al., 2004). This suggests that parental differential treatment has negative implications for all children in the family, and reflects the underlying emotional process of the family. This finding is consistent with a family systems perspective, which proposes that individuals and dyads within a family influence each other such that the interaction between two people within a family (within-dyad interactions) contributes to the family emotional process and atmosphere as a whole (Feinberg & Hetherington, 2001; Kerr & Bowen, 1988).

Research Gaps and Future Directions

Given the above accumulation of findings, it seems clear that problem drinking during adolescence is multifaceted and involves a complex set of influences. Many of the influences are present within the family, yet how to assess those family characteristics that influence substance use during adolescence and early adulthood remains problematic. Many of these studies in the preceding literature review treat “the family” as the unit of measurement, as if all members of the family share the same sorts of relationship dynamics (i.e. “we are all close”). This is conceptually problematic, as it ignores subsystems within the family (Cook, 2005; Cook & Kenny, 2006). Specifically, much of the research on family and parent–child connectedness employs measures that query the adolescent’s perception of family relations in general. For example, all items in Olson’s Family Adaptability and Cohesion Evaluation Scales (FACES; Olson, 2008) query the respondent’s view of the “family”. Similarly, the Emotional Autonomy Scale (Steinberg & Silverberg, 1986) queries the adolescent about their emotional autonomy.
from “parents”. These kinds of questions would mask differences between relationships such as emotional overinvolvement with one parent and cutoff in another, which is noted by Stanton and colleagues to be a consistent pattern in families with a substance–dependent child or adult child (Stanton & Todd, 1979; Stanton et al., 1982).

Furthermore, treating the family as the unit of analysis assumes that different members of the family will share the same perspective. For example, a child’s response to a query about intimacy or connection within the “family” assumes that other children or parents would respond the same way. This is not consistent with research, as Laursen and Collins (2009) note that closeness within the parent–adolescent relationship varies between siblings. In addition, questions that query the “family” leave it unclear as to who is the target of the question, and thus offer multiple plausible responses (Cook, 2005). For example, consider the item “my family is warm and loving to each other”. Respondents may have different ideas as to who constitutes their family, and this is a source of additional variance that cannot be accounted for in statistical analysis.

These issues underscore the importance of looking at the adolescent’s perception of their relationship with each parent separately, as opposed to asking the adolescent about their “family” in general or asking about one parent only and generalizing these findings to the entire family (Bartle & Sabatelli, 1989). While utilizing a dyad as the unit of measurement does not entirely eliminate these biases, it does enable the researcher to capture variance between dyads within families. In addition, the use of relationship–specific items, such as “Your mother is warm and loving to you” versus “You and your
mother are warm and loving to each other” can clarify the target of the question (Cook, 2005).

Multiple perspectives. The present study will address gaps in previous research through the use of multiple perspectives. Multi–person assessment is important because individual family members may espouse different or diverging views of the family. Obtaining multiple perspectives will provide a more complete picture of the family (Olson, 2000). It is well-established that members of a family have different experiences and perceptions of family relationships (Laursen & Collins, 2009). Laursen and Collins (2009, p. 15) note that there are “systematic differences” between adolescent and parents in how they view the relationship, thus underscoring the importance of multiple perspectives.

The use of multiple perspectives adds complexity to the data, and many researchers attempt to deal with this by combining or reducing the data. When Cole and McPherson (1993) queried each family’s member’s perspective on relations in distinct family subsystems (i.e. child perspective on relationship with mother, mother perspective on relationship with child, child perspective on relationship with father, etc.), they found a disturbing lack of convergence, such that no correlation between subsystems was high enough to warrant collapsing them into a global construct of family functioning. Findings such as these underscore the importance of not combining or reducing family data (Bartle & Sabatelli, 1989).

Sibling data. Empirical research on family relations and adolescent alcohol use almost exclusively focuses on parent(s) and a single child. Despite the fact that 80% of
U.S. families have more than one child (Daniels & Plomin, 2011), most research on adolescent and young adult substance use has largely ignored the role that sibling relational dynamics may play in the initiation and maintenance of alcohol use patterns. No research has systematically examined the quality of the sibling relationship and relational dynamics such as parental differential treatment and their influence on problematic drinking. Consideration of the sibling relationship, as in the current study, is essential given the systems perspective of the study. While a few researchers have noted this absence and called for the inclusion of siblings in family intervention programs for adolescent substance users (Bamberg, Toumbouru, & Marks, 2008), these researchers are in the minority. Stanton (1985) specifically notes the importance of working with at least several members of a family because he states that at least three people are “involved” in the development and maintenance of a symptom in an individual member.

**Current Study**

The present study will address gaps in the research by examining how family connectedness during adolescence is associated with trajectories of alcohol use in a sample of adolescent siblings. Experimentation with alcohol is generally considered a normative experience, and research shows that 70.8% of high school youth report ever having had at least 1 drink of alcohol (Eaton et al., 2012). However, a considerable number of adolescents also engage in high-risk drinking behaviors, with 21.9% of adolescents engaging in binge-drinking within the past 30 days (Eaton et al., 2012). This is of concern since there is clear evidence that a substantial proportion of individuals who experience problems with alcohol during adolescence continue to do so in adulthood.
(Clark, 2004; McCarty et al., 2004). Even if alcohol use during adolescence does not progress to dependency, engagement in problematic drinking patterns is linked to a host of other risky behaviors and negative consequences, such as poorer academic performance and risky sexual behavior (Miller, Naimi, Brewer & Jones, 2007).

Family relationships have been identified as an important factor in understanding and treating adolescent substance use (Liddle, 1999). Bowen Family Systems Theory may be useful in understanding the family processes and dynamics that foster the development of adolescent alcohol abuse problems. Furthermore, Bowen Family Systems theory may clarify our understanding of the family processes that allow one sibling to remain relatively symptom-free while another struggles with alcohol use.

The first goal of the current study was to examine how family connectedness is associated with trajectories of problem drinking. Bowen (1976/1978) and Olson (2000) propose that individual symptoms reflect the family’s difficulties balancing separateness and togetherness. Adolescents who perceive less support and nurturance from parents tend to initiate alcohol use at younger ages (Donovan, 2004) and drink more frequently (Wills, Resko, Ainette, & Mendoza, 2004). Conversely, emotional overinvolvement within the parent–child relationship is associated with child adjustment problems (Hirschfeld, Biederman, Brody, & Faraone, 1997). Thus, the first hypothesis proposes the relationship between connection with the parent and problem drinking will be moderated by level of autonomy. Specifically, connection will be negatively related to problem drinking when autonomy is high, but positively related to problem drinking when autonomy is low.
Better parent–adolescent relationship quality is associated with delayed initiation to alcohol use and less frequent substance use (Ryan, Jorm & Lubman, 2010) and longitudinal studies have linked adolescent perception of the parent–child relationship with drinking patterns in adulthood (Maggs, Patrick, & Feinstein, 2008). Thus, it is expected that the quality of the parent–adolescent relationship will be associated with alcohol use during adolescence. Furthermore, it is expected that the quality of the parent-child relationship during adolescence will have ramifications beyond this developmental period, such that it will be associated with problematic drinking patterns into adulthood.

The second hypothesis is that parent report of the quality of the parent–child relationship during adolescence will be negatively associated with child report of problem drinking over time. Youth whose parents report having more negative and poorer quality relationships with them during adolescence will be more likely to engage in problem drinking during adolescence and adulthood.

Despite considerable evidence for the influence of family dynamics on adolescent substance use, research has not simultaneously examined the quality of parent–child relationships and sibling relationships as predictors of engagement in problematic drinking patterns. In general, evidence suggests that close, positive, sibling relationships during adolescence are beneficial to siblings (East & Khoo, 2005; Hakvoort, Bos, Van Balen, & Hermanns, 2010) and may compensate for emotional disengagement between parents and children (East, 2009; McGuire & Shanahan, 2010). Furthermore, maintaining a close sibling relationship may be a way for the adolescent to stay connected to the family while seeking autonomy (Yeh & Lempers, 2004). It is expected
that a more positive sibling relationship during adolescence will predict less problem drinking during adolescence, and that these benefits will extend to adulthood. Thus, the third hypothesis is that the quality of the sibling relationship during adolescence will be negatively related to problem drinking over time.

Bowen (1978) and Stanton (1985) theorize that siblings in the same family and household have different experiences of the family, different experiences of parent-child relationship, and are treated differently, and that this explains why siblings have different outcomes. However, research has not examined these hypotheses. Research suggests that parents do treat their children differently and that this differential treatment affects adolescent functioning (Deater-Deckard, Pike, Petrill, Cutting, Hughes, & O’Connor, 2001). The fourth and final hypothesis is that parental differential treatment during adolescence will be positively related to greater problem drinking over time. These expectations are consistent with Bowen’s family projection process which suggests that parents may focus on one child to relieve anxiety in the marital relationship. Indeed, parental differential treatment is more likely to occur in families where parents report more marital conflict (Barrett, Singer & Weinstein, 2000).

Control variables. Finally, the present study will examine these relationships by controlling for potentially related variables. There is some evidence to suggest that pubertal status is associated with engagement in alcohol use during adolescence (Costello, Sung, Worthman, Angold, 2007; Wichstrøm, 2001). Furthermore, epidemiological studies consistently link major depression and alcohol use disorders. There are higher rates of major depressive disorder among adolescents with alcohol
dependence than in control populations (Clark, Pollock, Bukstein, Mezzich, Bromberger, & Donovan, 1997), and alcohol-dependent teens with a comorbid major depressive disorder relapse significantly sooner after treatment than alcohol-dependent teens who did not have comorbid major depression (Cornelius et al., 2004). This suggests that depressive symptoms play a role in alcohol use and relapse. Furthermore, Arnett (2005) has suggested that the increase in mood disorders and other psychiatric symptoms in emerging adulthood can account for some of the surge in alcohol use during this developmental period. Therefore, we will examine depressive symptoms at all three waves as predictors of problem drinking. Scholars of the developmental period of emerging adulthood suggest that the transition to more adult roles is associated with the decrease in problematic drinking and drug-using patterns (Arnett, 2005; O’Malley, 2004/2005). Thus, union status may be associated with frequency of engagement in problem drinking. That is, the formation of adult romantic unions may facilitate reductions in problem drinking through role socialization (Lee, Chassin, & MacKinnon, 2010), and research suggests marriage has a protective effect against heavy drinking (Liang & Chikritzhs, 2012). Specifically, Staff and colleagues found that married individuals drank less than those who were divorced, widowed, or never married (Staff et al., 2010). Research on the drinking patterns of cohabiters has lagged behind that of their married counterparts, but evidence suggests that the former engage in heavy drinking more frequently than the latter (Li, Wilsnack, Wilsnack, & Kristjanson, 2010) but less than single adults (Staff et al., 2010). Taken together, the research suggests that current
involvement in a romantic union is associated with amelioration in heavy drinking (Vik, Cellucci, & Ivers, 2003).

Furthermore, research suggests that parental status may be associated with differences in alcohol consumption. Both men and women consume alcohol less frequently when they have a child(ren) or are expecting a child (Staff et al., 2010). Furthermore, parents are less likely to meet criteria for an alcohol use disorder, even after accounting for potentially confounding variables such as socioeconomic status, childhood abuse history, and other parent and child characteristics (Fergusson, Boden, & Horwood, 2012). These findings suggest a need to consider parental status as a predictor when examining problem drinking. It is thought that those who have not yet transitioned into adult roles such as committed relationships and parenthood continue to experience fewer social controls on their behavior that researchers have suggested may account for some of the high rates of alcohol and drug use during emerging adulthood (Arnett, 2005).

This study contributes to the literature in several ways. Much of the research that has examined sibling relations or family connectedness and problem drinking has relied on samples of convenience. These smaller samples may limit the researcher’s ability to detect significant relationships (Kim, McHale, Osgood, & Crouter, 2006). The present study makes use of a large sample of sibling dyads that will test the generalizability of the tenets of Bowen Family Systems Theory.

Many studies that utilize secondary data to achieve larger samples are frequently limited to a single informant’s perspective (Kim et al., 2006). Kowal, Krull, and Kramer (2004) note that sibling research thus far was hampered by a failure to collect multiple
perspectives. The present study is notable for its use of each sibling’s report of their own problem drinking, the quality of the sibling relationship, autonomy, and connectedness with each parent.

Much of the research literature reviewed in the preceding paragraphs does not employ methods of statistical analyses that appropriately address issues unique to dyadic data. Recent research seeking to model change within and between sibling dyads has utilized advanced statistical methods such as multilevel modeling. However, many of these models have statistical disadvantages (Smith, Sayer & Goldberg, 2013) that may be the result of a dearth of knowledge of dyadic data analysis. The current study makes use of dyadic data analysis to accurately estimate of the strength of the relationships while accounting for the nonindependence of observations from siblings using the two–level model recommended by noted statistical experts (Raudenbush, Brennan, & Barrett, 1995; Lyons & Sayer, 2005).

Fourth, the use of longitudinal data will enable one to determine the direction of the relationship between family relational dynamics and problematic drinking. That is, it has often been debated whether dysfunctional patterns of relating preceded or developed as a consequence of the substance use (Liddle, 2004). Furthermore, the long–term impact of parental differential treatment and the quality of sibling relations during adolescence is unknown. Existing research that investigates the link between differential treatment, sibling relationships, and adjustment is overwhelmingly restricted to samples of children and adolescents. The current study fills gaps in the research by examining the
manner in which family dynamics in adolescence influence change in problem drinking over time including emerging and early adulthood.

Finally, this study has the potential to identify distance regulation as a core family process underlying adolescent substance use. That is, if problem drinking is a symptom of problems regulating distance, this finding can be used to improve treatment and intervention efforts. Improving targets of intervention efforts is needed given that the treatment literature indicates that as many as three-quarters of individuals completing substance abuse treatment relapse within three months (Brown, Tapert, Tate, & Abrantes, 2000; Cornelius et al., 2003). In addition, the effects of substance abuse treatment for adolescents often return to near baseline levels within a year in many clinical trials (Henggeler, Clingempeel, Brondino, & Pickrel, 2002).
CHAPTER 3: METHOD

Overview of Design

The present study utilizes data collected as part of the National Longitudinal Study of Adolescent Health (AddHealth). The AddHealth dataset is a multi-wave study examining adolescents’ social context and health outcomes. Many other large, national datasets may provide a wealth of valuable demographic information about families, such as income, household structure, and birth and pregnancy information, but exclude or provide limited information regarding family processes and perceptions of dyadic relationships in families. While information pertaining to the latter is valuable, it does not allow one to examine family relationships and patterns of relating and interacting, which is a fundamental tenet of the field of couple and family therapy and the central focus of the present study. The AddHealth dataset is particularly suitable for the present study as the parent and adolescent questionnaires contain items that query family relational and interaction patterns. This also enables the comparison of multiple perspectives. Thus, the AddHealth dataset is appropriate for addressing the complex and multifaceted nature of family relationships.

Data collected during Waves I, III, and IV will be used in the present study. A sample of 492 adolescent sibling pairs ranging from 12 to 18 years of age provided
information on their perceptions of their relationships with parents and siblings, as well as engagement in problematic drinking patterns. The adolescents’ biological mothers reported on the quality of their relationship with each child. The primary goal of this study was to examine how family connectedness during adolescence is associated with trajectories of problem drinking. The remainder of this chapter outlines the construction of measures and data analysis procedures. The coding of the individual items used in the present study are specified in Appendix A.

Sample

The National Longitudinal Study of Adolescent Health (Add Health) is a multi-wave, nationally representative sample of adolescents who were enrolled in grades 7 through 12 during the 1994 – 1995 school year (Harris et al., 2009d). Researchers selected a sample of 80 high schools and 52 middle schools stratified by region of the country, urbanicity, racial and ethnic makeup, and school size, type, and grade span. Adolescents were sampled from the school roster of all enrolled students to participate in the in-home interview. Wave I in-home sampling took place in 1995. Within this sample, there is a sub-sample of full sibling pairs of adolescents. Both of the adolescents in these pairs were enrolled in grades 7 through 12 during the 1994 – 1995 school year. As part of the Wave I in-home interview, the parent also completed a questionnaire. As the biological mother was the preferred person to interview (Harris et al., 2009c), the overwhelming majority of parent interviews were completed with the biological mother. In order to maintain consistency among respondents, only sibling pairs whose biological mothers completed the parent interview were included in the
present study. Researchers followed up with the adolescent participants in the Wave III data collection, which took place 2001 – 2002. The final data collection (Wave IV) occurred 2007 – 2008 when the respondents were age 24 – 32.

**Sample construction.** The initial sample consisted of 2,948 individuals in the probability sample that had at least one full sibling or twin within the sample. First, adolescents born before 1977 were eliminated since the survey only queried the mother’s relationship history extending back to 1977 (n= 196), and these items were needed to determine the number of transitions the adolescents experienced prior to the Wave I data collection. Adolescents who were living in an institution or group home at the time of the Wave I data collection (n= 32) were also removed from the sample, as the skip pattern dictated these adolescents would not be administered many of the items querying parent–adolescent relational dynamics. The third filter eliminated adolescents whose biological mother did not complete the parent interview (n= 534). The fourth filter removed individuals who did not complete Wave III and/or Wave IV interviews, and thus did not have a weight (n=642). The fifth filter removed individuals who had not received the section querying the sibling relationship due to interviewer error (n=161). Furthermore, since the dyad is the unit of analysis for the present study, the siblings of adolescents who had already been filtered out were also eliminated from the sample (n= 350). The next filter removed 32 adolescents who indicated a different race or ethnicity than their biologically-related sibling. Finally, if there was more than one sibling pair in a household that was eligible for the sample, the siblings closest in age were selected.
This resulted in the removal of an additional 17 individuals. The final sample consisted of 984 individuals (492 pairs).

Procedure

Written informed consent and assent were obtained from the parent or legal guardian and the adolescent at the Wave I in–home interview. The parent completed an interviewer–assisted questionnaire querying the parent’s sociodemographic information and the parent–adolescent relationship. The adolescent in–home interviews were completed using audio computer–assisted self–interview (ACASI) technology on laptop computers at all timepoints. Less sensitive questions were administered orally by the interviewer while the respondent entered their answers directly into the computer (Harris et al., 2009c). Items querying more sensitive topics, such as alcohol use, were self–administered, such that the respondent listened to the questions through headphones and entered their responses into the computer. Table 1 provides a full list of the measures completed by adolescents and their biological mothers.

Measures

Problem drinking. At Waves I, III, and IV, the adolescent participants were asked if they had ever had a drink of alcohol more than 2 or 3 times in their life, and then asked on how many days in the past 12 months they had ingested any alcohol. If the adolescent indicated alcohol use, they were further queried about binge–drinking and getting drunk. Binge–drinking was measured with the question “Over the past 12 months, on how many days did you drink five or more drinks in a row?” Getting drunk was assessed with the question “Over the past 12 months, on how many days have you
gotten drunk or ‘very, very high’ on alcohol?’” Response options for these two questions ranged on a 6 – point Likert scale from 1 (every day or almost every day) to 7 (never). These responses will be reverse coded to range from 0 (never) to 6 (every day or almost every day). Missing responses for these items were coded with a zero if the respondent indicated in the prior questions that they had not had alcohol in the past 12 months or more than two or three times in their life. In order to examine trajectories of change in problem drinking, it was necessary to create a continuous variable. To this end, the recoded responses to these two items were summed to create an overall index of problem drinking at each wave. Scores on the overall index would range from 0 through 12.

**Mother – adolescent relationship quality.** The biological mothers responded to five questions regarding their relationship with each adolescent during Wave I data collection. Parents were asked how often each of the following statements were true in regard to the relationship: get along well, make decisions about adolescent’s life together, do not understand the adolescent, can really trust the adolescent, and how much the adolescent interfered with the parent’s activities. Responses ranged on a 5 – point scale from 1 (always) to 5 (never). The items pertaining to getting along well, making decisions together, and trusting the adolescent were reverse – coded. Responses to the items were summed to create an index of the overall quality of the relationship, with higher scores indicating better quality. Potential scores ranged from 5 through 25. Cronbach’s alpha for the present study was .65.

**Parent – adolescent connection.** In order to examine the balance of separateness and togetherness, it was necessary to include items assessing adolescent autonomy, as
well as the adolescent’s perception of closeness with each parent. The adolescents responded to questions at Wave I assessing emotional and behavioral closeness in their relationships with their mothers. Two of the items “How close do you feel to your mother” and “How much do you think she cares about you” had a 5-point item response scale ranging from 1 (not at all) to 5 (very much). A third item queried how much the adolescent agreed with the statement “Most of the time, your mother is warm and loving toward you” on a 5-point scale ranging from 1 (strongly agree) to 5 (strongly disagree). This item was reverse-coded. The final nine questions asked the adolescent to indicate which activities they had done with their mother in the past four weeks: gone shopping; played a sport; gone to a religious service or church-related event; talked about someone they were dating, or a party they went to; gone to a movie, play, museum, or concert event; talked about a personal problem; talked about school work or grades; worked on a project for school; and talked about other things the adolescent was doing in school. One point was given for each activity the adolescent reported doing with his or her mother. Responses to all items assessing closeness with the mother were standardized before being summed to create an overall index of the amount of emotional closeness in the relationship. Cronbach’s alpha for the mother scale was .59. Identical questions and coding were utilized to create an index of father-adolescent connection. Reliability for father scale was .69.

**Autonomy from parents.** Adolescent autonomy was determined by the adolescent’s responses to eight questions assessing autonomy from parents. The first seven items queried whether or not the adolescent’s parents permitted the adolescent to
make their own decision regarding the following matters: the time at which the adolescent must be home on weekend nights; friends with whom the adolescent hung around; clothing; amount of television; choice in television programs; weeknight bedtime; and food selection. One point was given for each area the adolescent indicated they had the freedom to make their own choice. The final item queried the adolescent’s desire to leave home. The response options for this item were on a 5 – point scale ranging from 1 (not at all) to 5 (very much). Responses to all autonomy items were standardized before being summed to create an overall index of adolescent autonomy. Reliability for the autonomy scale was .57.

**Parent connection × autonomy.** Two interaction terms were created to test if the relationship between connection and problem drinking was moderated by autonomy. Both the mother connection and father connection scale scores were multiplied by the autonomy score to generate “mother connection × autonomy” and “father connection × autonomy” variables.

**Sibling relationship quality.** At Wave I, each adolescent responded to four questions regarding their relationship with their sibling. Two of the questions queried the amount of time spent together and the amount of time spent together with the same friend or group of friends as their sibling. Responses to the questions ranged from 1 (a lot) to 4 (none). The other two questions assessed the frequency with which the adolescent felt love for the sibling and had conflict with the sibling. Responses to these questions ranged from 1 (very often) to 5 (never). The first three items were reverse coded before all four items were summed to create an overall index of the quality of the sibling
relationship. A higher score indicates a better quality relationship. Potential scores range from 4 through 16. Cronbach’s alpha for the present study was .50.

**Adolescent report of parental differential treatment.** During the Wave I in–home assessment, adolescents were asked how much parental love and attention they felt their sibling received in comparison with the amount they received. Adolescents indicated their responses on a 5–point Likert scale ranging from 1 (a lot more) to 5 (a lot less). This item was recoded to emphasize the presence or absence of a disparity in love and attention, such that 0 = same amount of love attention (no differential treatment), 1 = a little/lot less/more (any differential treatment).

**Parent report of parental differential treatment.** An intraclass correlation was computed for mother’s report of the quality of her relationship with each adolescent. The intraclass correlation estimates the degree of similarity between dyad members’ scores on a single variable (Kenny, Kashy, & Cook, 2006). In this case, the intraclass correlation represented the relationship between the mother’s reports of the quality of her relationship with each adolescent. The intraclass correlation statistic ranges from -1 to 1. A positive ICC indicates mother–adolescent relationships of similar quality. An ICC of -1 indicates perfect dissimilarity between the scores (Maguire, 1999). An ICC of 0 indicates the two relationship quality scores are as similar to each other as they are to any other arbitrary person (Kenny et al., 2006; Maguire, 1999).

**Depressive symptoms.** Depressive symptoms were assessed using nine questions administered at Waves I, III, and IV. Adolescents were asked to indicate how often the following were true: being bothered by things that usually don’t bother you, felt you
could not shake off the blues even with help from family and friends, felt you were just as good as other people, trouble keeping your mind on what you were doing, felt depressed, felt you were too tired to do things, enjoyed life, felt sad, felt people disliked you.

Response categories range from 0 (never or rarely) to 3 (most of the time or all of the time). The items pertaining to enjoying life and feeling just as good as other people were reverse coded before all nine items were summed to create an overall index of severity of depressive symptoms. Potential scores ranged from 0 through 27. Higher scores on the total scale indicated more depressive symptoms. Reliability for the depressive symptoms scale was stable across the three waves, with Cronbach alpha’s ranging .80 - .83.

**Union status.** Wave III union status was collated from several questions. First, respondents were asked how many times they had ever been married or cohabited with someone in a marriage – like union. Respondents who reported at least one marriage or cohabiting union were asked a series of follow – up questions regarding each relationship. If they indicated any of the relationships was a current marriage or cohabiting union, their union status was coded as 1. If the respondent did not report any current marital or cohabiting relationships, their union status was coded as 0. If respondent had been in one of these relationships, but indicated that none of the relationships was current, their union status was coded as 0.

At Wave IV, respondents were queried about the type and number of different marriage, cohabiting, romantic, and sexual relationships they had experienced. Respondents were asked to list all romantic and sexual partners since the Wave III data collection in 2001. For each partner, the respondent indicated the type of relationship
(marriage, cohabiting, pregnancy, current dating, or most recent). Union status was coded as 1 if the respondent indicated at least one of the marriage or cohabiting relationships was current. Respondents who did not list any marriage or cohabiting partners since 2001, or who indicated none of these reported relationships was current were coded as 0.

**Parental status.** At Wave III, respondents reported the number of pregnancies that occurred in each of the reported romantic and sexual relationships. This was followed up with an item querying the outcome of each pregnancy (miscarriage, abortion, single stillbirth, live birth, pregnancy not yet ended, multiple; no live births, multiple; including a live birth and another outcome). If the respondent indicated the outcome of any pregnancy was at least one live birth, or if they were currently still pregnant, their parental status was coded as 1 (parent). Respondents were also coded as parents if they indicated the presence of one or more stepchildren, foster, or adopted children in their household. If the respondent reported no pregnancies or live births in any relationship, and no biological, adopted, step-, or foster children in the household, they were coded as 0 (not a parent). Likewise, if the respondent reported never having vaginal intercourse, and did not report any biological, foster, step-, or adopted children in their household, they were also coded as 0 (not a parent).

At Wave IV, respondents were asked to report the total number of pregnancies that occurred in all relationships, regardless of relationship type. If the respondent indicated one or more pregnancies, they were asked a follow up question querying the number of live births that resulted from the pregnancies. If they indicated 1 or more live
births, their parental status was coded as 1. Respondents’ parental status was coded as 1 or if they indicated any step-, foster, or adopted children in their household, or if they were currently pregnant. If a respondent did not indicate the presence of any step-children or adopted children, and reported no pregnancies or live births, their parental status was coded as 0.

**Race/ethnicity.** Parents and adolescents indicated their race during the Wave I interview. The participants were allowed to report multiple racial and ethnic groups. For the purposes of the present study, a single categorical variable for each respondent was constructed using the guidelines recommended by the AddHealth project staff (Harris et al., 2009a). If the respondent indicated they were Hispanic, this person was designated as Hispanic, and excluded from any other racial categories. This process proceeded in the following order: Hispanic, Black or African – American, Asian or Asian – American, Native American, Other, and White. This variable was further collapsed into four main categories: Hispanic, Black or African – American, White, and Other. To this end, three dummy coded variables were created as follows: Black Non – Hispanic (1, 0), Hispanic (1, 0), and Other (1, 0), with White Non – Hispanic as the reference group.

**Biological sex.** Adolescent biological sex collected during Wave I was used in the present study. Although there are several inconsistencies in sex between the waves, this variable was corrected using the guidelines provided by the AddHealth staff (Harris et al., 2009b). Biological sex was dummy coded male (1) and female (0).

**Age.** Parents reported their age in years in the Wave I interview. Adolescent age refers to the age during the Wave I data collection. This age was calculated by using the
date of birth of the adolescent and the date of the interview. Guidelines for this calculation are provided by the AddHealth project staff (Harris et al., 2009a).

**Parent education.** The biological mother reported her highest level of education during the Wave I parent interview. This item will be recoded to create three categories of education level: less than high school, high school diploma or GED, and more than high school. Two dummy coded variables were created for the purpose of statistical analyses: \( \text{HSGrad} \) (1 = high school diploma or GED, 0 = less than high school diploma or GED) and \( \text{SomeCollege} \) (1 = at least some postsecondary education, 0 = high school diploma, GED, or less).

**College education status.** Young adults reported the highest level of education achieved at the Wave IV interview. This item was recoded to reflect college education status as follows: some college education (1) and no college education (0).

**Relative poverty.** The biological mothers of the adolescents were queried regarding their financial resources during the Wave I interview. Relative poverty was assessed with the question “Do you have enough money to pay your bills?” Participants responded positively (yes) or negatively (no).

**Pubertal status.** Adolescents were queried about their pubertal development at Wave I. Separate sex-specific questions were given to males and females. Female breast development was assessed with the question “As a girl grows up, her breasts develop and get bigger. Which sentence best describes you?” Potential responses range from 1 (My breasts are about the same size as when I was in grade school) to 5 (My breasts are a whole lot bigger than when I was in grade school, they are as developed as a grown
woman’s breasts). The second question assessing physical development was “As a girl grows up, her body becomes more curved. Which sentence best describes you?” Potential responses ranged from 1 (My body is about as curvy when I was in grade school) to 5 (My body is a whole lot more curvy than when I was in grade school).

Female adolescents were also asked to indicate whether or not they began menstruating. Finally, female adolescents were asked to compare their overall physical development with their same – age peers. Responses to this question ranged from 1 (I look younger than most) to 5 (I look older than most).

Male pubertal status was assessed with four questions. The first question “How much hair is under your arms now? Which sentence best describes you?” had five potential responses, ranging from 1 (I have no hair at all) to 5 (I have a whole lot of hair that is very thick, as much hair as a grown man). Facial hair development was determined with the item “How thick is the hair on your face?” Which sentence best describes you?” Response options ranged from 1 (I have a few scattered hairs, but the growth is not thick) to 5 (The hair is very thick, like a grown man’s facial hair). The third question assessed vocal changes: “Is your voice lower now than it was when you were in grade school?” Potential responses ranged from 1 (No, it is about the same as when you were in grade school) to 5 (Yes, it is a whole lot lower than when you were in grade school, it is as low as an adult man’s voice). The final question asked the respondent to compare their overall physical development with same – age boys. Responses to this question ranged from 1 (I look younger than most) to 5 (I look older than most).
An overall index of pubertal status was created in a manner similar to that used by Shelton and VandenBree (2010). Given the variability in response formats, and the goal of creating an overall index of pubertal status, responses to the questions were standardized before being summed to create a composite score. Cronbach alpha’s for the present study were .64 and .71 for the female and male puberty scales, respectively.

**Sibling dyad type.** The dummy coded variable *Twin* distinguished twins (1) from non-twin siblings (0).

**Dyad sex constellation.** An item identifying the type of sibling dyad was constructed. This variable categorized the sibling pairs according to sex composition (i.e. older brother – younger sister, older sister – younger brother, older sister – younger sister, older brother – younger brother). Since male adolescents are more likely to drink than female adolescents, and younger siblings are more likely to drink if the older sibling drinks, (Duncan, Duncan, & Hops, 1996; Gossrau-Breen, Kuntsche, & Gmel, 2010) siblings with an older male sibling may also be at elevated risk. To this end three dummy coded variables were created: *Boys* (both siblings are males = 1, else = 0); *Girls* (both siblings are female = 1 else = 0), *OlderMale* (older sibling is male = 1, else = 0). The reference group is for mixed sex pairs with an older female.

**Household structure.** The adolescent reported their relation to each member of the household during Wave I data collection. These items were utilized to construct a four – category variable describing family structure within the adolescent’s home: two parents, single mother, single mother + partner, and other. As recommended by the AddHealth staff, parental relationships were given priority over the presence of other
family members such as grandparents or aunts and uncles for the purpose of determining household structure. For example, a family consisting of a biological mother, grandmother, and aunt would be classified as a single mother family. Households in which the adolescent did not identify any member as a father or mother were classified as “other”.

**Number of transitions.** Biological mothers were queried regarding their relationship history in order to determine the number of transitions in family structure throughout the adolescent’s life. First, the mothers asked how many marriage or marriage-like unions they had in the past 18 years. Marriage-like unions were defined as “living with someone as if you were married to him or her when you are not”. If the parent said 0, the adolescent experienced 0 transitions. If they indicated 1 or more unions in the past 18 years, follow up questions were asked regarding the type of union (marriage or marriage-like) and asked to indicate the year(s) they were in that relationship (from 1977 to 1995). If the mother reported having 2 or more relationships, the same follow-up questions were asked about the biological mother’s three most recent relationships back to 1977.

The transitions variable was constructed in the manner developed by Kamp–Dush (2005). Eighteen variables were created representing the family structure in each year of the adolescent’s life. The current or most recent union the mother was in was coded as 1 or a marriage relationship and 2 for a marriage–like relationship. For each year the mother reported being in the union, that year was coded as 1 or 2, depending on the type of the relationship. The second union was coded as 3 for a marriage relationship.
or 4 for a marriage–like relationship. The third union was coded as 5 for a marriage relationship and 6 for a marriage–like relationship. If the mother did not report any union for a given year, that year was coded as 0. This process was done for each year of the adolescent’s life, with any years prior to their birth left blank. Table 2 illustrates example data for four invented respondents. Respondent 1 was born in 1977 into a single–mother family and lived in this arrangement until age 2, when the mother married. Respondent 1 then spent the rest of his or her childhood in this arrangement. Respondent 2 was born into a family of married parents before spending most of his or her childhood in a single mother family. Respondent 2 spent the latter part of his or her adolescence with the biological mother and her cohabiting partner. Respondent 3 was born in 1980 to married parents, but also spent time in a single–mother, married parents, married step–family, and cohabiting step–families. Respondent 4 was born to married parents whose union dissolved in the third year of his or her life. The respondent subsequently lived in single mother and married step–families.

From this data, it is possible to determine the number of transitions the adolescent experienced before the Wave I data collection time point. The number of transitions is defined as the number of times the adolescent experienced a change in family structure from the time of birth until Wave I data collection. For example, Respondent 1 experienced 1 transition, respondent 2 experienced 2 transitions, respondent 3 experienced 6 transitions, and respondent 4 experienced 4 transitions.

Data Analysis Plan
**Preliminary analyses.** The final sample of 984 siblings was compared with the 1,964 eliminated siblings on demographic characteristics and key variables in order to examine potential differences. Sample characteristics and descriptive statistics were computed for the final sample. The means and standard deviations were computed for all continuous variables, while frequencies were reported for categorical variables. Preliminary examination of the dependent variable problem drinking identified a severely positively skewed distribution suggesting a Poisson distribution was more appropriate.

**Missing data.** Upon inspection of the data for the final sample of 984 siblings, it was determined that 208 adolescents (21.14%) had valid missing data for all items pertaining to emotional closeness with their father. According to the AddHealth protocol, these items were not administered if the adolescent did not identify a member of the household as a father figure. Thus, data for these items are not missing at random. To this end, the relationship between mother connection and problem drinking was estimated in a model separate from that of father connection. All aspects of the model – building process are identical for both “mother” and “father” models.

Many items in the AddHealth data allow the respondent to endorse “don’t know” “refuse” or “not applicable” as valid responses to questions. The occurrences of these responses in the present data set were minimal. Based upon the pattern of these responses, it was evident these responses occurred at random. All of these responses were recoded as missing (.). With the exception of the item assessing relative poverty, all items had missing responses for less than 1.1% of the data. The item querying relative poverty has 2.6% of the data missing.
**Primary analyses.** Sibling share significant genetic and environmental influences, so it is unlikely their responses to survey questions are independent of each other (Kenny, Kashy, & Cook, 2006). Furthermore, non–independence also arises when participants are assessed on the same measure multiple times. That is, one cannot assume that a person’s response to questions assessing problem drinking at Wave I are independent and unrelated to their responses at Wave III. Ignoring non–independence violates assumptions of many conventional data analytic methods and can result in incorrect or biased p–values, degrees of freedom, test statistics, and variance (Kashy & Donellan, 2012; Kenny et al., 2006). Dyadic data analysis methods can account for non–independence by using the dyad as the unit of analysis, with each sibling nested within the dyad. In order to determine whether or not to treat the sibling dyad as the unit of analysis, Kenny, Kashy, and Cook (2006) suggest testing for non–independence by calculating the intraclass correlation for the dependent variable. If the ICC is .45 or higher, then it is assumed the nonindependence of siblings is consequential (Kenny et al., 2006).

Multilevel modeling was used to examine change in problem drinking over time. This data analysis method is most appropriate for dyadic and longitudinal data as it allows the opportunity to “nest” data within person and dyad (Kashy & Donellan, 2012; Kenny et al., 2006). Multilevel modeling permits the estimation of trajectories of change while also accounting for the interdependence of observations (Lyons & Sayer, 2005). Furthermore, this data analysis method controls for the autocorrelation among repeated
measures, as well as adjusts for the error variance of the interdependence of the dyad (Lyons & Sayer, 2005).

In addition, there is the issue of both conceptual and empirical distinguishability. In order to be conceptually distinguishable, there must be a within–dyad categorical variable that can distinguish between all siblings in this sample (Kenny et al., 2006; Kenny & Ledermann, 2010). As this sample includes twin dyads, there is no categorical variable that could meaningfully distinguish siblings within all dyads. Empirical distinguishability refers to the equality or inequality of means, variances, and covariances in the dependent variable between the two siblings based upon the conceptually distinguishing variable (Kenny et al., 2006; Kenny & Ledermann, 2010; Kashy & Donellan, 2012). That is, this empirical distinguishability considers whether each sibling within a dyad comes from the same population (indistinguishable) or different populations (distinguishable). For indistinguishable dyads, the variances in the sibling intercepts must be constrained to be equal, as well as sibling slopes and the between- and within-person intercept–slope covariances (Kashy & Donellan, 2012). Several programs that can perform multilevel modeling, such as the GLLAMM module in Stata (Rabe-Hesketh, Skrondal, & Pickles, 2005), and HLM 7.01 (Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2011) do not allow the user to specify these equality constraints. Due to these limitations, the present study assumes the dyads are distinguishable, leading to a bias in standard errors.

The current study utilizes the multivariate two–level model for longitudinal data (Lyons & Sayer, 2005). The two–level model will examine how the independent
variables account for variability in initial status and change in problem drinking over time. The dependent variable problem drinking was entered at level 1. In addition, two dummy coded variables were also entered in the level 1 equation to distinguish the members of the dyad. The typical longitudinal model tests for linear change in the outcome variable over time. However, considering that the normative trajectory of alcohol use from adolescent through young adulthood is curvilinear, it was necessary to consider the inclusion of a quadratic “time” variable. Quadratic time was computed as linear time squared. If the fit of the model was significantly improved with the inclusion of the quadratic term (according to a Chi-square deviance test) it was retained in the level one equation. The basic level one model is shown below. The level one model describes within – person change.

\[
E(PDRINK|\pi) = \lambda \\
\log(\lambda) = \eta \\
\eta = \pi_1(Sib1) + \pi_2(Sib2) + \pi_3(Time) + \pi_4(Time^2)
\]

The intercepts and slopes are used as outcomes in the level two model. The independent variables representing sociodemographics (age, race/ethnicity, parent education, relative poverty, pubertal status, sibling dyad type, parental status, and union status) and mental health (depressive symptoms) are entered at level two to predict between – person variability in the slopes and intercepts across the three waves. Control variables that were not significant were removed from the model. Autonomy from
parents, connection with mother and father, sibling relationship quality, differential
treatment, and maternal perception of parent – adolescent quality were added as level two
predictors of the intercepts and slopes in the final model.

Thus far, it has been assumed that siblings would have common linear and
quadratic slopes. This assumption was tested by estimating a two – level model that
tested if the difference between the average linear and quadratic slopes of Sibling 1 and
Sibling 2 was significantly different from zero. This was achieved by including a sibling
indicator variable (Sib) coded 1 for Sibling 1 and -1 for Sibling 2, and multiplying that
indicator variable by the linear and quadratic slope terms to create two interaction terms.
The interaction terms “Sib × Time” and “Sib × Time²” tested whether the average
difference in the sibling slopes was significant. The level 1 equation is modeled below.
There are no predictors at level 2.

Separate models were estimated for the mother and father samples. If the
interaction terms for sibling were significant, separate sibling models were also
estimated.

\[ E(\text{PDRINK}|\pi) = \lambda \]

\[ \log(\lambda) = \eta \]

\[ \eta = \pi_1 + \pi_2(\text{Sib}) + \pi_3(\text{Time}) + \pi_4(\text{Time}^2) + \pi_5(\text{Sib} \times \text{Time}) + \pi_6(\text{Sib} \times \text{Time}^2) \]
CHAPTER 4: RESULTS

The aim of this study was to examine how patterns of family connectedness are associated with problem drinking in adolescence and with change in problem drinking over time. In the following chapter, a description of the sample is provided, along with the results of the multilevel analyses. Data preparation and preliminary analyses were conducted using the Stata 12 statistical program (StataCorp, 2011). The multilevel analyses were conducted using the HLM 7.0 program using adaptive Gaussian quadrature with a Poisson sampling model and log link. Adaptive Gaussian quadrature is preferable to the default penalized quasi-likelihood for two-level Poisson models when the event rate is low and the clusters are small (Johnson, 2006). A Poisson distribution is appropriate when modeling infrequent events. Problem drinking is likely to occur with much less frequency in the general population than in a clinical population, where a normal distribution may be more appropriate. Incidence rate ratios (also known as event rate ratios) are reported to enhance the interpretability of the results. The incidence rate ratio is the exponentiated function of the Poisson regression coefficient, which is the log of the rate of the occurrence of an event (Raudenbush & Bryke, 2002). The incidence rate ratio gives the ratio of expected counts for the time interval in
question (Rabe-Hesketh & Skrondal, 2012). For example, a predictor of the Sibling 2
intercept represents the expected ratio of the “count” (initial problem drinking score) to
the interval of time (previous twelve months) for each one – unit increase in the predictor
variable, holding all other variables constant. More often, the incidence – rate ratio is
interpreted as the percent increase or decrease in the dependent variable for a one - unit
increase in the predictor variable. Sampling weights were used to adjust for the stratified
sampling procedure. An extended discussion of the weight selection and scaling used for
the analysis is provided in Appendix B.

Preliminary Analyses

Unweighted univariate analyses were conducted comparing the eliminated 1,964
siblings with the final sample of 984 siblings on Wave I study variables. While
performing these tests on a sample of siblings violates the assumption of independence
between observations, it was necessary to identify any potential differences between the
two samples that could affect the generalizability of the results. Due to the number of
comparisons that were performed, a Bonferroni adjustment was used to control for the
overall type I error rate at 0.05 (p<0.05/6 = .0083). A series of t-tests indicated the final
sample of siblings were on average significantly younger than adolescents eliminated
through filters (p< .0083), but yielded no differences in reported depressive symptoms
(p=.05). Due to the non - normal distribution of problem drinking at Wave I, it was
necessary to perform a two - sample Kolmogorov-Smirnov test for equality of
distribution functions. The results indicated no significant differences in the distribution
of problem drinking scores between the two groups (p=.19).
Finally, three chi-square tests were conducted to test the null hypothesis that sample membership was unrelated to adolescent race, biological sex, and household structure, respectively. The null hypothesis was rejected in all three cases. The final sample of siblings had a higher percentage of female respondents (and thus fewer male respondents) than the sample of siblings who did not meet inclusion criteria. Furthermore, the final sample had less racial and ethnic diversity, with a higher percentage of White adolescents, and lower proportions of Hispanic, Black, and ‘Other’ youth. There was also less diversity in the household structures in the final sample, with a higher proportion of adolescents living in two–parent households. The sample of excluded siblings had a higher percentage of households without any biological parents residing in the home. The results of these analyses are reported in Table 3.

**Sample descriptive statistics.** The following paragraphs make use of the weighted sample statistics to describe the sample of 984 siblings (492 dyads). The sibling dyads in the sample were primarily White (79.89%) and lived in two–parent households (88.13%) that did not indicate relative poverty (84.65%). The sample consisted of slightly more females (53.38%) than males (46.62%). On average, Sibling 1 was older ($M=16.26, SE=.18$) than Sibling 2 ($M=14.32, SE=.13$ years), which is consistent with the coding used to designate siblings within the dyad. These statistics, along with unweighted sample characteristics are reported in Table 4 in Appendix C.

The weighted and unweighted descriptive statistics of all study variables are reported in Tables 5, 6, and 7. Of note are the low average problem drinking scores across all waves for both siblings. While problem drinking scores can range from 0 to
weighted mean scores do not exceed 3.06 (SE=.24) for either sibling across all waves (see Table 5). An examination of the distribution of problem drinking scores indicated a preponderance of zeros, and confirmed the appropriateness of a Poisson distribution. On average, the siblings reported minimal depressive symptoms across all waves, with weighted mean scores not exceeding 5.98 (SE=.30). Sibling relationship quality was largely positive, as mean scores for both Sibling 1 (M=12.47, SE=.27) and Sibling 2 (M=12.63, SE=.18) approached the maximum possible score of 16.

Weighted and unweighted demographic characteristics for the 492 biological mothers are reported in Table 8. The mothers were primarily White (82.22%) and had attained a high school diploma/GED or greater, with only 14.84% reporting less than a high school education. The average age for mothers was 40.84 (SE=.34) years. Overall, mothers reported particularly positive relationships with both adolescents (see Table 7). Comparable means in the quality of the relationship were obtained for Sibling 1 (M=20.38, SE=.19) and Sibling 2 (M=20.41, SE=.14)

**Bivariate correlations.** Unweighted correlation analyses were conducted for all study variables. Phi correlation coefficients and point-biserial coefficients are reported where Pearson’s product – moment correlation was not appropriate due to the level of measurement of the variable. Within – sibling correlations are reported in Tables 9 and 10. There were similar findings for both siblings. Most pairwise comparisons indicated small to moderate strength associations between study variables. Male sex was positively correlated with problem drinking for both siblings at all timepoints (all p<.05). Parental status and union status were negatively correlated with problem drinking. These
correlation coefficients ranged from weak ($r_{sib1} = -0.12, p< .05$) to moderate ($r_{sib2} = -0.27, p< .001$), with slightly stronger correlations observed for Sibling 2. Greater autonomy from parents was associated with higher problem drinking scores for both Sibling 1 ($r = -0.15, p< .01$) and Sibling 2 ($r = 0.23, p< .001$). Connection with father was negatively associated with problem drinking for both siblings, but only during adolescence ($r_{sib1} = -0.15, r_{sib2} = -0.17, both p< .01$). Connection with mother was weakly correlated with Sibling 2’s problem drinking in adolescence ($r = -0.14, p< .01$), but unrelated to Sibling 1’s problem drinking in both adolescence ($r = -0.07, p> .05$), and adulthood (both $p> .05$). However, mothers’ perception of the quality of their relationship with the adolescent was significantly negatively correlated with problem drinking at Wave 1 for both siblings ($r_{sib1} = -0.15, r_{sib2} = -0.12, both p< .01$). More positive sibling relationships during adolescence were associated with lower problem drinking scores for both siblings at all three waves (all $p< .05$). Notably, depressive symptoms were positively correlated with problem drinking for Sibling 2 only during adolescence ($r = 0.14, p< .01$). There was no relationship between depressive symptoms and problem drinking for Sibling 1 at any wave. Thus, only depressive symptoms in adolescence will be included in the models.

Finally, between-sibling correlation analyses are reported in Table 1. Sibling reports of differential treatment were only weakly correlated with each other ($r = 0.14, p< .01$). Moderate correlations were observed between sibling reports of autonomy ($r = 0.32, p< .001$), and connection with both mother ($r = 0.28, p< .001$) and father ($r = 0.37, p< .001$). Problem drinking was only moderately correlated between siblings at each wave, with correlations ranging from .25 to .35 (all $p< .001$). Sibling reports on the quality of the
sibling relationship \( (r=.54, p<.001) \), maternal report of the parent–adolescent relationship \( (r=.55, p<.001) \), as well as number of transitions \( (r=.97, p<.001) \) were highly correlated.

Correlations among predictor variables higher than .5 are cause for concern, as it can bias parameter estimates and standard errors to the extent that coefficients display an unexpected sign change that may not be physically possible (Bonate, 1999; Shieh & Fouladi, 2003). Multicollinearity can yield large standard errors that make it difficult to achieve statistical significance, and thus power is reduced. Furthermore, multilevel models with highly correlated predictor variables tend to produce solutions that are unstable, and vary with each computation (Bonate, 1999; Kubitschek & Hallinan, 1999; Shieh & Fouladi, 2003). Therefore, sibling relationship quality, mother report of her quality of the relationship with each adolescent, and number of transitions were averaged between siblings to create three new variables that were used in place of each sibling’s report.

**Primary Analyses**

The intraclass correlation between older sibling and younger sibling problem drinking was calculated to determine whether or not to treat the sibling dyad as the unit of analysis. The calculated ICC of .50 for both the mother and father samples indicated a high correlation between sibling problem drinking scores. Thus, problem drinking was nonindependent at the sibling dyad level, and a multilevel analysis was justified.

First, the unconditional models with two intercepts and a linear slope was estimated to verify there was change in problem drinking over the timespan of the study.
in both the mother-model and father-model samples. Time was centered so that the intercepts for the siblings represented the incidence rate of problem drinking at Wave I. The average linear slopes in both models indicated how the incident rate of problem drinking increased over time (both $p<.001$). The inclusion of a quadratic term significantly improved the fit of the model for the mother model sample $[\chi^2(1) = 725.79, p<.001]$ as well as for the father model sample $[\chi^2(1) = 613.29, p<.001]$ based on a comparison of the deviance statistics. The results of these models are reported in Tables 12 and 13. With the addition of the quadratic change terms, the linear slope now represented the average initial growth rate, or the rate at which problem drinking is increasing at Wave I. The quadratic term represented the overall curvature of the trajectory, or rate of acceleration or deceleration. The intercepts (or average incidence rate of problem drinking at Wave 1) for both siblings were not significantly different from zero (both $p > .05$) in either the mother or father model samples, but the random effects indicated there was substantial variability in the initial incidence rate of problem drinking for both siblings in adolescence (both $p<.001$). Estimates from the models indicate the incidence rate problem drinking increased over time (both $p<.001$) but that the average trajectory was nonlinear (both $p<.001$) throughout the 14 year span of the study. The random effects for the quadratic terms were significant ($p<.001$), which indicates there was substantial variability in the overall trajectories. Analyses proceeded with the addition of control variables and the estimation of the final models for both the mother and father model samples.
Comparison of siblings’ average slopes. For this analysis, time was centered so that the intercepts for the siblings represented the incidence rate of problem drinking at Wave III. Therefore, the linear slope represents the average growth rate in problem drinking at Wave 3. The meaning of the quadratic slope remains the same. For the both the mother and father model samples, the Sib × Time interaction term was significant, but the Sib × Time² term was not. This suggested a significant difference between siblings in their average instantaneous growth rates, but not in their overall trajectories. The results of models comparing siblings are displayed in Table 14. To further investigate these findings, separate models estimated each sibling’s problem drinking in both the mother and father model samples. In order to maintain the dyadic nature of the analyses, each sibling model included the predictor variables of both siblings. This enabled the estimation of crossover effects, hereafter referred to as inter–sibling effects. For example, this method permits one to model the effect of Sibling 1’s emotional connection with the mother on Sibling 2’s trajectory of problem drinking, and vice versa. The quadratic terms were constrained to the same value for both siblings, as there was no evidence the average curvature of the quadratic slope differed between siblings. The intercept and slope terms were left free to vary. Next, the control variables were added at level two in order to account for variability in initial problem drinking and change in problem drinking over time. Autonomy from parents, emotion closeness with mother, differential treatment, sibling relationship quality, and maternal perception of parent–adolescent quality were added as level two predictors of the intercepts and slopes in the final models.
**Final model results.** The final models were built based on the stages of entering predictors described above. At each stage, the significant predictors were left in the equation and the following set of predictors was entered. The final models represent the final set of significant predictors for problem drinking trajectories.

*Socio-demographic variables.* There were substantial similarities among the mother and father model samples in regards to socio-demographic characteristics. Race was associated with variability in the initial incidence rate of problem drinking for both siblings. Black Non-Hispanic and Other Non-Hispanic adolescents reported 45 - 88% lower incidence rates of problem drinking for the previous 12 months relative to White adolescents. These initial differences in the incidence rate of problem drinking were replicated at Wave III in younger adulthood. Race did not account for a significant portion of variability in initial growth rate or overall trajectory in either the mother or father model samples. The incidence rate of problem drinking for Hispanic youth was initially no different from that of White, Non-Hispanic adolescents, but differences quickly emerged in the mother sample model. Hispanic adolescents had a slower short-term increase in the incidence rate of problem drinking ($b = -.84, SE = .28, ERR = .43, p < .01$) and less curvature in their overall trajectory ($b = .26, SE = .13, ERR = 1.29, p < .05$). This suggests Hispanic adolescents may have a less severe course of problem drinking relative to White Non-Hispanic youth, controlling for all other races. In sum, variability in problem drinking according to racial/ethnic group was consistent across siblings.

Dyad type accounted for variability in the incidence rate of problem drinking for Sibling 2 in adolescence. Girls with a female twin or older sister had 33 - 39% lower
incidence rates of problem drinking in adolescence relative to boys with a female twin or older sister. Overall, the presence of a male twin or older brother was associated with approximately 50% lower incidence rate of problem drinking, regardless of the sex of Sibling 2. Yet if both siblings were boys, Sibling 2 reported incidence rates of problem drinking that were an average of 62 - 89% higher than the reference group. These initial differences were replicated at Wave III in young adulthood. Dyad type was unrelated to Sibling 1’s problem drinking in all models. Taking into consideration that Sibling 1 is on average, older than Sibling 2, these findings suggest that older siblings have a bigger influence on younger sibling’s drinking than vice versa and the effects are lasting. Furthermore, the sex constellation of the dyad also mattered; when the dyad was two males, there was a much higher incidence rate of problem drinking at Wave 1.

Somewhat surprisingly, there were few age differences in problematic alcohol use. Sibling 1’s age at Wave I was positively associated with their initial incidence rate of problem drinking \( (b=.12, SE=.05, ERR= 1.13, p< .05) \), while Sibling 2 exhibited a slower growth rate \( (b=-.28, SE=.07, ERR=.76, p<.001) \) and less of a quadratic effect in the overall trajectory if they were older at the Wave I assessment \( (b=.08, SE=.03, ERR=1.08, p<.05) \). These findings were limited to the mother model sample. However, it appears that physical development and maturation may better account for variability in problem drinking than chronological age. Greater physical maturation and development at Wave I was associated with higher initial incidence rate of problem drinking for both Sibling 1 \( (b=.11, SE=.03, ERR= 1.12, p<.001) \) and Sibling 2 \( (b=.07, SE=.03, ERR=1.07, p<.01) \) in the father model sample. Furthermore, more advanced pubertal status predicted
significantly slower initial growth rates for both siblings, along with less curvature in Sibling 1’s overall trajectory ($b=.06$, $SE=.02$, $ERR=1.06$, $p<.01$) and marginally less curvature for that of Sibling 2 ($b=.03$, $SE=.02$, $ERR=1.03$, $p=.06$) (see Table 13 for initial growth rate estimates). Sibling 1’s pubertal status was positively associated with problematic drinking in adolescence in mother model sample, but only Sibling 2’s physical maturation and development predicted variability in how problem drinking changed over time.

Depressive symptoms were positively associated with problem drinking for both siblings in adolescence in the mother model sample. Consistent with previous research, adolescents who reported higher levels of depressive symptoms also higher initial incident rates of problem drinking. On average, every 1 point increase on the 27-point scale of depressive symptoms was associated with a 4% increase in the incidence rate of adolescent problem drinking for both Sibling 1 and Sibling 2 (both $p<.05$). Furthermore, depressive symptoms in adolescence predicted change in problem drinking over time, but only for Sibling 2. Greater depression in adolescence was associated with a slower initial increase in the incidence rate of problem drinking and a less curvilinear trajectory for Sibling 2 in both the mother and father model samples.

Union status at Wave III was consistently associated with Sibling 1’s change in problem drinking over time in both the mother and father model samples. Specifically, involvement in a committed union in young adulthood was associated with a slower initial growth rate and less curvilinearity in their overall trajectory (See Tables 12 and 13 for estimates). Sibling 2 also exhibited this relationship, but only in the father model
sample. Taken together, these finding suggests the transition to more adult-like roles (such as committed unions) predicts a far more moderate trajectory of problematic alcohol use. Arnett (2005) has suggested the high rates of substance use during emerging adulthood reflect the accompanying instability in romantic relationships, educational pursuits, and residential arrangement that occur during this period. Thus, the finding that involvement in a committed union by Wave III was associated with a far more moderate trajectory of problem drinking may signify greater stability in their lives.

Differences between siblings emerged in regards to college education status. Future college attendance was associated with a 34% reduction in the average incidence rate of problem drinking in adolescence, and a 19% faster initial growth rate for Sibling 1 in the mother model sample, but made no difference for Sibling 2.

Parental status accounted for variability in how problem drinking changed over time in the separate sibling models. Parenthood at Wave III was associated with a slower rate of deceleration \( (b=.27, \ SE=.14, \ ERR= 1.32, \ p<.05) \) for Sibling 1. Figure 1 displays this trajectory. This figure illustrates the finding that siblings who were already parents by Wave III exhibit higher incidence rates of problem drinking for a longer period of time than those who delay or forgo parenthood. Parenthood by the final wave showed a significantly slower short – term increase at Wave III for both siblings in all of the four sibling models. Figure 2 shows that siblings who were parents appear to already be at their peak problem drinking at Wave 3, whereas those who were not parents at the final wave continue to increase their problematic use. Thus, it appears parental status in
general, as well as the timing of parenthood, is associated with change in problem drinking.

_Autonomy, connection, and problem drinking_. The first hypothesis proposed the relationship between parent connection and problem drinking was moderated by autonomy. Specifically, connection would be negatively related to problem drinking when autonomy was high, but positively associated with problem drinking when autonomy was low. The connection × autonomy interaction terms represented the combined effects of emotional closeness and autonomy from parents on change in problem drinking over time. When the interaction term was significant, it indicated the effect of emotional connectedness on the incidence rate of problem drinking was dependent upon the level autonomy (and vice versa). The father connection × autonomy interaction term was positively related to Sibling 2’s initial growth rate in adolescence ($b=0.01, SE=0.004, ERR=1.01, p<.05$) and was a significant predictor of their overall trajectory ($b=-0.004, SE=0.002, ERR=1.00, p=.05$) in the father model sample. Figure 3 illustrates how these variables interacted with respect to Sibling 2’s change in problem drinking over time. It does not appear that adolescents who are close with their fathers but have little autonomy problem drink any more than adolescents who are also emotionally close with their fathers and permitted greater independence. There was no interaction between mother connection and autonomy in the mother model sample.

There was still evidence to suggest there can be “too much” closeness. Sibling 1’s report of closeness with father predicted a faster initial growth rate ($b=.05, SE=.02, ERR=1.05, p<.01$) and a marginally faster rate of deceleration ($b= -.02, SE=.01$,
ERR=.98, \( p=.05 \)) in the incidence rate of problem drinking over time in the father model sample. That is, a warmer and more positive relationship with father was associated with a faster increase in problem drinking during adolescence, and greater curvature, or a higher peak, in their overall trajectory.

There was little support for the first hypothesis in the separate sibling models. There was a significant interaction between Sibling 1’s report of connection with mother and adolescent autonomy on Sibling 1’s instantaneous rate of change at Wave III (\( b= -.01, SE=.003, ERR=.99, p=.05 \)). Figure 4 graphically displays this interaction. Siblings who were close with their mothers in adolescence but had little autonomy appear to have a faster short-term increase at Wave III, while all others have already reached or are approaching reached their peak use. Thus, it appears emotional closeness without autonomy delays problematic alcohol use for Sibling 1, but does not affect their overall trajectory. These findings provide some support for the notion of an interaction between connectedness and autonomy, but not in the expected direction.

Further support for the notion of extremes in connection was found in the separate siblings models. Increasing amounts of closeness with their father (\( b= -.05, SE=.02, ERR=.95, p<.05 \)) or mother (\( b= -.04, SE=.02, ERR=.97, p=.07 \)) in adolescence predicted marked curvilinearity in Sibling 1’s overall trajectory. This suggests a short period of more severe problem drinking in young adulthood. Greater autonomy, however appeared to predict a more chronic course of problematic use. Specifically, greater autonomy in adolescence predicted a slower short-term increase in Sibling 2’s incidence rate of problem drinking at Wave III in both the father (\( b= -.04, SE=.02, \)
ERR=.96, p< .05) and mother model samples (b=.06, SE=.02, ERR=.95, p<.01) and only marginally slower deceleration (b=.04, SE=.02, ERR=1.04, p=.067) in the mother model sample. It is interesting to note that these results were not consistent across siblings, but may speak to the notion of “too much” autonomy or closeness in relationships with parents.

Mother – adolescent relationship quality. The second hypothesis for this study predicted a negative relationship between maternal perception of the quality of the parent – adolescent relationship and problem drinking. As expected, mother report of the quality of the mother – adolescent relationship was negatively related to Sibling 2’s problem drinking in adolescence (b = -.08, SE=.04, ERR=.93, p<.05). This translates to a 7% reduction in initial incidence rate of problem drinking for each 1-point increase in the quality of the mother - adolescent relationship. Furthermore, there was a trend (b= -.06, SE=.04, ERR=.94, p=.08) in the same direction for Sibling 1’s problem drinking during adolescence. While more positive mother – adolescent relationships appear to have a protective effect on problem drinking in adolescence, the benefits of such a positive relationship may be short – lived, as these adolescents experienced a faster short – term increase (b=.10, SE=.03, ERR= 1.10, p<.01) in the incidence rate of problem drinking in the mother model sample when modeled together. For each one unit increase in the quality of the relationship, the instantaneous rate of change in the incidence rate of problem drinking increased by 10%. While contrary to the hypothesis, these findings may represent the effects of a mother – adolescent relationship, which again may be “too
close”. Mother report of the quality of the relationship was unrelated to problem drinking in the father model sample.

Mother – adolescent relationships that lack appropriate boundaries may exert a lasting influence on change in problem drinking over time. Specifically, Sibling 1 exhibited a trend for a more positive mother – adolescent relationship to predict a faster short – term increase in the incidence rate of problem drinking at Wave III \((b=.05, SE=.03, ERR=1.04, p=.08)\) in the separate sibling models. Maternal report of the relationship quality was not related to problem drinking in the model for Sibling 2.

**Sibling relationship quality.** The third hypothesis for the study proposed a negative relationship between the quality of the sibling relationship and problem drinking. Relationship quality failed to account for a significant amount of variability in the sibling intercepts and slopes in both the mother and father model samples.

Sibling relationship quality was also unrelated to the incidence rate of problem drinking in the separate sibling models, with the exception of the Sibling 1 model in the father sample. Contrary to the hypothesis, closer sibling relationships in adolescence predicted a marginally faster growth rate at Wave III \((b=.07, SE=.04, ERR=1.08, p=.05)\) for Sibling 1. For every one point increase in the quality of the sibling relationship, the instantaneous rate of change in the incidence rate of increased by 8%. Thus, the closer and more positive the sibling relationship was in adolescence, the faster Sibling 1’s drinking was increasing at Wave III.

**Differential treatment.** The final hypothesis of the study proposed a positive relationship between differential treatment and problem drinking. Differential treatment
was uniquely associated with Sibling 2’s problem drinking, but only in the father model sample. Sibling 2’s report of the experience of differential treatment predicted a 55% higher average incidence rate of problem drinking in adolescence ($p<.05$). Furthermore, those siblings who reported differential treatment in adolescence had on average a 47% slower initial increase in the incidence rate of problem drinking ($p<.05$), along with a reduction in the curvature of their overall trajectory ($b=.29, SE=.13, ERR=1.34, p<.05$). This finding is illustrated in Figure 5. Taken together, these findings indicate that siblings who perceive differences in love and attention may start problem drinking earlier, and exhibit somewhat more chronic problematic use relative to the average trajectory. However, these findings were not replicated in the separate sibling models. In addition, both maternal report and Sibling 1’s perception of disparities in parenting were unrelated to problematic alcohol use in any of the models. Thus, there was limited support for Hypothesis 4.

**Inter–sibling effects.** The separate sibling models yielded a number of crossover effects that could contribute to our understanding of the various ways in which the family can shape the course of problem drinking. Several effects were observed with regards to college education and pubertal status. Sibling 2’s incidence rate of problem drinking increased faster at Wave III if Sibling 1 had attended at least some college, while Sibling 2’s educational status was unrelated to their own problem drinking across all models. Similarly, Sibling 1’s pubertal status in adolescence predicted Sibling 2’s problem drinking better than Sibling 2’s own physical maturation. Specifically, Sibling 1’s physical maturity and development at Wave I was positively related to Sibling 2’s
incidence rate of problem drinking at Wave III in both the father sample model \( (b=.07, SE=.03, ERR=1.07, p<.05) \) and mother model sample \( (b=.07, SE=.02, ERR=1.07, p<.01) \). Furthermore, Sibling 2 exhibited a significantly slower \( (b=-.05, SE=.02, ERR=.95, p<.05) \) or marginally slower \( (b=-.05, SE=.02, ERR=.95, p=.06) \) short-term increase in the incidence rate of problem drinking at Wave III if Sibling 1 was more physically developed and mature at Wave I. The slower growth rate is likely due to the fact that Sibling 2’s incidence rate was already higher if their sibling was more developed. Sibling 2’s physical maturity at Wave I only predicted a slower initial growth rate at Wave III in the father sample, but was otherwise unrelated to their own incidence rate of problem drinking at Wave III or their overall trajectory in the mother and father samples. There were similar findings for Sibling 1. Specifically, the more physically developed Sibling 2 was at Wave I, the slower Sibling 1’s drinking was increasing at Wave III \( (b=-.08, SE=.03, ERR=.93, p<.01) \) and the less curvature there was in their overall trajectory \( (b=.09, SE=.03, ERR=1.10, p<.01) \). However, considering the pubertal development of siblings was only moderately correlated \( (r=.28, p<.001) \), this finding suggests that Sibling 1’s pubertal development was not merely a proxy for Sibling 2’s physical maturity, and vice versa.

Further evidence suggests the dynamics occurring between other family members can have a lasting influence on the progression of problem drinking. The more autonomy Sibling 2 had in adolescence, the slower Sibling 1’s incidence rate was increasing at Wave III in the separate sibling models \( (b=-.03, SE=.02, ERR=1.01, p<.05) \). Furthermore, these siblings exhibited marginally less curvature in their overall trajectory.
(b=.04, SE=.02, ERR=97, p=.054). This finding suggests a pattern of more consistent use over time (See Figure 6). Sibling 1’s problem drinking was unrelated to their own report of autonomy in all models.

Sibling 2’s connection with their mother was marginally related to Sibling 1’s problem drinking, but in the opposite direction. The more connected Sibling 2 felt with their mother, the slower the rate of deceleration in Sibling 1’s trajectory (b=.03, SE=.02, ERR=1.03, p=.06). Contrary to expectations, Sibling 2’s problem drinking was not related to their own experience of emotional connection with their father in any model. However, the closer Sibling 1 felt to father in adolescence, the faster Sibling 2’s incidence rate was increasing at Wave III (b=.03, SE=.02, ERR=1.03, p<.05). Thus, there is evidence to suggest that Sibling 1’s connection with father predicts change in problem drinking for both siblings. These inter-sibling effects provide further support of the necessity of a family systems perspective in understanding seemingly “individual” symptoms.
CHAPTER 5: DISCUSSION

Family therapy for alcohol and drug use has received increasing empirical support in recent years. In order to enhance and improve upon treatment outcomes, it is important to know the mechanisms through which family-based treatments are effective (Rowe, 2012). The present study sought to examine how patterns of family connectedness and relating during the formative years of adolescence are associated with concomitant problem drinking and trajectories of problematic use over time. While research consistently links the quality of relations with parents to problem drinking in adolescence, the role of other family members and more insidious family processes such as parental differential treatment are largely ignored. The current study is one of the first to examine how multiple perspectives of the family system in adolescence are associated with problem drinking in a longitudinal dyadic analysis of 492 sibling pairs. The following chapter discusses the findings in relation to each hypothesis. Furthermore, the strengths and limitation of the present study are noted. The findings bolster support for a family systems approach to researching, assessing and treating seemingly “individual” symptoms.

Hypothesis 1: The relationship between connection with the parent and problem drinking will be moderated by level of autonomy. Specifically connection will be
negatively related to problem drinking when autonomy is high, but positively related to problem drinking when autonomy is low.

The first hypothesis was largely unsupported. There was no evidence to suggest that autonomy and connection with either parent interacted in relation to problem drinking in adolescence. However, father connection and autonomy did interact to predict Sibling 2’s initial rate of change and overall trajectory in the father model sample. There appeared to be little difference in the initial rate of change and overall course of problematic alcohol use between adolescents who were high in both autonomy and connection in comparison to those who were emotionally close with their fathers but had little independence. Furthermore, the separate mother model for Sibling 1 suggested no benefit of greater autonomy if Sibling 1 was close with his or her mother.

The finding that greater connectedness predicted a faster increase in the incidence rate problem drinking as well as marked curvilinearity speaks to the notion of excessive closeness or emotional overinvolvement. It may be the case that these relationships are “too close” and indicate a lack of appropriate boundaries in the parent-adolescent relationship (Klagsbrun & Davies, 1977). This finding is consistent with the observation that the overwhelming majority of adult substance users either reside with family members or are in regular or constant contact with their parents either through telephone or communication through other family members (Stanton, 1997; Stanton & Todd, 1982). Thus, the problem drinking may reflect the individual’s attempt to separate from family of origin while remaining connected. Furthermore, the finding that greater autonomy in adolescence predicted a more chronic course of use is consistent with the expectation that
extremes in connectedness would be associated with problem drinking. Thus, patterns of connectedness with parents in adolescence can account for some of the variability in how problem drinking changes during emerging adulthood.

The lack of support for an interaction between connection and autonomy in the expected direction may be a result of sex or gender differences. Specifically, there is some evidence to suggest the relationship between autonomy, connection and problematic alcohol use may vary by gender. Choquet, Hassler, Morin, Glaissard, and Chau (2008) found a much stronger relationship between emotional support from the family and alcohol use for girls than for boys. Furthermore, Bartle and Sabatelli (1989) found that female adolescents reported more negative consequences of alcohol use if they experienced less tolerance for autonomy and separateness in their relationships with their parents. This relationship was not found for boys. These gender differences may reflect that girls are socialized toward relationships and connectedness, while boys are encouraged to be more independent (Choquet et al., 2008; Kelly, Toumbourou, Flaherty, Patton, Homel, O’Connor & William, 2011). Furthermore, emerging evidence suggests that sex or gender of the parent also matters. Specifically, Kelly and colleagues (2001) found that greater closeness with the parent of the opposite sex was associated with less problem drinking in adolescence (Kelly et al., 2011). Thus, future studies should examine whether these findings are moderated by gender or biological sex of the parent as well as the child.

**Hypothesis 2:** Parent report of the quality of the parent – child relationship during adolescence will be negatively associated with child report of problem drinking over
time. Youth whose parents report having more negative and poorer quality relationship with them during adolescence will be more likely to engage in problem drinking during adolescence and adulthood.

The second hypothesis was partially supported, with adolescents engaging in less problem drinking in adolescence if they had a more positive relationship with their mother. However, the better the mother perceived her relationship with her child, the faster the short–term increase in problem drinking during adolescence. While contrary to expectations, this finding suggests that mother–adolescent relationships that are “too good” may be detrimental to the adolescent. This again leads to the notion of too much closeness and a lack of appropriate boundaries in the mother–adolescent relationship.

The current study did not assess the father’s perspective of his relationship with the adolescent. Therefore, it is unknown how the link between problem drinking and mother–adolescent relationship quality may vary once the quality of the father–adolescent relationship is taken into account.

**Hypothesis 3: The quality of the sibling relationship during adolescence will be negatively related to problem drinking over time.**

The third hypothesis was not supported. In fact, the results from the separate sibling models indicated that a more positive sibling relationship in adolescence was associated with a faster short–term increase in problem drinking during emerging adulthood. This finding contradicts the research on sibling relations in which more positive sibling relationships are associated with less alcohol use in adolescence (Buist, Deković, & Prinzie, 2013; East & Khoo, 2005; East & Shi, 1997; Samek & Reuter,
2011). However, much of the research on the link between relationship quality and outcomes is limited to adolescence. Far less is known about long-term impact of these positive sibling relationships and how they may influence the manner in which problem drinking changes during emerging adulthood.

There are several potential explanations for this finding. It may be the case that the siblings are “too close”. Problem drinking may be the way through which distance is regulated in the sibling subsystem. Another possible explanation is that the association between qualities of the sibling relationship and alcohol use is moderated by the gender or sex composition of the sibling dyad (Van der Vorst, Engels, Meeus, Deković, & Van Leeuwe, 2007). Solmeyer, McHale, and Crouter (2013) found that sibling warmth was positively related to engagement in risky behavior only when both siblings were boys. These findings are consistent with an earlier study that found a positive relationship between sibling warmth and externalizing symptoms, but only for brother dyads (Slomkowski, Rende, Conger, Simons, & Conger, 2001). Thus, several researchers have suggested this relationship only holds for brothers (Van der Vorst et al., 2007). To the contrary, Rowe and Gulley (1992) found that warmth in the sibling relationship was positively related to younger sibling’s substance for sister dyads only. However, warmth was related to substance use for both brother and sister dyads if the siblings spent a lot of time with mutual friends. Future research should explore how the link between sibling relationship quality and problem drinking is moderated by the sex constellation of the dyad, as the present study showed that Sibling 2’s problem drinking in adolescence and young adulthood varied according to the type of dyad.
Some may argue that finding a more positive sibling relationship in adolescence was associated with a faster short-term increase in emerging adulthood is consistent with a social learning approach (East & Khoo, 2005). It should be noted, however, that in the current study, one sibling’s use of alcohol was not used to predict that of the other sibling. Furthermore, Whiteman, Jensen, and Maggs (2013) note that many studies espousing a social learning perspective have used sibling relationship qualities such as warmth and emotional intimacy as substitutes for modeling and imitation, when sibling admiration or desire to be liked by the sibling may be more appropriate. Finally, researchers from a social learning perspective have almost exclusively considered the link to be a unidirectional influence or “top-down” approach from older sibling to younger sibling (Gossrau – Breen, Kuntsche, & Gmel, 2010; Van Der Vorst et al, 2007; Whiteman, Jensen, & Maggs, 2013). In the present study, the link between relationship quality and problem drinking was only found for Sibling 1, who was on average, was older than Sibling 2. While some have suggested that siblings who are close in age have a greater impact on each other’s behavior, a recent meta-analysis of 34 studies did not find evidence that the relationship between sibling relationship quality and externalizing problems was moderated by age difference between siblings (Buist et al., 2013).

**Hypothesis 4: Parental differential treatment during adolescence will be positively related to greater problem drinking over time.**

The data provided some support for the final hypothesis. The experience of differential treatment was associated with higher problem drinking scores in adolescence and a somewhat more chronic course of problematic alcohol use during emerging
adulthood, but only for Sibling 2 in the father model sample. Bowen (1976) predicted that the child with the least emotional separation (the focus of the parents’ anxiety) would start to develop symptoms in adolescence, and become increasingly impaired as long as they remained the focus of the projection process. The current findings provide some support for this conjecture. A few studies have suggested that younger siblings are more vulnerable to or more negatively influenced by differential treatment (McHale, Updegraff, Jackson-Newsom, Tucker, & Crouter, 2000; Scholte, Engels, de Kemp, Harakeh, & Overbeek, 2006), but others have not found this to be the case (Tamrouti-Makink et al, 2004). However, one consistent finding in the parental differential treatment literature is that first–born and last–born children are consistently favored over middle–born children as recipients of positive parenting, in terms of emotional closeness and as the mother’s preferred choice for caregiving and emotional support (Jenkins, Rabash, & O’Connor, 2003; Salmon, Shackelford, & Michalski, 2012; Suitor & Pillemer, 2007). While we did not account for the total number of biologically related children in a household, nor did we examine the direction of the differential treatment, it is possible that this finding may at least somewhat reflect this phenomenon.

The relationship between parental differential treatment and sibling adjustment may be moderated by the gender or sex constellation of the sibling dyad and the parent–child dyad (Buist et al., 2013; McHale et al., 2001). There is some evidence to suggest that parents in heterosexual relationships tended to favor children of their own sex, with mothers spending less time and exhibiting less warmth with brother dyads (McHale et al., 2000; Salmon et al., 2012). However, few studies have included the father as a source of
differential treatment. A few studies have suggested that differential treatment from the opposite sex parent has the greater impact on adjustment (McHale et al., 2000; Scholte et al., 2006). Thus, future studies should examine whether these findings are moderated by gender and/or the biological sex of the parent as well as the child. Finally, some research suggests differential treatment may have a greater impact on females and sister dyads as a result of being socialized towards relationships (Boisvert & Wright, 2008; McHale et al., 2001; Shanahan, McHale, Crouter, & Osgood, 2008). The present study suggests younger siblings’ drinking varies according to the sex constellation of the dyad, but further research is needed to determine how this may interact with differential treatment (Atzaba-Poria & Pike, 2008).

Another possible reason for the lack of consistent findings is that some research has suggested differential treatment may not be harmful if the child understands the reason for the treatment (Brody, 2004). That is, some researchers have found that differential parenting is common and necessary based on the developmental needs of the children (Atzaba-Poria & Pike, 2008; Buist et al., 2013). Thus, it may be the case that some siblings do perceive differential treatment (and reported it as so) but feel it is justified and fair, and thus it does not negatively impact them in terms of substance use. However, prominent researchers in the sibling relationship field note that even the perception of fairness does not necessarily serve as a buffer against negative outcomes (McHale et al., 2000). Furthermore, while one sibling in a family may benefit as a result of differential treatment, the disparity may have a negative impact on other siblings (McHale et al., 2000).
Finally, the lack of significant findings for mother report of differential treatment is not entirely surprising. Several researchers argue parental report of differential treatment may be biased, given that they are likely motivated to promote the perception of family harmony and positive relationships (McHale et al., 2001; Meunier, Boyle, O’Connor, & Jenkins, 2013) particularly if siblings are of same sex and close in age (Atzaba-Poria & Pike, 2008). Furthermore, research suggests that mother and father reports of differential treatment show little to no relationship with the reports of the child (Atzaba-Poria & Pike, 2008) and that the child or adolescent’s perception of differential treatment is more strongly associated with variability in outcomes (Kowal, Kramer, Krull, & Crick, 2002; Rauer & Volling, 2007)

**Inter-Sibling Effects**

The identification of inter-sibling effects on problem drinking serve as evidence of the interrelatedness of family members. Few, if any studies have examined how one adolescent’s pubertal development may be related to their sibling’s problem drinking. Research consistently shows that adolescent pubertal status is positively related to their alcohol use. One way in which it has been proposed that this occurs is that those who appear older (due to physical development) may be more accepted by older peers who are likely drinking more, and treated more like an adult by others (Patton, McMorris, Toumbourou, Hemphill, Donath, & Catalano, 2004; Wichstrøm, 2001). It makes sense then, that this would also have an impact on siblings’ problem drinking, given their close proximity and frequency of interaction.
The finding that separateness and connectedness in one parent–adolescent relationship predicted variability in a sibling’s overall trajectory provides support for the notion that parent–child relationships do not take place in isolation of the larger family system (Atzaba-Poria & Pike, 2008). Consistent with a family systems perspective, this finding suggests the interaction between two people within a family contributes to the family emotional process and atmosphere as a whole (Feinberg & Hetherington, 2001; Kerr & Bowen, 1988). The present study is the first to examine these longitudinally, and suggests a need for further research in this area.

Limitations

Several factors may limit the generalizability of the findings noted in the present study. The final sample showed less diversity with regards to race/ethnicity and household structure. Thus, the extent to which the findings reflect dynamics in underrepresented populations and alternative family or household structures may be limited. The substantial age range of study participants at Wave I may have limited the ability to detect an association between problem drinking and family dynamics in adolescence. That is, problem drinking at age 12 would warrant greater concern than engaging in such behavior at age 18. Research consistently shows that those who drink heavily in early adolescence are at an increased likelihood of alcohol abuse and dependence and related problems in adulthood (Bonomo, Bowes, Coffey, Carlin, & Patton, 2004; Hingson, Heeren, & Winter, 2006; Hingson, Heeren, Zakocs, Winter, & Wechsler, 2003). Thus, future studies may find distinguishing between early and later adolescence yields more consistent results with regards to patterns of connectedness.
Given the theoretical perspective of the present study, a second limitation was the failure to query autonomy in the mother–adolescent relationship separately from that of the father–adolescent relationship. Measures that assess autonomy from “parents” rather than “mother”, “father” or “parent” imply/assume autonomy in the parent–adolescent relationship is constant across parents. This assumption contradicts Stanton and colleagues’ seminal work with adolescent and adult substance users and their families. Future research should utilize measures that assess both autonomy and connection in the mother–adolescent relationship separately from the father–adolescent relationship. The reliabilities of the measures assessing autonomy, connection, and the quality of the sibling and mother–adolescent relationships were lacking. These findings are not entirely surprising, given the similarly low reliabilities reported in a previous study that utilized parent–child relational items in the AddHealth dataset (Nguyen, 2012). Some have suggested that acceptable Cronbach alphas can be as low as .60 (Nunnally & Bernstein, 1994) and that alphas even lower than .60 can be considered as fair reliability (Shrout, 1998).

The lack of significant findings in regards to closeness with mothers was surprising. However, it may be the case that the items querying the adolescent’s perception of emotional connection with their mother were measuring the same construct as the items administered to the biological mother regarding the quality of her relationship with each sibling. While mother–adolescent relationship quality was only weakly to moderately correlated with each sibling’s report of connection with mother, the former was equally or more strongly correlated with each sibling’s problem drinking than
the latter. Thus, if the two measures tapped the same or very similar constructs, there may not have been any remaining variance in problem drinking that could be accounted for by the adolescent’s report of closeness with their mothers. Additionally, the paucity of significant findings in regards to mother–adolescent relationship and sibling relationship quality may be due to the creation of the variables. Unfortunately, including the scores of both siblings would have led to problems due to multicollinearity. Averaging the scores can mask a great deal of variability between the two scores. Further, it can be argued that the resulting score does not accurately reflect the perception of either respondent. Thus, it may be the case that this finding (or lack thereof) is an artifact of how the variable was constructed. Future research should utilize alternative statistical methods to investigate the relationship between problem drinking and each person’s perception of the quality of the sibling relationship. Further research on the link between problem drinking and the quality of the sibling relationship may be particularly fruitful. For both siblings, quality of the relationship in adolescence was highly negatively correlated with their problem drinking at all three timepoints, which is consistent with the literature.

Another limitation of the present study is the possibility the most severe drinkers were not included in the final sample. In order to adjust for sampling strategy and perform a weighted analysis, it was necessary that the respondent completed the final Wave IV assessment. Longitudinal studies with substance—using samples struggle with low retention rates (Siddiqui, Flay, & Hu, 1996) and require considerable effort and cost to achieve acceptable follow-up rates, even when retention is a priority (Cottler, Compton, Ben-Abdallah, Horne, & Claverie, 1996; Haggerty, Fleming, Catalano, Petrie,
Rubin, & Grassley, 2008). Some evidence suggests severity of use is correlated with attrition, but the results are not consistent (Cottler et al., 1996; Cunradi, Moore, Killoran, & Ames, 2005). Furthermore, most longitudinal studies with substance using populations do not exceed two years in duration (Wutzke, Conigrave, Kogler, Saunders & Hall, 2000). It is possible the most severe problem drinkers were not retained in the AddHealth project. Thus, there may have been a floor effect which restricted the ability to find support for the proposed hypotheses.

The final limitation concerns the issue of distinguishability of the dyads. Essentially, HLM 7.0 treats dyads as distinguishable because it leaves the “tau” matrix free, which allows the variances and covariances of the “dependent” variables (i.e. intercepts, slopes, and quadratic terms in this case) to vary between the siblings. Unfortunately, HLM 7.0 does not permit the user to specify constraints on the tau matrix. Other statistical programs that perform multilevel modeling allow the analyst to determine whether the dyads are empirically distinguishable. A model with no restrictions on the variances and covariances is tested and compared to a model in which the variances and covariances are set to be equal between the siblings. The dyad is not empirically distinguishable if there is no loss of fit between the freed and constrained model. This implies that the dyad members come from the same statistical population, which was likely the case for the AddHealth siblings. When the dyads are empirically indistinguishable, any further analyses are performed with the constrained “tau” matrix.

While the present study does not examine distinguishability, the complexity of the tested models in addition to the weighting processes, prohibited the use of other programs that
would permit constraints on the tau matrix. Future research not only needs to explore the distinguishability of the siblings in AddHealth data set, but also needs to focus on ways of analyzing indistinguishable dyads in HLM, as well as in STATA without undue computation load.

**Strengths**

The present study arguably bridges the most important period in the lifespan for examining the development and patterns of change in problem drinking over time. The findings suggest family dynamics during adolescence have implications for change in problem drinking in emerging adulthood, when substance use is at its highest. Furthermore, research on sibling relations is an emerging area and longitudinal investigations are largely limited to adolescence as of yet. While the present study was limited due to multicollinearity, the preliminary analyses indicate the quality of the sibling relationship could have far-reaching implications for problem drinking. Despite limitations, the present study provides evidence of the lasting effects of the family system during the formative years of adolescence, and enables one to infer the direction of the relationships between family dynamics and problem drinking. The use of dyadic methods models the interdependence and relatedness of family members and seemingly individual phenomena such as problem drinking.

Most studies on parental differential treatment and sibling outcome have been cross-sectional. From a systems perspective, the relationship between differential treatment and child or adolescent adjustment is undoubtedly somewhat bidirectional, whereby the positive characteristics and behaviors of an adolescent will be more likely to
evoke a positive response from parent(s). The few longitudinal studies suggest
differential treatment predicts adjustment, rather than vice versa, (Burt, McGue, Iacono,
& Kreuger, 2006; McGuire, Dunn, & Plomin, 1995; Shebloski, Conger, & Widaman,
2005) and the present study provide some support for this.

The present study is one of only two investigations to suggest that differential
treatment, regardless of its direction and who is favored, has negative implications.
Existing research on the topic largely proposes that favored siblings will be better off and
disfavored siblings worse. This approach fails to acknowledge that interactions occurring
within one parent–child dyad do not occur in isolation of the larger family system, and
have repercussions for the emotional functioning of the family system. Rauer and
Volling (2007) found that young adults who reported disparities in parental affection,
regardless of who benefited, experienced greater difficulties in romantic relationships.
This is consistent with previous research indicating differential treatment negatively
impacts all children in a family (Boyle et al., 2004) and may be a manifestation of the
family projection process as described by Bowen.

**Research & Clinical Implications**

The present study confirmed the nonindependence of sibling problem drinking.
This suggests that the problem drinking of an individual cannot be understood in isolation
of their sibling(s)’ use. Therefore, more comprehensive assessments of the family system
are needed for both the researcher and the clinician to understand and/or intervene in
problem drinking.
The substance use treatment field struggles to achieve long–term reductions in alcohol and drug use and associated problems (Timko, Moos, Finney & Lesar, 2000). Family therapy for adolescent substance use/abuse is shown to be effective in clinical trials, but the mechanisms through which this occurs are unknown (Waldron & Turner, 2008). Furthermore, improvements in substance use treatment are essential, as initial reductions in alcohol and drug use in clinical trials are frequently not maintained beyond a 12 month follow up (Edelen, Slaughter, McCaffrey, Becker, & Morrall, 2010; Henggeler, Clingempeel, Brondino, & Pickrel, 2002). Furthermore, substance use after treatment in adolescence returns to baseline levels by young adulthood (Anderson, Ramo, Cummins & Brown, 2010; Chung, Maisto, Cornelius, & Martin, 2004). Thus, while family–based interventions are the treatment du jour for adolescent substance use, they may not make enough of a difference to achieve lasting change.

Failure to address distance regulation may account for some of the disappointing long–term outcomes of many intervention programs. Current family–based treatments seek to increase parental monitoring and involvement (Henggeler et al., 2002; Liddle, 1999). However, as shown in the present study, excessively high closeness and overinvolvement during adolescence may not be beneficial in the long run. If problem drinking has its roots in patterns of family connectedness, then interventions need to address the family system in order to be successful.

Conclusions

The results of this study underscore the importance of viewing the family as a system, and seemingly individual symptoms as a manifestation of family processes.
Previous research has linked low parent–child bonding with a greater likelihood of alcohol use. The results of the present study suggest excessive closeness or emotional overinvolvement in adolescence negatively impacts the course of problem drinking. Taken together, this suggests families with problem drinking may have difficulty regulating distance.

The finding that connectedness and separateness in one parent–adolescent relationship predict sibling’s problem drinking is consistent with a family systems perspective, which proposes family members influence each other such that the relational dynamics between two people within a family contributes to the family emotional process and affect the entire family atmosphere (Feinberg & Hetherington, 2001; Kerr & Bowen, 1988). Results suggest a need for intervention at the family level including all siblings in the household in order to prevent and treat problem drinking.
REFERENCES


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Appendix A: Coding
Adolescent age
  . recode H1GI1M (96=.), gen (w1bmonth)
  . recode H1GI1Y (96=.), gen (w1byear)
  . gen w1bdate = mdy(w1bmonth, 15,1900+w1byear)
  . format w1bdate %d
  . gen w1idate=mdy(IMONTH, IDAY,1900+IYEAR)
  . format w1idate %d
  . gen w1age=int((w1idate-w1bdate)/365.25)
  . label variable w1age "Adolescent age at W1"

Adolescent Race/Ethnicity
  . clonevar RACE_W1= H1GI6A
  . recode RACE_W1 (else=2) if H1GI6E==1
  . recode RACE_W1 (else=3) if H1GI6C==1
  . recode RACE_W1 (else=4) if H1GI6D==1
  . recode RACE_W1 (else=5) if H1GI6B==1
  . recode RACE_W1 (else=6) if H1GI4==1
  . label define RACE_W1 1 "White" 2 "Other" 3 "Native American" 4 "Asian or Asian American" 5 "Black or African American" 6 "Hispanic" 8 "refused to respond"
  . label values RACE_W1 RACE_W1
  . recode RACE_W1 (1=0)(2=1)(3=1)(4=1)(5=0)(6=0), generate(RACE_other_dc)
  . label variable RACE_other_dc "DC for OTHER race-adolescent"
  . recode RACE_W1 (1=0)(2=0)(3=0)(4=0)(5=1)(6=0), generate(RACE_blAA_dc)
  . label variable RACE_blAA_dc "DC for black/AA - adolescent"
  . recode RACE_W1 (1=0)(2=0)(3=0)(4=0)(5=0)(6=1), generate(RACE_Hisp_dc)
  . label variable RACE_Hisp_dc "DC for Hispanic - adolescent"

College Education Status
  . recode H4ED2
     (1=0)(2=0)(3=0)(4=0)(5=0)(6=1)(7=1)(8=1)(9=1)(10=1)(11=1)(12=1)(13=1),
  . generate(College_educ_w4)
  . label define College_educ_w4 0 "no college education" 1 "some college education" 96 "refused" 98 "don't know"
  . label values College_educ_w4 College_educ_w4

Relative Poverty
  . clonevar Relpov_w1=PA56
  . mvencode Relpov_w1, mv(7)
  . label define Relative_Poverty_w1 0 "YES, in relative poverty" 1 "NO, not in relative poverty" 6 "refused to answer" 7 "missing"
  . label values Relpov_w1 Relative_Poverty_w1
  . label variable Relpov_w1 "Relative poverty"
  . recode Relpov_w1 (0=1)(1=0)
  . label define Relative_Poverty_w1 1 "YES, in relative poverty" 0 "NO, not in relative poverty" 6 "refused to answer" 7 "missing", replace

Parent Race/Ethnicity
  . clonevar Par_race_w1= PA6_1
  . recode Par_race_w1 (6=8)
  . recode Par_race_w1 (else = 2) if PA6_5 == 1
  . recode Par_race_w1 (else = 3) if PA6_3 == 1
. recode Par_race_w1 (else = 4) if PA6_4 == 1
. recode Par_race_w1 (else = 5) if PA6_2 == 1
. recode Par_race_w1 (else = 6) if PA4 == 1
. label variable Par_race_w1 "Parent Race"
. label define Par_race_w1 1 "White" 2 "Other" 3 "Native American" 4 "Asian or Asian American" 5 "Black or African American" 6 "Hispanic" 8 "refused to respond"
. label values Par_race_w1 Par_race_w1
. recode Par_race_w1 (1=0) (2=1) (3=1) (4=1) (5=0) (6=0), generate(PARRACE_df)
. label variable PARRACE_df "DC for OTHER race-biomom"
. recode Par_race_w1 (1=0) (2=0) (3=0) (4=0) (5=1) (6=0), generate(PARRACE_blAA_df)
. label variable PARRACE_blAA_df "DC for black/AA - biomom"
. recode Par_race_w1 (1=0) (2=0) (3=0) (4=0) (5=0) (6=1), generate(PARRACE_Hisp_df)
. label variable PARRACE_Hisp_df "DC for Hispanic - biomom"

Parent Education
. clonevar ParED_w1 = PA12
. recode ParED_w1 
  (1=0) (2=0) (3=0) (10=0) (4=1) (5=1) (6=2) (7=2) (8=2) (9=2) (96=6), generate(ParED_rec1_w1)
. mvencode ParED_rec1_w1, mv(7)
. label define ParED_rec1_w1 0 "less than high school" 1 "High school ED/GED" 2 "more than high school" 6 "refused to answer" 7 "missing"
. label values ParED_rec1_w1 ParED_rec1_w1
. recode ParED_rec1_w1 (0=0) (1=1) (2=1) if SMPJC_f7finalSIB==1, generate(Par_edHSGRAD)
. label define Par_edHSGRAD 0 "not a HS grad" 1 "HS Grad or more"
. label values Par_edHSGRAD Par_edHSGRAD
. recode ParED_rec1_0 (0=0) (1=0) (2=1) if SMPJC_f7finalSIB==1, generate(Par_edSOMECOLL)
. label define Par_edSOMECOLL 0 "no college" 1 "some college"
. label values Par_edSOMECOLL Par_edSOMECOLL

generate Par_edHSGRAD_S1 = Par_edHSGRAD *SIB_1
. generate Par_edHSGRAD_S2 = Par_edHSGRAD *SIB_2
. generate Par_edSOMECOLL_S2 = Par_edSOMECOLL*SIB_2
. generate Par_edSOMECOLL_S1 = Par_edSOMECOLL*SIB_1

Household Structure
. generate HHDad_w1=. 
. generate HHmom_w1=. 
. generate HHmompartner=.
. generate HHDadpartner_w1=

. mvencode HHDad_w1 if H1HR3A==11, mv(1), override
. mvencode HHDad_w1 if H1HR3B==11, mv(1) override
. mvencode HHDad_w1 if H1HR3C==11, mv(1) override
. mvencode HHDad_w1 if H1HR3D==11, mv(1) override
. mvencode HHDad_w1 if H1HR3E==11, mv(1) override
mvencode HHmom_partner if H1HR3S==16, mv(1) override
mvencode HHmom_partner if H1HR3T==15, mv(1) override
mvencode HHmom_partner if H1HR3T==16, mv(1) override
mvencode HHmom_w1 if H1HR3A==14, mv(1) override
mvencode HHmom_w1 if H1HR3B==14, mv(1) override
mvencode HHmom_w1 if H1HR3C==14, mv(1) override
mvencode HHmom_w1 if H1HR3D==14, mv(1) override
mvencode HHmom_w1 if H1HR3E==14, mv(1) override
mvencode HHmom_w1 if H1HR3F==14, mv(1) override
mvencode HHmom_w1 if H1HR3G==14, mv(1) override
mvencode HHmom_w1 if H1HR3H==14, mv(1) override
mvencode HHmom_w1 if H1HR3I==14, mv(1) override
mvencode HHmom_w1 if H1HR3J==14, mv(1) override
mvencode HHmom_w1 if H1HR3K==14, mv(1) override
mvencode HHmom_w1 if H1HR3L==14, mv(1) override
mvencode HHmom_w1 if H1HR3M==14, mv(1) override
mvencode HHmom_w1 if H1HR3N==14, mv(1) override
mvencode HHmom_w1 if H1HR3O==14, mv(1) override
mvencode HHmom_w1 if H1HR3P==14, mv(1) override
mvencode HHmom_w1 if H1HR3Q==14, mv(1) override
mvencode HHmom_w1 if H1HR3R==14, mv(1) override
mvencode HHmom_w1 if H1HR3S==14, mv(1) override
mvencode HHmom_w1 if H1HR3T==14, mv(1) override
mvencode HHdad_partner_w1 if H1HR3A==13, mv(1) override
mvencode HHdad_partner_w1 if H1HR3A==12, mv(1) override
mvencode HHdad_partner_w1 if H1HR3B==13, mv(1) override
mvencode HHdad_partner_w1 if H1HR3B==12, mv(1) override
mvencode HHdad_partner_w1 if H1HR3C==13, mv(1) override
mvencode HHdad_partner_w1 if H1HR3C==12, mv(1) override
mvencode HHdad_partner_w1 if H1HR3D==13, mv(1) override
mvencode HHdad_partner_w1 if H1HR3D==12, mv(1) override
mvencode HHdad_partner_w1 if H1HR3E==13, mv(1) override
mvencode HHdad_partner_w1 if H1HR3E==12, mv(1) override
mvencode HHdad_partner_w1 if H1HR3F==13, mv(1) override
mvencode HHdad_partner_w1 if H1HR3F==12, mv(1) override
mvencode HHdad_partner_w1 if H1HR3G==13, mv(1) override
mvencode HHdad_partner_w1 if H1HR3G==12, mv(1) override
mvencode HHdad_partner_w1 if H1HR3H==13, mv(1) override
mvencode HHdad_partner_w1 if H1HR3H==12, mv(1) override
mvencode HHdad_partner_w1 if H1HR3I==13, mv(1) override
mvencode HHdad_partner_w1 if H1HR3I==12, mv(1) override
mvencode HHdad_partner_w1 if H1HR3J==13, mv(1) override
mvencode HHdad_partner_w1 if H1HR3J==12, mv(1) override
mvencode HHdad_partner_w1 if H1HR3K==13, mv(1) override
mvencode HHdad_partner_w1 if H1HR3K==12, mv(1) override
mvencode HHdad_partner_w1 if H1HR3L==13, mv(1) override
mvencode HHdad_partner_w1 if H1HR3L==12, mv(1) override
mvencode HHdad_partner_w1 if H1HR3M==13, mv(1) override
mvencode HHdad_partner_w1 if H1HR3M==12, mv(1) override
mvencode HHdad_partner_w1 if H1HR3N==13, mv(1) override
mvencode HHdad_partner_w1 if H1HR3N==12, mv(1) override
mvencode HHdad_partner_w1 if H1HR3O==13, mv(1) override

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. mvencode HHdadpartner_w1 if H1HR3O==12, mv(1) override
. mvencode HHdadpartner_w1 if H1HR3P==13, mv(1) override
. mvencode HHdadpartner_w1 if H1HR3P==12, mv(1) override
. mvencode HHdadpartner_w1 if H1HR3Q==13, mv(1) override
. mvencode HHdadpartner_w1 if H1HR3Q==12, mv(1) override
. mvencode HHdadpartner_w1 if H1HR3R==13, mv(1) override
. mvencode HHdadpartner_w1 if H1HR3R==12, mv(1) override
. mvencode HHdadpartner_w1 if H1HR3S==13, mv(1) override
. mvencode HHdadpartner_w1 if H1HR3S==12, mv(1) override
. mvencode HHdadpartner_w1 if H1HR3T==13, mv(1) override
. mvencode HHdadpartner_w1 if H1HR3T==12, mv(1) override
. recode H1HR12 (97=97)(else=1), generate(HHtypeother_w1)
. generate HHtype_w1=.  
. replace HHtype_w1 = 0 if HHmom_w1==1 & HHDad_w1==1  
. replace HHtype_w1 = 0 if HHmom_w1==1 & HHmompartner==1  
. replace HHtype_w1 = 1 if HHmom_w1==1 & HHDad_w1== & HHmompartner==.  
. replace HHtype_w1 = 2 if HHDad_w1==1 & HHmom_w1== & HHdadpartner==. & HHmom_w1==.  
. label define HHtype_w1 0 "two parents" 1 "single mother" 3 "other"  
. label values HHtype_w1 HHtype_w1  
. label define HHtype_w1 "two parents" 1 "single mother" 3 "other" 4 "single mom + partner", replace  
. recode HHtype_w1 (0=0)(else=1), generate(HHtype_dc)  
. label define HHtype_w1 0 "two parent" 1 "other" 4 "single mom + partner", replace  
. label values HHtype_w1 HHtype_w1  

**Problem Drinking**

. recode H1TO17_copy (1=6)(2=5)(3=4)(4=3)(5=2)(6=1)(7=0)(96=50)(97=0)(98=99), generate(scale_binge_12mo_w1)  
. label define scale_binge_12mo_w1 0 "no binge drink past 12 mo" 1 "1 or 2 days in the past 12 months" 2 "once a month or less (3-12 times in the past 12 mos" 3 "2 or 3 days a month" 4 "1 or 2 days a week" 5 "3 to 5 days a week" 6 "every day or almost everyday" 50 "refused" 99 "don't know"  
. label values scale_binge_12mo_w1 scale_binge_12mo_w1  
. recode H1TO18_copy (1=6)(2=5)(3=4)(4=3)(5=2)(6=1)(7=0)(96=50)(97=0)(98=99), generate(scale_drunk_12mo_w1)  
. label define scale_drunk_12mo_w1 0 "NO, not drunk past 12 mo" 1 "1 or 2 days in the past 12 months" 2 "once a month or less (3-12 times in the past 12 mos" 3 "2 or 3 days a month" 4 "1 or 2 days a week" 5 "3 to 5 days a week" 6 "every day or almost everyday" 50 "refused" 99 "don't know"  
. label values scale_drunk_12mo_w1 scale_drunk_12mo_w1
. generate problem_drink_w1=scale_binge_12mo_w1+scale_drunk_12mo_w1

. recode H3TO40_copy
   (0=0) (1=1) (2=2) (3=3) (4=4) (5=5) (6=6) (96=50) (97=0) (98=99) (99=101) (.=7),
   generate(scale_binge_12mo_w3)
. mvencode scale_binge_12mo_w3, mv(7)
. label variable scale_binge_12mo_w3 "scale_binge_12mo_w3"
. label define scale_binge_12mo_w3 0 "no binge drink in past 12 mo" 1 "1 or 2 days in the past 12 mo" 2 "once a month or less (3-12 times in the past 12mo)" 3 "2 or 3 days a month" 4 "1 or 2 days a week" 5 "3 to 5 days a week" 6 "everyday or almost everyday" 7 "missing" 50 "refused" 99 "don't know" 101 "not applicable"
. label values scale_binge_12mo_w3 scale_binge_12mo_w3

. generate problem_drink_w3=scale_binge_12mo_w3+scale_drunk_12mo_w3

. clonevar H4TO37_copy=H4TO37
. recode H4TO37_copy
   (0=0) (1=1) (2=2) (3=3) (4=4) (5=5) (6=6) (96=50) (97=0) (98=99),
   generate(scale_binge_12mo_w4)
. label define scale_binge_12mo_w4 0 "no binge drink in past 12 mo" 1 "1 or 2 days in the past 12 mo" 2 "once a month or less (3-12 times in the past 12mo)" 3 "2 or 3 days a month" 4 "1 or 2 days a week" 5 "3 to 5 days a week" 6 "everyday or almost everyday" 7 "missing" 50 "refused" 99 "don't know"
. label values scale_binge_12mo_w4 scale_binge_12mo_w4

. generate problem_drink_w4=scale_binge_12mo_w4+scale_drunk_12mo_w4
 Adolescent Autonomy

. clonevar Autcurfew_w1= H1WP1 
. clonevar Autfriend_w1= H1WP2 
. clonevar Autclothing_w1= H1WP3 
. clonevar AutTVamt_w1 =H1WP4 
. clonevar AutTVprog_w1= H1WP5 
. clonevar Autbed_w1= H1WP6 
. clonevar Autdiet_w1= H1WP7 
. clonevar Autleavehome_w1=H1PR6

. label define AutleaveHome_w1 1 "not at all" 2 "very little" 3 "somewhat" 4 "quite a bit" 5 "very much" 6 "does not apply" 96 "refused" 98 "don't know" 99 "not applicable" 599 "missing"

. label define Autonomy_w1 0 "no" 1 "yes" 6 "refused" 7 "legit skip" 8 "don't know" 9 "not applicable" 599 "missing"

. label values Autcurfew_w1 Autonomy_w1
. label values Autfriend_w1 Autonomy_w1
. label values Autclothing_w1 Autonomy_w1
. label values AutTVamt_w1 Autonomy_w1
. label values AutTVprog_w1 Autonomy_w1
. label values Autbed_w1 Autonomy_w1
. label values Autdiet_w1 Autonomy_w1
. label values Autleavehome_w1 AutleaveHome_w1

. egen int z_Autcurfew_w1 = std(Autcurfew_w1), mean(0) std(1)
. egen int z_Autfriend_w1= std(Autfriend_w1), mean(0) std(1)
. egen int z_Autclothing_w1 = std(Autclothing_w1), mean(0) std(1)
. egen int z_AutTVamt_w1 = std(AutTVamt_w1), mean(0) std(1)
. egen int z_AutTVprog_w1 = std(AutTVprog_w1), mean(0) std(1)
. egen int z_Autbed_w1 = std(Autbed_w1), mean(0) std(1)
. egen int z_Autdiet_w1 = std(Autdiet_w1), mean(0) std(1)
. egen int z_Autleavehome_w1 = std(Autleavehome_w1), mean(0) std(1)

. generate AutTOTAL_w1=z_Autcurfew_w1+z_Autcurfew_w1+z_Autclothing_w1+z_AutTVamt_w1+z_AutTVprog_w1+z_Autbed_w1+z_Autdiet_w1+z_Autleavehome_w1

 Connection with mother

. clonevar H1WP9jc = H1WP9
. clonevar H1WP10jc = H1WP10
. clonevar H1PF1j= H1PF1
. clonevar H1WP13jc= H1WP13
. clonevar H1WP14jc= H1WP14
. clonevar H1PF23jc= H1PF23

. recode H1WP9jc (1=1)(2=2)(3=3)(4=4)(5=5)(6=50)(7=99)(8=150)(9=150), generate(Momclose_w1)
. label define Momclose_w1 1 "not at all" 2 "very little" 3 "somewhat" 4 "quite a bit" 5 "very much" 50 "refused" 99 "legit skip-NO RES MOM" 150 "don't know/NA"
. label values Momclose_w1 Momclose_w1
. recode H1WP10jc (1=1)(2=2)(3=3)(4=4)(5=5)(6=50)(7=99)(8=150)(9=150), generate(Momcare_w1)
. label define Momcare_w1 1 "not at all" 2 "very little" 3 "somewhat" 4 "quite a bit" 5 "very much" 50 "refused" 99 "legit skip-NO RES MOM" 150 "don't know/NA"
. label values Momcare_w1 Momcare_w1
. recode H1PF1jc (1=5)(2=4)(3=3)(4=2)(5=1)(6=50)(7=99)(8=150), generate(Momwarm_w1)
. label define Momwarm_w1 5 "strongly agree" 4 "agree" 3 "neither agree nor disagree" 2 "disagree" 1 "strongly disagree" 50 "refused" 99 "legit skip-NO RES MOM" 150 "don't know"
. label values Momwarm_w1 Momwarm_w1
. clonevar Momshop_w1= H1WP17A
. clonevar Momsport_w1= H1WP17B
. clonevar Momrelig_w1= H1WP17C
. clonevar Momlife_w1= H1WP17D
. clonevar Mommovie_w1= H1WP17E
. clonevar Mompersonal_w1= H1WP17F
. clonevar Momschool_w1= H1WP17H
. clonevar Momwork_w1= H1WP17I
. clonevar Momtalk_w1= H1WP17J
. clonevar Mom_noactiv_w1= H1WP17K
. egen int z_Momclose_w1 = std(Momclose_w1), mean(0) std(1)
. egen int z_Momcare_w1 = std(Momcare_w1), mean(0) std(1)
. egen int z_Momwarm_w1 = std(Momwarm_w1), mean(0) std(1)
. egen int z_Momshop_w1 = std(Momshop_w1), mean(0) std(1)
. egen int z_Momsport_w1 = std(Momsport_w1), mean(0) std(1)
. egen int z_Momrelig_w1 = std(Momrelig_w1), mean(0) std(1)
. egen int z_Momlife_w1 = std(Momlife_w1), mean(0) std(1)
. egen int z_Mommovie_w1 = std(Mommovie_w1), mean(0) std(1)
. egen int z_Mompersonal_w1 = std(Mompersonal_w1), mean(0) std(1)
. egen int z_Momschool_w1 = std(Momschool_w1), mean(0) std(1)
. egen int z_Momwork_w1 = std(Momwork_w1), mean(0) std(1)
. egen int z_Momtalk_w1 = std(Momtalk_w1), mean(0) std(1)
. generate
Momconnect_w1=z_Momclose_w1+z_Momcare_w1+z_Momwarm_w1+z_Momshop_w1+z_Momsport_w1+z_Momrelig_w1+z_Momlife_w1+z_Mommovie_w1+z_Mompersonal_w1+z_Momschool_w1+z_Momwork_w1+z_Momtalk_w1
. notes Momconnect_w1: Numeric score of connection with Mom
Connection with Father

. clonevar H1WP13jc = H1WP13
. clonevar H1WP14jc = H1WP14
. clonevar H1PF23jc = H1PF23
. clonevar Dadshop_w1 = H1WP18A
. clonevar Dadsport_w1 = H1WP18B
. clonevar Dadrelig_w1 = H1WP18C
. clonevar Dadlife_w1 = H1WP18D
. clonevar Dadmovie_w1 = H1WP18E
. clonevar Dadpersonal_w1 = H1WP18F
. clonevar Dadschool_w1 = H1WP18H
. clonevar Dadwork_w1 = H1WP18I
. clonevar Dadtalk_w1 = H1WP18J

. recode H1WP13jc (1=1)(2=2)(3=3)(4=4)(5=5)(6=50)(7=99)(8=150)(9=150), generate(Dadclose_w1)
. label define Dadclose_w1 1 "not at all" 2 "very little" 3 "somewhat" 4 "quite a bit" 5 "very much" 50 "refused" 99 "legit skip-NO RES DAD" 150 "don't know/NA"
. label values Dadclose_w1 Dadclose_w1

. recode H1WP14jc (1=1)(2=2)(3=3)(4=4)(5=5)(6=50)(7=99)(8=150)(9=150), generate(Dadcare_w1)
. label define Dadcare_w1 1 "not at all" 2 "very little" 3 "somewhat" 4 "quite a bit" 5 "very much" 50 "refused" 99 "legit skip-NO RES DAD" 150 "don't know/NA"
. label values Dadcare_w1 Dadcare_w1

. recode H1PF23jc (1=5)(2=4)(3=3)(4=2)(5=1)(6=50)(7=99)(8=150)(9=150), generate(Dadwarm_w1)
. label define Dadwarm_w1 5 "strongly agree" 4 "agree" 3 "neither agree nor disagree" 2 "disagree" 1 "strongly disagree" 50 "refused" 99 "legit skip-NO RES DAD" 150 "don't know/NA"
. label values Dadwarm_w1 Dadwarm_w1

. replace Dadclose_w1 = . if SMPJC_f7finalSIB!=1
. replace Dadcare_w1 = . if SMPJC_f7finalSIB!=1
. replace Dadwarm_w1 = . if SMPJC_f7finalSIB!=1
. replace Dadshop_w1 = . if SMPJC_f7finalSIB!=1
. replace Dadsport_w1 = . if SMPJC_f7finalSIB!=1
. replace Dadrelig_w1 = . if SMPJC_f7finalSIB!=1
. replace Dadlife_w1 = . if SMPJC_f7finalSIB!=1
. replace Dadmovie_w1 = . if SMPJC_f7finalSIB!=1
. replace Dadpersonal_w1 = . if SMPJC_f7finalSIB!=1
. replace Dadschool_w1 = . if SMPJC_f7finalSIB!=1
. replace Dadtalk_w1 = . if SMPJC_f7finalSIB!=1
. replace Dadwork_w1 = . if SMPJC_f7finalSIB!=1

. mvdecode Dadclose_w1 Dadcare_w1 Dadwarm_w1 Dadshop_w1 Dadsport_w1 Dadrelig_w1 Dadlife_w1 Dadmovie_w1 Dadpersonal_w1 Dadschool_w1 Dadwork_w1 Dadtalk_w1 if SMPJC_f7finalSIB==1, mv(7)
. mvdecode Dadclose_w1 Dadcare_w1 Dadwarm_w1 Dadshop_w1 Dadsport_w1 Dadrelig_w1 Dadlife_w1 Dadmovie_w1 Dadpersonal_w1 Dadschool_w1 Dadwork_w1 Dadtalk_w1 if SMPJC_f7finalSIB==1, mv(99)

. egen int z_Dadclose_w1 = std(Dadclose_w1), mean(0) std(1)
. egen int z_Dadcare_w1 = std(Dadcare_w1), mean(0) std(1)
. egen int z_Dadwarm_w1 = std(Dadwarm_w1), mean(0) std(1)
. egen int z_Dadshop_w1 = std(Dadshop_w1), mean(0) std(1)
. egen int z_Dadsport_w1 = std(Dadsport_w1), mean(0) std(1)
. egen int z_Dadrelig_w1 = std(Dadrelig_w1), mean(0) std(1)
. egen int z_Dadlife_w1 = std(Dadlife_w1), mean(0) std(1)
. egen int z_Dadmovie_w1 = std(Dadmovie_w1), mean(0) std(1)
. egen int z_Dadpersonal_w1 = std(Dadpersonal_w1), mean(0) std(1)
. egen int z_Dadschool_w1 = std(Dadschool_w1), mean(0) std(1)
. egen int z_Dadwork_w1 = std(Dadwork_w1), mean(0) std(1)
. egen int z_Dadtalk_w1 = std(Dadtalk_w1), mean(0) std(1)

. generate Dadconnect_w1=z_Dadclose_w1+z_Dadcare_w1+z_Dadwarm_w1+z_Dadshop_w1+z_Dadsport_w1+z_Dadrelig_w1+z_Dadlife_w1+z_Dadmovie_w1+z_Dadpersonal_w1+z_Dadschool_w1+z_Dadwork_w1+z_Dadtalk_w1
  . notes Dadconnect_w1: Numeric score of connection with Dad

**Depressive Symptoms**

. recode H1FS1 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate (CESDBother_w1)
. label define CESDBother_w1 0 "never or rarely" 1 "sometimes" 2 "a lot of the time" 3 "most of the time or all of the time" 50 "refused" 99 "don't know"
  . label values CESDBother_w1 CESDBother_w1

. recode H1FS3 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate (CESDBlues_w1)
. label define CESDBlues_w1 0 "never or rarely" 1 "sometimes" 2 "a lot of the time" 3 "most of the time or all of the time" 50 "refused" 99 "don't know"
  . label values CESDBlues_w1 CESDBlues_w1

. recode H1FS4 (0=3)(1=2)(2=1)(3=0)(6=50)(8=99), generate (CESDgood_w1)
. label define CESDgood_w1 0 "most of the time or all of the time" 1 "a lot of the time" 2 "sometimes" 3 "never or rarely" 50 "refused" 99 "don't know"
  . label values CESDgood_w1 CESDgood_w1

. recode H1FS5 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate (CESDconcen_w1)
. label define CESDconcen_w1 0 "never or rarely" 1 "sometimes" 2 "a lot of the time" 3 "most of the time or all of the time" 50 "refused" 99 "don't know"
  . label values CESDconcen_w1 CESDconcen_w1
. recode H1FS6 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate 
(CESDdepress_w1)
.label define CESDdepress_w1 0 "never or rarely" 1 "sometimes" 2 "a 
lot of the time" 3 "most of the time or all of the time" 50 "refused" 99 
"don't know"
.label values CESDdepress_w1 CESDdepress_w1

. recode H1FS7 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate 
(CESDtired_w1)
.label define CESDtired_w1 0 "never or rarely" 1 "sometimes" 2 "a lot 
of the time" 3 "most of the time or all of the time" 50 "refused" 99 
"don't know"
.label values CESDtired_w1 CESDtired_w1

. recode H1FS15 (0=3)(1=2)(2=1)(3=0)(6=50)(8=99), generate 
(CESDenjoy_w1)
.label define CESDenjoy_w1 0 "most of the time or all of the time" 1 
"a lot of the time" 2 "sometimes" 3 "never or rarely" 50 "refused" 99 
"don't know"
.label values CESDenjoy_w1 CESDenjoy_w1

. recode H1FS16 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate (CESDsad_w1)
.label define CESDsad_w1 0 "never or rarely" 1 "sometimes" 2 "a lot of 
the time" 3 "most of the time or all of the time" 50 "refused" 99 
"don't know"
.label values CESDsad_w1 CESDsad_w1

. recode H1FS17 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate 
(CESDdislike_w1)
.label define CESDdislike_w1 0 "never or rarely" 1 "sometimes" 2 "a 
lot of the time" 3 "most of the time or all of the time" 50 "refused" 99 
"don't know"
.label values CESDdislike_w1 CESDdislike_w1

.generate DepressTOT_w1= CESDbother_w1+ CESDblues_w1+ CESDgood_w1+ 
CESDconcen_w1+ CESDdepress_w1+ CESDtired_w1+ CESDenjoy_w1+ CESDsad_w1+ 
CESDdislike_w1

. recode H3SP5 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate 
(CESDbother_w3)
.label define CESDbother_w3 0 "never or rarely" 1 "sometimes" 2 "a lot 
of the time" 3 "most of the time or all of the time" 50 "refuse" 99 
"don't know"
.label values CESDbother_w3 CESDbother_w3

. recode H3SP6 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate 
(CESDblues_w3)
.label define CESDblues_w3 0 "never or rarely" 1 "sometimes" 2 "a lot 
of the time" 3 "most of the time or all of the time" 50 "refuse" 99 
"don't know"
.label values CESDblues_w3 CESDblues_w3

. recode H3SP7 (0=3)(1=2)(2=1)(3=0)(6=50)(8=99), generate (CESDgood_w3)
. label define CESDgood_w3 0 "most of the time or all of the time" 1 "a lot of the time" 2 "sometimes" 3 "never or rarely" 50 "refuse" 99 "don't know"
. label values CESDgood_w3 CESDgood_w3
. recode H3SP8 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate (CESDconcen_w3)
. label define CESDconcen_w3 0 "never or rarely" 1 "sometimes" 2 "a lot of the time" 3 "most of the time or all of the time" 50 "refuse" 99 "don't know"
. label values CESDconcen_w3 CESDconcen_w3
. recode H3SP9 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate (CESDdepress_w3)
. label define CESDdepress_w3 0 "never or rarely" 1 "sometimes" 2 "a lot of the time" 3 "most of the time or all of the time" 50 "refuse" 99 "don't know"
. label values CESDdepress_w3 CESDdepress_w3
. recode H3SP10 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate (CESDtired_w3)
. label define CESDtired_w3 0 "never or rarely" 1 "sometimes" 2 "a lot of the time" 3 "most of the time or all of the time" 50 "refuse" 99 "don't know"
. label values CESDtired_w3 CESDtired_w3
. recode H3SP11 (0=3)(1=2)(2=1)(3=0)(6=50)(8=99), generate (CESDenjoy_w3)
. label define CESDenjoy_w3 0 "most of the time or all of the time" 1 "a lot of the time" 2 "sometimes" 3 "never or rarely" 50 "refuse" 99 "don't know"
. label values CESDenjoy_w3 CESDenjoy_w3
. recode H3SP12 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate (CESDsad_w3)
. label define CESDsad_w3 0 "never or rarely" 1 "sometimes" 2 "a lot of the time" 3 "most of the time or all of the time" 50 "refuse" 99 "don't know"
. label values CESDsad_w3 CESDsad_w3
. recode H3SP13 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate (CESDdislike_w3)
. label define CESDdislike_w3 0 "never or rarely" 1 "sometimes" 2 "a lot of the time" 3 "most of the time or all of the time" 50 "refuse" 99 "don't know"
. label values CESDdislike_w3 CESDdislike_w3
. generate DepressTOT_w3= CESDbother_w3+ CESDblues_w3+ CESDgood_w3+ CESDconcen_w3+ CESDdepress_w3+ CESDtired_w3+ CESDenjoy_w3+ CESDsad_w3+ CESDdislike_w3
. recode H4MH18 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate (CESDbother_w4)
. label define CESDbother_w4 0 "never or rarely" 1 "sometimes" 2 "a lot of the time" 3 "most of the time or all of the time" 50 "refuse" 99 "don't know"
. label values CESDbother_w4 CESDbother_w4

. recode H4MH19 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate (CESDblues_w4)
. label define CESDblues_w4 0 "never or rarely" 1 "sometimes" 2 "a lot of the time" 3 "most of the time or all of the time" 50 "refuse" 99 "don't know"
. label values CESDblues_w4 CESDblues_w4

. recode H4MH20 (0=3)(1=2)(2=1)(3=0)(6=50)(8=99), generate (CESDgood_w4)
. label define CESDgood_w4 0 "most of the time or all of the time" 1 "a lot of the time" 2 "sometimes" 3 "never or rarely" 50 "refuse" 99 "don't know"
. label values CESDgood_w4 CESDgood_w4

. recode H4MH21 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate (CESDconcen_w4)
. label define CESDconcen_w4 0 "never or rarely" 1 "sometimes" 2 "a lot of the time" 3 "most of the time or all of the time" 50 "refuse" 99 "don't know"
. label values CESDconcen_w4 CESDconcen_w4

. recode H4MH22 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate (CESDepress_w4)
. label define CESDepress_w4 0 "never or rarely" 1 "sometimes" 2 "a lot of the time" 3 "most of the time or all of the time" 50 "refuse" 99 "don't know"
. label values CESDepress_w4 CESDepress_w4

. recode H4MH23 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate (CESDtired_w4)
. label define CESDtired_w4 0 "never or rarely" 1 "sometimes" 2 "a lot of the time" 3 "most of the time or all of the time" 50 "refuse" 99 "don't know"
. label values CESDtired_w4 CESDtired_w4

. recode H4MH25 (0=3)(1=2)(2=1)(3=0)(6=50)(8=99), generate (CESDenjoy_w4)
. label define CESDenjoy_w4 0 "most of the time or all of the time" 1 "a lot of the time" 2 "sometimes" 3 "never or rarely" 50 "refuse" 99 "don't know"
. label values CESDenjoy_w4 CESDenjoy_w4

. recode H4MH26 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate (CESDsad_w4)
. label define CESDsad_w4 0 "never or rarely" 1 "sometimes" 2 "a lot of the time" 3 "most of the time or all of the time" 50 "refuse" 99 "don't know"
. label values CESDsad_w4 CESDsad_w4
. recode H4MH27 (0=0)(1=1)(2=2)(3=3)(6=50)(8=99), generate (CESDdislike_w4)
. label define CESDdislike_w4 0 "never or rarely" 1 "sometimes" 2 "a lot of the time" 3 "most of the time or all of the time" 50 "refuse" 99 "don't know"
. label values CESDdislike_w4

generate DepressTOT_w4= CESDbother_w4+ CESDbles_w4+ CESDgood_w4+
CESDconcen_w4+ CESDdepress_w4+ CESDtired_w4+ CESDenjoy_w4+ CESDsad_w4+
CESDdislike_w4

Maternal report of mother – adolescent relationship quality

. recode PC34A (1=5)(2=4)(3=3)(4=2)(5=1)(6=50)(.=99),
generate(Parentwell_w1)
. label define Parentwell_w1 5 "always" 4 "often" 3 "sometimes" 2
"seldom" 1 "never" 50 "refused" 99 "missing"
. label values Parentwell_w1 Parentwell_w1

. recode PC34B (1=5)(2=4)(3=3)(4=2)(5=1)(6=50)(.=99),
generate(Parentdecide_w1)
. label define Parentdecide_w1 5 "always" 4 "often" 3 "sometimes" 2
"seldom" 1 "never" 50 "refused" 99 "missing"
. label values Parentdecide_w1 Parentdecide_w1

. recode PC34C (1=1)(2=2)(3=3)(4=4)(5=5)(6=50)(.=99),
generate(Parentunderst_w1)
. label define Parentunderst_w1 1 "always" 2 "often" 3 "sometimes" 4
"seldom" 5 "never" 50 "refused" 99 "missing"
. label values Parentunderst_w1 Parentunderst_w1

. recode PC34D (1=5)(2=4)(3=3)(4=2)(5=1)(6=50)(.=99),
generate(Parenttrust_w1)
. label define Parenttrust_w1 5 "always" 4 "often" 3 "sometimes" 2
"seldom" 1 "never" 50 "refused" 99 "missing"
. label values Parenttrust_w1 Parenttrust_w1

. recode PC34E (1=1)(2=2)(3=3)(4=4)(5=5)(6=50)(.=99),
generate(Parentinterf_w1)
. label define Parentinterf_w1 1 "always" 2 "often" 3 "sometimes" 4
"seldom" 5 "never" 50 "refused" 99 "missing"
. label values Parentinterf_w1 Parentinterf_w1

. generate Parentrelations_TOT_w1= Parentwell_w1+ Parentdecide_w1+
Parentunderst_w1+ Parenttrust_w1+ Parentinterf_w1

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Mother Report of Differential Treatment

. egen float PCSib1_f7 = total(Parentrelations_TOT_w1) if sibnum==1&smpjcf8==1
. generate Num_487pair = 487 if sibnum==1&smpjcf8==1
. generate PCSib1mean = PCSib1_f7/Num_487pair if sibnum==1&smpjcf8==1
. egen float PCSib2_f7 = total(Parentrelations_TOT_w1) if sibnum==2&smpjcf8==1
. replace Num_487pair = 487 if sibnum==2&smpjcf8==1
. generate PCSib2mean = PCSib2_f7/Num_487pair if sibnum==2&smpjcf8==1
. replace PCSib2mean = 20.20392 if sibnum==1&smpjcf8==1
. generate PCSib_meanTOT = PCSib1mean + PCSib2mean
. generate PCSib_gmean = PCSib_meanTOT/2
. generate PCSib1score_f7 = Parentrelations_TOT_w1 if sibnum==1&smpjcf8==1
. generate PCSib2score_f7 = Parentrelations_TOT_w1 if sibnum==2&smpjcf8==1
. rename (Num_487pair_f7 PCSib1mean_f7 PCSib2mean_f7 PCSib_meanTOT_f7 PCSib_gmean_f7)
. replace PCSib_gmean_f7 = 20.33137 if smpjcf8==1&PCSib_gmean_f7==20.3317
. generate gmean2_f7 = PCSib_gmean_f7*2
. generate Sum_PCSib_score = PCSib1score_f7+PCSib2score_f7
. generate Sum_minus_gmean_f7 = Sum_PCSib_score-gmean2_f7
. generate SSbtw_f7 = Sum_minus_gmean_f7*Sum_minus_gmean_f7/.5
. generate PCSib1_minus_PCSib2 = PCSib1score_f7-PCSib2score_f7
. generate PCSib1_minus_PCSib2_SQ = PCSib1_minus_PCSib2*PCSib1_minus_PCSib2
. generate SSbtw_f7 = Sum_minus_gmean_f7_SQ/.5
. generate MSbtw_plus_MSwithin = SSbtw_f7+SSwith_f7
. generate MSbtw_minus_MSwithin = SSbtw_f7-SSwith_f7
. generate ICC_f7 = MSbtw_minus_MSwithin/MSbtw_plus_MSwithin

Pubertal status

. clonevar Hair_Male_w1=H1MP1
. recode Hair_Male_w1 (1=1)(2=2)(3=3)(4=4)(5=5), generate(Hair_Male_rec_w1)
. label define Hair_Male_W1 1 "I have no hair at all" 2 "I have a little hair" 3 "I have some hair, but not a lot; it has spread out since it first started growing and is thicker." 4 "I have a lot of hair that is thick" 5 "I have a whole lot of hair that is very thick, as much hair
as a grown man" 6 "refused" 8 "don't know" 9 "not applicable" 7 "legitimate skip"

. clonevar FaceHair_Male_w1=H1MP2
. recode FaceHair_Male_w1 (1=1) (2=2) (3=3) (4=4) (5=5), generate(FaceHair_Male_rec_w1)
. label define Voice_male_w1 1 "Same" 2 "A little lower" 3 "Somewhat lower" 4 "A lot lower" 5 "A whole lot lower" 6 "refuse" 7 "legit skip" 8 "don't know" 9 "not applicable"

. clonevar Voice_Male_w1=H1MP3
. recode Voice_Male_w1 (1=1) (2=2) (3=3) (4=4) (5=5), generate(Voice_Male_rec_w1)
. label define Hair_Male_W1 1 "No hair at all" 2 "A little hair" 3 "Some hair" 4 "A lot of hair" 5 "A whole lot of hair" 6 "refused" 7 "legitimate skip" 8 "don't know" 9 "not applicable", replace

. clonevar AdvPhysMALE_w1=H1MP4
. recode AdvPhysMALE_w1 (1=1) (2=2) (3=3) (4=4) (5=5), generate(AdvPhysMALE_rec_w1)
. label define AdvPhysMALE_w1 1 "younger than most" 2 "younger than some" 3 "average" 4 "older than some" 5 "older than most" 6 "refused" 7 "legit skip" 8 "don't know" 9 "not applicable"

. label values Hair_Male_w1 Hair_Male_W1
. label values FaceHair_Male_w1 FaceHair_Male_w1
. label values Voice_Male_w1 Voice_male_w1
. label values AdvPhysMALE_w1 AdvPhysMALE_w1

. egen int stand_AdvPhysMALE_w1 = std(AdvPhysMALE_rec_w1), mean(0) std(1)
. egen int stand_Voice_Male_w1 = std(Voice_Male_rec_w1), mean(0) std(1)
. egen int stand_FaceHair_Male_w1 = std(FaceHair_Male_rec_w1), mean(0) std(1)
. egen int stand_Hair_Male_w1 = std(Hair_Male_rec_w1), mean(0) std(1)

. generate
Male_puberty_S_w1=stand_AdvPhysMALE_w1+stand_Voice_Male_w1+stand_FaceHair_Male_w1+stand_Hair_Male_w1. clonevar Breast_w1= H1FP1
. recode Breast_w1 (1=1) (2=2) (3=3) (4=4) (5=5), generate(Breast_rec_w1)
. label define Breast_w1 1 "Same" 2 "A little bigger" 3 "somewhat bigger" 4 "A lot bigger" 5 "A whole lot bigger" 6 "refuse" 7 "legit skip" 8 "don't know" 9 "not applicable"

. clonevar Curve_w1= H1FP2
. recode Curve_w1 (1=1) (2=2) (3=3) (4=4) (5=5), generate(Curve_rec_w1)
. label define Curve_w1 1 "about as curvy" 2 "A little more curvy" 3 "somewhat more curvy" 4 "A lot more curvy" 5 "A whole lot more curvy" 6 "refuse" 7 "legit skip" 8 "don't know" 9 "not applicable"

. clonevar AdvPhysFEM_w1= H1FP6
. recode AdvPhysFEM_w1 (1=1) (2=2) (3=3) (4=4) (5=5), generate(AdvPhysFEM_rec_w1)
. label define Ever_mens_w1 0 "no" 1 "yes" 6 "refuse" 7 "legit skip" 8 "don't know" 9 "not applicable"
 . clonevar Ever_mens_w1= H1FP3
 . recode Ever_mens_w1 (0=0)(1=1), generate(Ever_mens_rec_w1)
 . label define AdvPhysFEMALE_w1 1 "younger than most" 2 "younger than some" 3 "average" 4 "older than some" 5 "older than most" 6 "refuse" 7 "legit skip" 8 "don't know" 9 "not applicable"
 . label values Breast_w1 Breast_w1
 . label values Curve_w1 Curve_w1
 . label values AdvPhysFEM_w1 AdvPhysFEMALE_w1
 . label values Ever_mens_w1 Ever_mens_w1

 . egen int stand_Breast_w1 = std(Breast_rec_w1) if SMPJC_f7finalSIB==1, mean(0) std(1)
 . egen int stand_AdvPhysFEM_w1 = std(AdvPhysFEM_rec_w1) if SMPJC_f7finalSIB==1, mean(0) std(1)
 . egen int stand_Curve_w1 = std(Curve_rec_w1) if SMPJC_f7finalSIB==1, mean(0) std(1)
 . egen int stand_mens_w1 = std(Ever_mens_rec_w1) if SMPJC_f7finalSIB==1, mean(0) std(1)

 . generate Female_puberty_S=stand_Breast_w1+stand_AdvPhysFEM_w1+stand_Curve_w1+stand_mens_w1
 . generate Male_puberty_S_w1=stand_AdvPhysMALE_w1+stand_Voice_Male_w1+stand_FaceHair_Male_w1, replace
 . clonevar Pubert_Stat_w1= Female_puberty_S
 . replace Pubert_Stat_w1 = Male_puberty_S_w1 if bio_sex_w1_j_0==1

Parental Status at Wave 3

. clonevar Pregoutcome_w3=H3TP1
 . recode Pregoutcome_w3 (1=0)(2=0)(3=0)(4=1)(5=1)(6=0)(7=1)
 . label define Pregoutcome_w3 0 "no living child as a result of pregnancy" 1 "at least 1 living child as a result of pregnancy"
 . label values Pregoutcome_w3 Pregoutcome_w3

***The variables RRELNO (relationship number) and RPREGNO (pregnancy # in that relationship) were used to manually change RPREGNO so that it represented the individual’s total number of pregnancies (female) or pregnancies in which they were a biological parent (male).

. reshape wide Pregoutcome_w3 , i(aid) j( rpregno )
 . mvencode Pregoutcome_w31 Pregoutcome_w32 Pregoutcome_w33 Pregoutcome_w34 Pregoutcome_w35 Pregoutcome_w36 Pregoutcome_w37 Pregoutcome_w38 Pregoutcome_w39, mv(0) override

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generate Parentstatus_w3 = Pregoutcome_w31 + Pregoutcome_w32 + 
Pregoutcome_w33 + Pregoutcome_w34 + Pregoutcome_w35 + Pregoutcome_w36 + 
Pregoutcome_w37 + Pregoutcome_w38 + Pregoutcome_w39
replace Parentstatus_w3 = 1 if Parentstatus_w3 >= 2
label define Parentstatus_w3 0 "no, not a parent or pregnant" 1 "currently pregnant or a parent"
label values Parentstatus_w3 Parentstatus_w3

***Information from Section 11: Household Roster was used to determine if respondents had any biological or nonbiological children (foster, step, adopted).

recode H3HR11A (39=1)(44=1)(else=0), generate(biokidA_w3)
recode H3HR11B (39=1)(44=1)(else=0), generate(biokidB_w3)
recode H3HR11C (39=1)(44=1)(else=0), generate(biokidC_w3)
recode H3HR11D (39=1)(44=1)(else=0), generate(biokidD_w3)
recode H3HR11E (39=1)(44=1)(else=0), generate(biokidE_w3)
recode H3HR11F (39=1)(44=1)(else=0), generate(biokidF_w3)
recode H3HR11G (39=1)(44=1)(else=0), generate(biokidG_w3)
recode H3HR11H (39=1)(44=1)(else=0), generate(biokidH_w3)
recode H3HR11I (39=1)(44=1)(else=0), generate(biokidI_w3)
recode H3HR11J (39=1)(44=1)(else=0), generate(biokidJ_w3)
recode H3HR11K (39=1)(44=1)(else=0), generate(biokidK_w3)
recode H3HR11L (39=1)(else=0), generate(biokidL_w3)
recode H3HR11M (39=1)(else=0), generate(biokidM_w3)
generate biokidTOT_w3= biokidA_w3+ biokidB_w3+ biokidC_w3+ biokidD_w3+ 
biokidE_w3+ biokidF_w3+ biokidG_w3+ biokidH_w3+ biokidI_w3+ biokidJ_w3+ 
biokidK_w3+ biokidL_w3+ biokidM_w3
replace biokidTOT_w3 = 1 if biokidTOT_w3 >= 1

. recode H3HR11A (40=1)(41=1)(43=1)(45=1)(46=1)(else=0), 
generate(nonbiokidA_w3)
. recode H3HR11B (40=1)(41=1)(42=1)(45=1)(46=1)(47=1)(else=0), 
generate(nonbiokidB_w3)
. recode H3HR11C (40=1)(41=1)(43=1)(45=1)(46=1)(else=0), 
generate(nonbiokidC_w3)
. recode H3HR11D (40=1)(41=1)(43=1)(45=1)(46=1)(else=0), 
generate(nonbiokidD_w3)
. recode H3HR11E (41=1)(45=1)(46=1)(else=0), generate(nonbiokidE_w3)
. recode H3HR11F (41=1)(46=1)(else=0), generate(nonbiokidF_w3)
. recode H3HR11G (46=1)(else=0), generate(nonbiokidG_w3)
. recode H3HR11H (45=1)(else=0), generate(nonbiokidH_w3)
. recode H3HR11I (46=1)(else=0), generate(nonbiokidI_w3)
. generate nonbiokidTOT_w3= nonbiokidA_w3+ nonbiokidB_w3+ 
nonbiokidC_w3+ nonbiokidD_w3+ nonbiokidE_w3+ nonbiokidF_w3+ 
nonbiokidG_w3+ nonbiokidH_w3+ nonbiokidI_w3
. replace nonbiokidTOT_w3 = 1 if nonbiokidTOT_w3 >= 1
. label define nonbiokidTOT_w3 0 "no adopted, foster, or step kids in house" 1 "1 or more adopted, foster, or step kids in house"
. label values nonbiokidTOT_w3 nonbiokidTOT_w3

***Merge the two datasets

. recode Parentstatus_w3 (0=1) if nonbiokidTOT_w3 > 0
mvencode Parentstatus_w3 if nonbiokidTOT_w3>0, mv(1) override
recode Parentstatus_w3 (0=1)(.=1) if biokidTOT_w3==1
clonevar sexinrel_w3= H3TR8
label define sexinrel_w3 0 "no vaginal, oral, or anal sex in rel" 1 "yes, vaginal, oral, and/or anal sex in rel" 6 "refused" 8 "don't know" 9 "not applicable"
label values sexinrel_w3 sexinrel_w3
clonevar pregninrel_w3= H3TR9
label define pregninrel_w3 0 "no preg in rel" 1 "yes, preg in rel" 6 "refused" 8 "don't know" 9 "not applicable"
label values pregninrel_w3 pregninrel_w3
clonevar adoptinrel_w3= H3TR13
label define adoptinrel_w3 0 "No adoption of child in rel" 1 "yes, adopted child in rel" 6 "refused" 8 "don't know" 9 "not applicable"
label values adoptinrel_w3 adoptinrel_w3
reshape wide H3TR3 sexinrel_w3 pregninrel_w3 adoptinrel_w3 , i(aid) j( rrelno )
**File then merged with main dataset

recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if preginrel_w31==1| preginrel_w31==6 | preginrel_w31==8
recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if preginrel_w32==1| preginrel_w32==6 | preginrel_w32==8
recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if preginrel_w33==1| preginrel_w33==6 | preginrel_w33==8
recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if preginrel_w34==1| preginrel_w34==6 | preginrel_w34==8
recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if preginrel_w35==1| preginrel_w35==6 | preginrel_w35==8
recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if preginrel_w36==1| preginrel_w36==6 | preginrel_w36==8
recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if preginrel_w37==1| preginrel_w37==6 | preginrel_w37==8
recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if preginrel_w38==1| preginrel_w38==6 | preginrel_w38==8
recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if preginrel_w39==1| preginrel_w39==6 | preginrel_w39==8
recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if preginrel_w310==1| preginrel_w310==6 | preginrel_w310==8
recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if preginrel_w311==1| preginrel_w312==6 | preginrel_w313==8
recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if preginrel_w312==1| preginrel_w312==6 | preginrel_w312==8
recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if preginrel_w313==1| preginrel_w313==6 | preginrel_w313==8
recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if preginrel_w314==1| preginrel_w314==6 | preginrel_w314==8
recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if preginrel_w315==1| preginrel_w316==6 | preginrel_w317==8
recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if preginrel_w315==1| preginrel_w315==6 | preginrel_w315==8

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. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w316==1| pregninrel_w316==6 | pregninrel_w316==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w317==1| pregninrel_w317==6 | pregninrel_w317==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w318==1| pregninrel_w318==6 | pregninrel_w318==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w319==1| pregninrel_w319==6 | pregninrel_w319==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w320==1| pregninrel_w320==6 | pregninrel_w320==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w321==1| pregninrel_w321==6 | pregninrel_w321==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w322==1| pregninrel_w322==6 | pregninrel_w322==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w323==1| pregninrel_w323==6 | pregninrel_w323==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w324==1| pregninrel_w324==6 | pregninrel_w324==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w325==1| pregninrel_w325==6 | pregninrel_w325==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w326==1| pregninrel_w326==6 | pregninrel_w326==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w327==1| pregninrel_w327==6 | pregninrel_w327==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w328==1| pregninrel_w328==6 | pregninrel_w328==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w329==1| pregninrel_w329==6 | pregninrel_w329==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w330==1| pregninrel_w330==6 | pregninrel_w330==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w331==1| pregninrel_w331==6 | pregninrel_w331==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w332==1| pregninrel_w332==6 | pregninrel_w332==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w333==1| pregninrel_w333==6 | pregninrel_w333==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w334==1| pregninrel_w334==6 | pregninrel_w334==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w335==1| pregninrel_w335==6 | pregninrel_w335==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w336==1| pregninrel_w336==6 | pregninrel_w336==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w337==1| pregninrel_w337==6 | pregninrel_w337==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w338==1| pregninrel_w338==6 | pregninrel_w338==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w339==1| pregninrel_w339==6 | pregninrel_w339==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w340==1| pregninrel_w340==6 | pregninrel_w340==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w341==1| pregninrel_w341==6 | pregninrel_w341==8
. recode preginANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w342==1| pregninrel_w342==6 | pregninrel_w342==8
. recode pregANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w343==1 | pregninrel_w343==6 | pregninrel_w343==8
. recode pregANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w344==1 | pregninrel_w344==6 | pregninrel_w344==8
. recode pregANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w345==1 | pregninrel_w345==6 | pregninrel_w345==8
. recode pregANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w346==1 | pregninrel_w346==6 | pregninrel_w346==8
. recode pregANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w347==1 | pregninrel_w347==6 | pregninrel_w347==8
. recode pregANYrel_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if pregninrel_w348==1 | pregninrel_w348==6 | pregninrel_w348==8

. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w31==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w32==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w33==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w34==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w35==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w36==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w37==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w38==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w39==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w310==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w311==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w312==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w313==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w314==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w315==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w316==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w317==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w318==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w319==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w320==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w321==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w322==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w323==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w324==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w325==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w326==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w327==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w328==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w329==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w330==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w331==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w332==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w333==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w334==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w335==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w336==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w337==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w338==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w339==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w340==1
. recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w341==1
recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w342==1
recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w343==1
recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w344==1
recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w345==1
recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w346==1
recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w347==1
recode Parentstatus_w3 (0=1)(.=1) if adoptinrel_w348==1
mvencode Parentstatus_w3 if preginANYrel_w3==0, mv(0) override

***After merging these two datasets, missing (blank) parental status values were replaced with “0” if they met both of the following conditions: (1) no biological, adopted, step–or foster children in the home (2) no pregnancies or live births in any relationship OR never had vaginal intercourse

mvencode Parentstatus_w3 if nonbiokidTOT_w3>0, mv(1) override
mvencode Parentstatus_w3 if preginANYrel_w3==0, mv(0) override
mvencode Parentstatus_w3 if H3SE1==0, mv(0) override
***H3SE1 asks if they have ever had sexual intercourse
mvencode Parentstatus_w3, mv(0) override
label define Parentstatus_w3 0 "no, not a parent or pregnant" 1 "currently pregnant or a parent" 599 "missing due to no Wave 3 interv.", replace
recode Parentstatus_w3 (599=299)

label define Parentstatus_w3 0 "no, not a parent or pregnant" 1 "currently pregnant or a parent" 299 "missing due to no Wave 3 interv." 599 "missing ", replace

Parental Status at Wave 4

recode H4TR10 (0=0) (1=1) (2=1) (3=1) (4=1) (5=1) (6=1) (7=1) (8=1) (11=1), generate (Anylivebirth_w4)
mvencode Anylivebirth_w4 if H4TR9==0, mv(0)

***Note: H4TR9 asks respondent for the number of times they have gotten pregnant or made a partner pregnant, regardless of the outcome of the pregnancy.

***Information from Section 8: Household Roster was used to determine if respondents had any biological or nonbiological children (foster, step, adopted).

recode H1HR4A (1=1) (7=1) (else=0), generate (biokidA_w4)
recode H1HR4B (1=1) (7=1) (else=0), generate (biokidB_w4)
recode H1HR4C (1=1) (7=1) (else=0), generate (biokidC_w4)
recode H1HR4D (1=1) (7=1) (else=0), generate (biokidD_w4)
recode H1HR4E (1=1) (7=1) (else=0), generate (biokidE_w4)
recode H1HR4F (1=1) (7=1) (else=0), generate (biokidF_w4)
recode H1HR4G (1=1) (7=1) (else=0), generate (biokidG_w4)
recode H1HR4H (1=1) (7=1) (else=0), generate (biokidH_w4)
recode H1HR4J (1=1) (7=1) (else=0), generate (biokidJ_w4)
. recode H1HR4K (1=1)(7=1)(else=0), generate (biokidK_w4)
. generate biokidTOT_w4 = biokidA_w4 + biokidB_w4 + biokidC_w4 + biokidD_w4 + biokidE_w4 + biokidF_w4 + biokidG_w4 + biokidH_w4 + biokidJ_w4 + biokidK_w4
. replace nonbiokidTOT_w4 = 1 if nonbiokidTOT_w4>=1
. label define biokidTOT_w4 0 "no biological children in house" 1 "1 or more biological children in house"
. label values biokidTOT_w4 biokidTOT_w4

. recode H4HR9A (2=1)(3=1)(else=0), generate (nonbiokidA_w4)
. recode H4HR9B (2=1)(3=1)(4=1)(5=1)(else=0), generate (nonbiokidB_w4)
. recode H4HR9C (2=1)(3=1)(4=1)(5=1)(else=0), generate (nonbiokidC_w4)
. recode H4HR9D (2=1)(3=1)(4=1)(5=1)(else=0), generate (nonbiokidD_w4)
. recode H4HR9E (2=1)(3=1)(4=1)(5=1)(else=0), generate (nonbiokidE_w4)
. recode H4HR9F (2=1)(3=1)(5=1)(else=0), generate (nonbiokidF_w4)
. recode H4HR9G (3=1)(5=1)(else=0), generate (nonbiokidG_w4)
. recode H4HR9H (3=1)(5=1)(else=0), generate (nonbiokidH_w4)
. generate nonbiokidTOT_w4= nonbiokidA_w4 + nonbiokidB_w4 + nonbiokidC_w4 + nonbiokidD_w4 + nonbiokidE_w4 + nonbiokidF_w4 + nonbiokidG_w4 + nonbiokidH_w4
. replace nonbiokidTOT_w4 = 1 if nonbiokidTOT_w4>=1
. label define nonbiokidTOT_w4 0 "no adopted, foster, or step kids in house" 1 "1 or more adopted, foster, or step kids in house"
. label values nonbiokidTOT_w4 nonbiokidTOT_w4

. clonevar Parentstatus_w4= Anylivebirth_w4
. label define Parentstatus_w4 0 "not a parent or currently pregnant" 1 "parent or currently pregnant"
. label values Parentstatus_w4 Parentstatus_w4
. replace Parentstatus_w4 = 1 if nonbiokidTOT_w4>=1
. replace Parentstatus_w4 = 1 if biokidTOT_w4>=1
. replace Parentstatus_w4 = 1 if H4TR7==1

**Note: H4TR7 asks females respondents if they are currently pregnant.

. label define Parentstatus_w4 0 "not a parent or currently pregnant" 1 "parent or currently pregnant" 98 "don't know", replace
. recode Parentstatus_w4 (97=96) if H4TR9==96
. recode Parentstatus_w4 (97=99) if H4TR9==98
. label define Parentstatus_w4 0 "not a parent or currently pregnant" 1 "parent or currently pregnant" 96 "unknown due to refusal to report # pregnancies" 98 "don't know # of live births" 99 "unknown due to unknown # pregn & skip pattern", replace
. recode Parentstatus_w4 (299=1) if Parentstatus_w3==1

. label define Parentstatus_w4 0 "not a parent or currently pregnant" 1 "parent or currently pregnant" 96 "unknown due to refusal to report # pregnancies" 98 "don't know # of live births" 99 "unknown due to unknown # pregn & skip pattern" 599 "missing due to no Wave 4 interv.", replace
. recode Parentstatus_w4v (599=299)
. label define Parentstatus_w4 0 "not a parent or currently pregnant" 1 "parent or currently pregnant" 96 "unknown due to refusal to report # pregnancies" 98 "don't know # of live births" 99 "unknown due to unknown # preg & skip pattern" 299 "missing due to no Wave 4 interv." 599 "missing", replace

Union status at Wave 3

. clonevar Relstatus_w3= H3TR1
. label define Relstatus_w3 0 "NO, rel is not current" 1 "YES, rel is current" 6 "refused" 8 "don't know" 9 "not applicable"
. label values Relstatus_w3 Relstatus_w3

. clonevar CohabRel_w3= H3TR11
. label define CohabRel_w3 0 "never lived together" 1 "live together now" 2 "lived together in past, but not now" 6 "refused" 8 "don't know" 9 "not applicable"
. label values CohabRel_w3 CohabRel_w3

. clonevar MarriedRel_w3 0 "Never been married" 1 "Currently married" 2 "Married in past, but not now" 6 "refuse" 8 "don't know" 9 "not applicable"
. label values MarriedRel_w3 MarriedRel_w3

. recode Relstatus_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if CohabRel_w3==1
. recode Relstatus_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if MarriedRel_w3==1
. drop H3TR12 CohabRel_w3 MarriedRel_w3
. reshape wide Relstatus_w3, i(aid) j(rrelno)

. replace Relstatus_w3 = 1 if Relstatus_w32==1
. replace Relstatus_w3 = 1 if Relstatus_w33 ==1
. replace Relstatus_w3 = 1 if Relstatus_w34 ==1
. replace Relstatus_w3 = 1 if Relstatus_w35 ==1
. replace Relstatus_w3 = 1 if Relstatus_w36 ==1
. replace Relstatus_w3 = 1 if Relstatus_w37 ==1
. replace Relstatus_w3 = 1 if Relstatus_w38 ==1
. replace Relstatus_w3 = 1 if Relstatus_w39 ==1
. replace Relstatus_w3 = 1 if Relstatus_w310 ==1
. replace Relstatus_w3 = 1 if Relstatus_w311 ==1
. replace Relstatus_w3 = 1 if Relstatus_w312 ==1
. replace Relstatus_w3 = 1 if Relstatus_w313 ==1
. replace Relstatus_w3 = 1 if Relstatus_w314 ==1
. replace Relstatus_w3 = 1 if Relstatus_w315 ==1
. replace Relstatus_w3 = 1 if Relstatus_w316 ==1
. replace Relstatus_w3 = 1 if Relstatus_w317 ==1
. replace Relstatus_w3 = 1 if Relstatus_w318 ==1
. replace Relstatus_w3 = 1 if Relstatus_w319 ==1
. replace Relstatus_w3 = 1 if Relstatus_w320 ==1
. replace Relstatus_w3 = 1 if Relstatus_w321 ==1
. replace Relstatus_w3 = 1 if Relstatus_w322 ==1
. replace Relstatus_w3 = 1 if Relstatus_w323 ==1
. replace Relstatus_w3 = 1 if Relstatus_w324 ==1
. replace Relstatus_w3 = 1 if Relstatus_w325 ==1
. replace Relstatus_w3 = 1 if Relstatus_w326 ==1
. replace Relstatus_w3 = 1 if Relstatus_w327 ==1
. replace Relstatus_w3 = 1 if Relstatus_w328 ==1
. replace Relstatus_w3 = 1 if Relstatus_w329 ==1
. replace Relstatus_w3 = 1 if Relstatus_w330 ==1
. replace Relstatus_w3 = 1 if Relstatus_w331 ==1
. replace Relstatus_w3 = 1 if Relstatus_w332 ==1
. replace Relstatus_w3 = 1 if Relstatus_w333 ==1
. replace Relstatus_w3 = 1 if Relstatus_w334 ==1
. replace Relstatus_w3 = 1 if Relstatus_w335 ==1
. replace Relstatus_w3 = 1 if Relstatus_w336 ==1
. replace Relstatus_w3 = 1 if Relstatus_w337 ==1
. replace Relstatus_w3 = 1 if Relstatus_w338 ==1
. replace Relstatus_w3 = 1 if Relstatus_w339 ==1
. replace Relstatus_w3 = 1 if Relstatus_w340 ==1
. replace Relstatus_w3 = 1 if Relstatus_w341 ==1
. replace Relstatus_w3 = 1 if Relstatus_w342 ==1
. label define Relstatus_w3 0 "not currently in relationship" 1 "currently in relationship" 6 "refused" 8 "don't know" 9 "not applicable"
. label values Relstatus_w3 Relstatus_w3

**Merge file with main dataset

**The following commands recodes respondents if they indicated they were currently married or in a marriage-like relationship (as reported in Marriage and Cohabitation Section)

. recode Relstatus_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if H3MR3_A==1
. recode Relstatus_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if H3MR3_B==1
. recode Relstatus_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if H3MR3_C==1
. recode Relstatus_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if H3MR13_A==1
. recode Relstatus_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if H3MR13_B==1
. recode Relstatus_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if H3MR13_C==1
. recode Relstatus_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if H3MR13_D==1
. recode Relstatus_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if H3MR13_E==1
. recode Relstatus_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if H3MR13_F==1
. recode Relstatus_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if H3MR13_G==1
. recode Relstatus_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if H3MR13_I==1
. recode Relstatus_w3 (0=1)(6=1)(8=1)(9=1)(.=1) if H3MR13_J==1
. clonevar num_marr_w3=H3MR1
. replace Relstatus_w3 = 0 if num_marr_w3==0

. label define Relstatus_w3 0 "not currently in relationship" 1 "currently in relationship" 6 "refused" 8 "don't know" 9 "not applicable" 599 "missing due to no Wave 3 interv.", replace
. recode Relstatus_w3 (599=299)

. label define Relstatus_w3 0 "not currently in relationship" 1 "currently in relationship" 6 "refused" 8 "don't know" 9 "not applicable" 299 "missing due to waves 3 and 4 data collection“, replace

. recode Relstatus_w3 (299=599)

. label define Relstatus_w3 0 "not currently in relationship" 1 "currently in relationship" 6 "refused" 8 "don't know" 9 "not applicable" 599 "missing due to no Wave 3 interv.", replace
. recode Relstatus_w3 (599=299)

. label define Relstatus_w3 0 "not currently in relationship" 1 "currently in relationship" 6 "refused" 8 "don't know" 9 "not applicable" 299 "missing due to waves 3 and 4 data collection", replace

. recode Relstatus_w3 (299=599)
applicable" 299 "missing due to no Wave 3 interv." 599 "missing", replace

**Union status at Wave 4**

- `clonevar Reltype_w4= H4TR13`
- `recode Reltype_w4 (1=0)(2=0)(3=0)(4=1)(5=0)`
- `label define Reltype_w4 0 "not in a current DATING specific relationship" 1 "currently dating"`
- `label values Reltype_w4`
- `recode H4TR14 (0=0)(1=1)(6=6)(7=0)(8=0), generate(H4TR14_rec)`
- `label define H4TR14_rec 0 "no, marriage, cohab, romantic relationship is not current" 1 "relationship is current" 6 "refused" 8 "don't know"`
- `label values H4TR14_rec`
- `generate Relstatus_w4= Reltype_w4+ H4TR14_rec`
- `label define Relstatus_w4 0 "not currently in any kind of relationship" 1 "currently in relationship" 6 "refused to report on status of relationship"`
- `label values Relstatus_w4`
- `reshape wide Relstatus_w4 , i(aid) j(PTNR_ID)`
- `mvencode Relstatus_w41 Relstatus_w42 Relstatus_w43 Relstatus_w44 Relstatus_w45 Relstatus_w46 Relstatus_w47 Relstatus_w48 Relstatus_w49 Relstatus_w410 Relstatus_w411 Relstatus_w412 Relstatus_w413 Relstatus_w414 Relstatus_w415 Relstatus_w416 Relstatus_w417 Relstatus_w418 Relstatus_w419 Relstatus_w420 Relstatus_w421 Relstatus_w422 Relstatus_w423 Relstatus_w425 Relstatus_w426 Relstatus_w427, mv(0) override`
- `generate Relstatus_w4= Relstatus_w41+ Relstatus_w42+ Relstatus_w43+ Relstatus_w44+ Relstatus_w45+ Relstatus_w46+ Relstatus_w47+ Relstatus_w48+ Relstatus_w49+ Relstatus_w410+ Relstatus_w411+ Relstatus_w412+ Relstatus_w413+ Relstatus_w414+ Relstatus_w415+ Relstatus_w416+ Relstatus_w417+ Relstatus_w418+ Relstatus_w419+ Relstatus_w420+ Relstatus_w421+ Relstatus_w422+ Relstatus_w423+ Relstatus_w424+ Relstatus_w425+ Relstatus_w426+ Relstatus_w427`
- `replace Relstatus_w4 = 1 if Relstatus_w4>=2 & Relstatus_w4<7`
- `label values Relstatus_w4`
- `replace Relstatus_w4 = 1 if Relstatus_w41==1`
- `replace Relstatus_w4 = 1 if Relstatus_w42==1`
- `replace Relstatus_w4 = 1 if Relstatus_w43==1`
- `replace Relstatus_w4 = 1 if Relstatus_w44==1`
- `replace Relstatus_w4 = 1 if Relstatus_w45==1`
- `replace Relstatus_w4 = 1 if Relstatus_w46==1`
- `replace Relstatus_w4 = 1 if Relstatus_w47==1`
- `replace Relstatus_w4 = 1 if Relstatus_w48==1`
- `replace Relstatus_w4 = 1 if Relstatus_w49==1`
replace Relstatus_w4  = 1 if Relstatus_w410==1
replace Relstatus_w4  = 1 if Relstatus_w411==1
replace Relstatus_w4  = 1 if Relstatus_w412==1
replace Relstatus_w4  = 1 if Relstatus_w413==1
replace Relstatus_w4  = 1 if Relstatus_w414==1
replace Relstatus_w4  = 1 if Relstatus_w415==1
replace Relstatus_w4  = 1 if Relstatus_w416==1
replace Relstatus_w4  = 1 if Relstatus_w417==1
replace Relstatus_w4  = 1 if Relstatus_w418==1
replace Relstatus_w4  = 1 if Relstatus_w419==1
replace Relstatus_w4  = 1 if Relstatus_w420==1
replace Relstatus_w4  = 1 if Relstatus_w421==1
replace Relstatus_w4  = 1 if Relstatus_w422==1
replace Relstatus_w4  = 1 if Relstatus_w423==1
replace Relstatus_w4  = 1 if Relstatus_w424==1
replace Relstatus_w4  = 1 if Relstatus_w425==1
replace Relstatus_w4  = 1 if Relstatus_w426==1
replace Relstatus_w4  = 1 if Relstatus_w427==1

label define Relstatus_w4 0 "not currently in any kind of relationship" 1 "currently in relationship" 6 "refused to report on status of relationship" 12 "refused to report relationship status" 18 "refused to report relationship status", replace

***Merge with main dataset

***The following code fixes some of the values that are still "missing" or blank after merging. It codes relationship status as 0 (not in a relationship) if the person answered "No" to questions about the different types of relationships they may have had.

replace Relstatus_w4 = 0 if H4TR1==0 & H4TR2==0 & H4TR3==0 & H4TR4==0 & H4TR5==0 & H4TR6==0
replace Relstatus_w4 = 96 if H4TR1==0 & H4TR2==96 & H4TR3==96 & H4TR5==996 & H4TR6==996

label define Relstatus_w4 0 "not currently in any kind of relationship" 1 "currently in relationship" 6 "refused to report on status of relationship" 12 "refused to report relationship status" 18 "refused to report relationship status" 96 "unknown due to refusal to report rel info & skip pattern", replace
replace Relstatus_w4 = 6 if H4TR1==6 & H4TR2==96 & H4TR3==96 & H4TR5==996 & H4TR6==996

Adolescent Report of Parental Differential Treatment

recode H1W$5A (1=1)(2=1)(3=0)(4=1)(5=1)(6=6)(96=7)(97=97)(98=8)(99=6), generate(Diff_SibA)
label define Diff_SibA 1 "Presence of differential tx" 0 "Absence of differential tx" 6 "not applicable" 7 "refused" 8 "don't know" 97 "legit skip"
label values Diff_SibA Diff_SibA

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. recode H1WS5B
(1=1)(2=1)(3=0)(4=1)(5=1)(6=6)(96=7)(97=97)(98=8)(99=6),
generate(Diff_SibB)
. label define Diff_SibB 1 "Presence of differential tx" 0 "Absence of
differential tx" 6 "not applicable" 7 "refused" 8 "don't know" 97
"legit skip"
. label values Diff_SibB Diff_SibB

. recode H1WS5C
(1=1)(2=1)(3=0)(4=1)(5=1)(6=6)(96=7)(97=97)(98=8)(99=6),
generate(Diff_SibC)
. label define Diff_SibC 1 "Presence of differential tx" 0 "Absence of
differential tx" 6 "not applicable" 7 "refused" 8 "don't know" 97
"legit skip"
. label values Diff_SibC Diff_SibC

. recode H1WS5D
(1=1)(2=1)(3=0)(4=1)(5=1)(6=6)(96=7)(97=97)(98=8)(99=6),
generate(Diff_SibD)
. label define Diff_SibD 1 "Presence of differential tx" 0 "Absence of
differential tx" 6 "not applicable" 7 "refused" 8 "don't know" 97
"legit skip"
. label values Diff_SibD Diff_SibD

. clonevar Diff_SibFIN= Diff_SibA
. replace Diff_SibFIN = Diff_SibB if studsibb==1 & studsiba==0
. replace Diff_SibFIN = Diff_SibC if studsibc==1 & studsibb==0 &
studsiba==0
. replace Diff_SibFIN = Diff_SibD if studsibd==1 & studsibb==0 &
studsiba==0 & studsibc==0

. rename (Diff_SibFIN) (AnyDiff)

**Sibling Relationship Quality**

. recode H1WS1A (1=4)(2=3)(3=2)(4=1)(6=7)(7=97)(8=8)(9=6),
generate(Time_SibA)
. label define Time_SibA 4 "a lot" 3 "some" 2 "little" 1 "none" 7
"refused" 97 "legit skip" 8 "don't know" 6 "not applicable"
. label values Time_SibA Time_SibA

. recode H1WS2A (1=4)(2=3)(3=2)(4=1)(6=7)(7=97)(8=8)(9=6),
generate(Friend_SibA)
. label define Friend_SibA 4 "a lot" 3 "some" 2 "little" 1 "none" 7
"refused" 97 "legit skip" 8 "don't know" 6 "not applicable"
. label values Friend_SibA Friend_SibA

. recode H1WS3A (1=1)(2=2)(3=3)(4=4)(5=5)(6=7)(7=97)(8=8)(9=6),
generate(Fight_SibA)
. label define Fight_SibA 5 "never" 4 "seldom" 3 "sometimes" 2 "often" 1 "very often" 7 "refused" 97 "legit skip" 8 "don't know" 6 "not applicable"
. label values Fight_SibA Fight_SibA

. recode H1WS4A (1=5) (2=4) (3=3) (4=2) (5=1) (6=7) (7=97) (8=8) (9=6),
generate(Love_SibA)
. label define Love_SibA 5 "very often" 4 "often" 3 "sometimes" 2 "seldom" 1 "never" 7 "refused" 97 "legit skip" 8 "don't know" 6 "not applicable"
. label values Love_SibA Love_SibA

. recode H1WS1B (1=4) (2=3) (3=2) (4=1) (6=7) (7=97) (8=8) (9=6),
generate(Time_SibB)
. label define Time_SibB 4 "a lot" 3 "some" 2 "little" 1 "none" 7 "refused" 97 "legit skip" 8 "don't know" 6 "not applicable"
. label values Time_SibB Time_SibB

. recode H1WS2B (1=4) (2=3) (3=2) (4=1) (6=7) (7=97) (8=8) (9=6),
generate(Friend_SibB)
. label define Friend_SibB 4 "a lot" 3 "some" 2 "little" 1 "none" 7 "refused" 97 "legit skip" 8 "don't know" 6 "not applicable"
. label values Friend_SibB Friend_SibB

. recode H1WS3B (1=1) (2=2) (3=3) (4=4) (5=5) (6=7) (7=97) (8=8) (9=6),
generate(Fight_SibB)
. label define Fight_SibB 5 "never" 4 "seldom" 3 "sometimes" 2 "often" 1 "very often" 7 "refused" 97 "legit skip" 8 "don't know" 6 "not applicable"
. label values Fight_SibB Fight_SibB

. recode H1WS4B (1=5) (2=4) (3=3) (4=2) (5=1) (6=7) (7=97) (8=8) (9=6),
generate(Love_SibB)
. label define Love_SibB 5 "very often" 4 "often" 3 "sometimes" 2 "seldom" 1 "never" 7 "refused" 97 "legit skip" 8 "don't know" 6 "not applicable"
. label values Love_SibB Love_SibB

. recode H1WS1C (1=4) (2=3) (3=2) (4=1) (6=7) (7=97) (8=8) (9=6),
generate(Time_SibC)
. label define Time_SibC 4 "a lot" 3 "some" 2 "little" 1 "none" 7 "refused" 97 "legit skip" 8 "don't know" 6 "not applicable"
. label values Time_SibC Time_SibC

. recode H1WS2C (1=4) (2=3) (3=2) (4=1) (6=7) (7=97) (8=8) (9=6),
generate(Friend_SibC)
. label define Friend_SibC 4 "a lot" 3 "some" 2 "little" 1 "none" 7 "refused" 97 "legit skip" 8 "don't know" 6 "not applicable"
. label values Friend_SibC Friend_SibC

. recode H1WS3C (1=1) (2=2) (3=3) (4=4) (5=5) (6=7) (7=97) (8=8) (9=6),
generate(Fight_SibC)
. label define Fight_SibC 5 "never" 4 "seldom" 3 "sometimes" 2 "often" 1 "very often" 7 "refused" 97 "legit skip" 8 "don't know" 6 "not applicable"
. label values Fight_SibC Fight_SibC
. recode H1WS4C (1=5)(2=4)(3=3)(4=2)(5=1)(6=7)(7=97)(8=8)(9=6), generate(Love_SibC)
. label define Love_SibC 5 "very often" 4 "often" 3 "sometimes" 2 "seldom" 1 "never" 7 "refused" 97 "legit skip" 8 "don't know" 6 "not applicable"
. label values Love_SibC Love_SibC
. recode H1WS1D (1=4)(2=3)(3=2)(4=1)(6=7)(7=97)(8=8)(9=6), generate(Time_SibD)
. label define Time_SibD 4 "a lot" 3 "some" 2 "little" 1 "none" 7 "refused" 97 "legit skip" 8 "don't know" 6 "not applicable"
. label values Time_SibD Time_SibD
. recode H1WS2C (1=4)(2=3)(3=2)(4=1)(6=7)(7=97)(8=8)(9=6), generate(Friend_SibD)
. label define Friend_SibD 4 "a lot" 3 "some" 2 "little" 1 "none" 7 "refused" 97 "legit skip" 8 "don't know" 6 "not applicable"
. label values Friend_SibD Friend_SibD
. recode H1WS3D (1=1)(2=2)(3=3)(4=4)(5=5)(6=7)(7=97)(8=8)(9=6), generate(Fight_SibD)
. label define Fight_SibD 5 "never" 4 "seldom" 3 "sometimes" 2 "often" 1 "very often" 7 "refused" 97 "legit skip" 8 "don't know" 6 "not applicable"
. label values Fight_SibD Fight_SibD
. recode H1WS4D (1=5)(2=4)(3=3)(4=2)(5=1)(6=7)(7=97)(8=8)(9=6), generate(Love_SibD)
. label define Love_SibD 5 "very often" 4 "often" 3 "sometimes" 2 "seldom" 1 "never" 7 "refused" 97 "legit skip" 8 "don't know" 6 "not applicable"
. label values Love_SibD Love_SibD
. clonevar Time_SibFIN= Time_SibA
. clonevar Friend_SibFIN= Friend_SibA
. clonevar Fight_SibFIN= Fight_SibA
. clonevar Love_SibFIN= Love_SibA
. replace Time_SibFIN = Time_SibB if studsibb==1 & studsiba==0
. replace Time_SibFIN = Time_SibC if studsibc==1 & studsibb==0 & studsiba==0
. replace Time_SibFIN = Time_SibD if studsibd==1 & studsibc==0 & studsiba==0 & studsibb==0
. replace Friend_SibFIN = Friend_SibB if studsibb==1 & studsiba==0
. replace Friend_SibFIN = Friend_SibC if studsibc==1 & studsibb==0 & studsiba==0
. replace Friend_SibFIN = Friend_SibD if studsibd==1 & studsibc==0 & studsiba==0 & studsibb==0
. replace Fight_SibFIN = Fight_SibB if studsibb==1 & studsiba==0
. replace Fight_SibFIN = Fight_SibC if studsibc==1 & studsibbb==0 & studsiba==0
. replace Fight_SibFIN = Fight_SibD if studsibd==1 & studsibbb==0 & studsiba==0 & studsibc==0

. replace Love_SibFIN = Love_SibB if studsibc==0 & studsibb==1 & studsiba==0
. replace Love_SibFIN = Love_SibC if studsibc==1 & studsibb==0 & studsiba==0
. replace Love_SibFIN = Love_SibD if studsibd==1 & studsibb==0 & studsiba==0 & studsibc==0

. generate Qual_SibFIN=Time_SibFIN+Friend_SibFIN+Fight_SibFIN+Love_SibFIN

***The older sibling in the pair is designated "1" and younger sib in pair is designated "2". If siblings are twins, they were randomly assigned 1 or 2***

. label define gender_constellation 1 "older bro + younger sis" 2 "older sis + younger bro" 3 "two sis" 4 "two bro"
. label values genderCONST gender_constellation

. recode genderCONST (3=1)(else=0), generate(genderConst_GIRLS_dc)
. recode genderCONST (4=1)(else=0), generate(genderConst_BOYS_dc)
. recode genderCONST (1=1)(4=1)(else=0), generate(genderConstMIXED_dc)
Sample filters

. generate SMPJC_new=1 if GSWGT1!=.  
. recode SMPJC_new (1=0) if FAMID==.  
. label variable SMPJC_new "initial sample"

. clonevar SMPJC_f2year= SMPJC_new  
. recode SMPJC_f2year (1=0) if H1GI1Y==74  
. recode SMPJC_f2year (1=0) if H1GI1Y==75  
. recode SMPJC_f2year (1=0) if H1GI1Y==76  
. label variable SMPJC_f2year "Filter out born before 77"

. clonevar SMPJC_f3alone= SMPJC_f2year  
. label variable SMPJC_f3alone "Filter out live alone or in institution"  
. recode SMPJC_f3alone (1=0) if H1WP1==7

. clonevar SMPJC_f4biomom= SMPJC_f3alone  
. recode SMPJC_f4biomom (1=0) if Par_relationship!=1  
. label variable SMPJC_f4biomom "Filter out no biomom"

. clonevar SMPJC_f5noweight= SMPJC_f4biomom  
. label variable SMPJC_f5noweight "Filter out no weight"  
. recode SMPJC_f5noweight (1=0) if GSWGT4==.

. clonevar SMPJC_f6sibrel= SMPJC_f5noweight  
. label variable SMPJC_f6sibrel "Filter out no sib relationship ques"  
. recode SMPJC_f6sibrel (1=0) if SMPJC_f5noweight==1&SibRelQualv2==0

. clonevar SMPJC_f7final= SMPJC_f6sibrel  
. label variable SMPJC_f7final_a "Filter out sibs of eliminated sibs"

. clonevar SMPJC_f7final_a= SMPJC_f7final  
. label variable SMPJC_f7final_a "Filter out dyads where race/ethnicity doesn’t match"

. clonevar SMPJC_f7final_a= smpjcf8  
. label variable smpjcf8 "Filter out sibs farther in age"

. generate twin_dummy_w1=.  
. replace twin_dummy_w1 = 0 if smpjcf8==1&sibtype==3  
. replace twin_dummy_w1 = 1 if smpjcf8==1&sibtype!=3
Preparation for univariate and bivariate analyses

. recode sibnum (1=1)(2=0), generate(SIB_1)
. recode sibnum (1=0)(2=1), generate(SIB_2)

. generate Depress_SIB_1 = DepressTOT_*SIB_1
. generate Depress_SIB_2 = DepressTOT_*SIB_2

. generate Relstatus_SIB_1 = Relstatus_*SIB_1
. generate Relstatus_SIB_2 = Relstatus_*SIB_2

. generate Parentstatus_SIB_1 = Parentstatus_*SIB_1
. generate Parentstatus_SIB_2 = Parentstatus_*SIB_2

. generate HHtype_dcSIB_1 = HHtype_dc*SIB_1
. generate HHtype_dcSIB_2 = HHtype_dc*SIB_2

. generate Relpow_SIB_2 = Relpow_0*SIB_2
. generate Relpow_SIB_1 = Relpow_0*SIB_1

. generate twin_dummySIB_1 = twin_dummy_0*SIB_1
. generate twin_dummySIB_2 = twin_dummy_0*SIB_2

. generate biosex_SIB_1 = biosex_w1_j_0*SIB_1
. generate biosex_SIB_2 = biosex_w1_j_0*SIB_2

. generate A_ageCSIB_1= A_ageC*SIB_1
. generate A_ageCSIB_2= A_ageC*SIB_2

. generate College_edSIB_2 = College_educ_w4*SIB_2
. generate College_edSIB_1 = College_educ_w4*SIB_1

. generate Par_ageCSIB_2 = Par_ageC*SIB_2
. generate Par_ageCSIB_1 = Par_ageC*SIB_1

. generate ParentED_SIB_1 = ParentED_rec1_0*SIB_1
. generate ParentED_SIB_2 = ParentED_rec1_0*SIB_2

. generate RACE_other_dcS1 = RACE_other_dc*SIB_1
. generate RACE_other_dcS2 = RACE_other_dc*SIB_2
. generate RACE_blAA_dcS1 = RACE_blAA_dc*SIB_1
. generate RACE_blAA_dcS2 = RACE_blAA_dc*SIB_2
. generate RACE_Hisp_dcS2 = RACE_Hisp_dc*SIB_2
. generate RACE_Hisp_dcS1 = RACE_Hisp_dc*SIB_1
. generate RACE_Hisp_dcS2 = RACE_Hisp_dc*SIB_2

. generate PARRACE_other_dcS1 = PARRACE_other_dc*SIB_1
. generate PARRACE_other_dcS2 = PARRACE_other_dc*SIB_2
. generate PARRACE_blAA_dcS2 = PARRACE_blAA_dc*SIB_2
. generate PARRACE_blAA_dcS1 = PARRACE_blAA_dc*SIB_1
. generate PARRACE_Hisp_dcS1 = PARRACE_Hisp_dc*SIB_1
. generate PARRACE_Hisp_dcS2 = PARRACE_Hisp_dc*SIB_2
generate genderConst_GIRLS_dcS2 = genderConst_GIRLS_dc * SIB_2
generate genderConst_GIRLS_dcS1 = genderConst_GIRLS_dc * SIB_1
generate genderConst_BOYS_dcS1 = genderConst_BOYS_dc * SIB_1
generate genderConst_BOYS_dcS2 = genderConst_BOYS_dc * SIB_2
generate genderConstMIXED_dcS2 = genderMIXED.dc * SIB_2
generate genderConstMIXED_dcS1 = genderMIXED.dc * SIB_1

generate Pubert_S1 = Pubert.Stat_w1_f7FIN*SIB_1
generate Pubert_S2 = Pubert.Stat_w1_f7FIN*SIB_2

generate Num_transit_S1 = Num_transit_0*SIB_1
generate Num_transit_S2 = Num_transit_0*SIB_2

generate AutTOTALSIB_1 = AutTOTAL_0 * SIB_1
generate AutTOTALSIB_2 = AutTOTAL_0 * SIB_2

generate MomconnectSIB_1 = Momconnect_0*SIB_1
generate MomconnectSIB_2 = Momconnect_0*SIB_2

generate DadconnectSIB_1 = Dadconnect_0*SIB_1
generate DadconnectSIB_2 = Dadconnect_0*SIB_2

generate Qual_Sibfin_CSIB_1 = Qual_Sibfin_C*SIB_1
generate Qual_Sibfin_CSIB_2 = Qual_Sibfin_C*SIB_2

generate ICCSIB_1 = ICC_0 * SIB_1
generate ICCSIB_2 = ICC_0 * SIB_2

generate Par_RelatTOT_CSIB_1 = Par_RelatTOT_C*SIB_1
generate Par_RelatTOT_CSIB_2 = Par_RelatTOT_C*SIB_2

generate AnyDif_SIB_1 = AnyDif_0f * SIB_1
generate AnyDif_SIB_2 = AnyDif_0f * SIB_2
Unweighted descriptive statistics:

***Wave 1

. tab1 RACE_0, subpop(smpjcf8)
. tab1 HHtype_0 biosex_w1_j_0 Relpov_0 ParentED_rec1 Par_race_0
twin_dummy_0 College_educ_w4 Relstatus_ Any_Dif_0f, subpop(SIB_1)

. summarize DepressTOT_ w1age_0 problem_drink_ AutTOTAL_0 Momconnect_0
  Dadconnect_0 Qual_SibFIN_0 Parge_age_0 Parentrelations_TOT_0 ICC_0
  Num_transit_0 if SIB_1==1

. tab1 HHtype_0 biosex_w1_j_0 Relpov_0 ParentED_rec1 Par_race_0
twin_dummy_0 College_educ_w4 Relstatus_ Any_Dif_0f, subpop(SIB_2)

. summarize DepressTOT_ w1age_0 problem_drink_ AutTOTAL_0 Momconnect_0
  Dadconnect_0 Qual_SibFIN_0 Parge_age_0 Parentrelations_TOT_0 ICC_0
  Num_transit_0 if SIB_2==1

***Wave 3

. tab1 Relstatus_ Parentstatus_, subpop(SIB_1)
. tab1 Relstatus_ Parentstatus_, subpop(SIB_2)

. summarize DepressTOT_ problem_drink_ if SIB_1==1
. summarize DepressTOT_ problem_drink_ if SIB_2==1
Weighted descriptive statistics:

. svyset PSUSCID [pweight=GSWGT4], strata(REGION) vce(linearized)
singleunit(missing)

**Wave 1

. svy linearized, subpop(smpjc8): tabulate RACE_0, cell count percent
. svy linearized, subpop(SIB_1): tabulate HHtype_0, cell count percent
. svy linearized, subpop(SIB_1): tabulate biosex_w1_j_0, cell count percent
. svy linearized, subpop(SIB_1): tabulate ParentED_rec1_0, cell count percent
. svy linearized, subpop(SIB_1): tabulate College_educ_w4, cell count percent
. svy linearized, subpop(SIB_1): tabulate Relstatus_, cell count percent
. svy linearized, subpop(SIB_1): tabulate AnyDif_0f, cell count percent
. svy linearized, subpop(SIB_1): tabulate genderCONST, cell count percent

. svy linearized: mean DepressTOT_problem_drink_AutTOTAL_0
Momconnect_0 Dadconnect_0 Qual_SibFIN_0 Par_age_0 Parentrelations_TOT_0
ICC_0 Num_transit_0 Pubert_stat_w1_f7FIN_wlge_0, over(SIB_1)
. svy linearized, subpop(SIB_2): tabulate Relstatus_, cell count percent
. svy linearized, subpop(SIB_2): tabulate College_educ_w4, cell count percent
. svy linearized, subpop(SIB_2): tabulate AnyDif_0f, cell count percent
. svy linearized, subpop(SIB_2): tabulate biosex_w1_j_0, cell count percent

**Wave 3

. svy linearized, subpop(SIB_1): tabulate Relstatus_, cell count percent
. svy linearized, subpop(SIB_2): tabulate Relstatus_, cell count percent
. svy linearized, subpop(SIB_1): tabulate Parentstatus_, cell count percent
. svy linearized, subpop(SIB_2): tabulate Parentstatus_, cell count percent
. svy linearized: mean DepressTOT_problem_drink_, over(SIB_1)
Appendix B: Weight Selection and Scaling
Multilevel modeling permits the modeling of variance within and between clusters (Carle, 2009). In order to appropriately employ this data analytic strategy with survey data, it is necessary to specify weights for each level of sampling. Thus, appropriate modeling of the AddHealth data requires the knowledge of both school-level weights and individual-level weights. While these weights are appropriate for estimating models predicting outcomes for unrelated individuals, it is the goal of the present study to predict the behavior of sibling within dyads. The ideal weight would adjust for clustering and the unequal probability of selection of both siblings. The AddHealth project staff provides a guide for calculating pair weights (Chantala, 2001). However, the formula for the calculation, which is based on the use of Grand Sample Weights, is only applicable for determining pair weights for a single-level model. Thus, it was necessary to select the school and individual of one sibling in the dyad to apply to both siblings. Chantala (2001) provides recommendations that were utilized in the decision to use the weights for the older sibling. First, it is important to note that siblings could be enrolled in different schools (Chantala, 2001). For example, the older sibling could be attending the high school, while the younger sibling was enrolled in the associated feeder school. Chantala (2001) recommends the reassignment of the paired individual in the feeder school to the primary sampling unit associated with the high school. Thus, if the younger sibling attended a feeder school, he or she was reassigned to the primary sampling unit of the older sibling and the associated high school weight. Following from this, the individual weight for the older sibling will also be used for the younger sibling.
After determining dyad weights, it was necessary to scale the raw school and individual level weights for inclusion in the multilevel equation. Failure to scale the weights can bias the parameters, standard errors, and variance, particularly when cluster sizes are small (Carle, 2009; Rabe – Hesketh & Skrondal, 2006). While there are several methods for scaling weights, Chantala & Suchindran (2006) recommend the use of PWIGLS Method 2 for use with the AddHealth data. The program code for this method is as follows:

```
pwigls, psu_id(PSUSCID) fsu_id(FAMID) psu_wt(SCHWT1) fsu_wt(W4_WC) psu_m2wt(method_2_level_2_adjust) fsu_m2wt(method_2_level_1_weight)
```
Appendix C: Tables and Figures
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Table 1. Measures completed by respondents at each wave.
### Table 2. Example of coding for fictional respondents

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<td>17.28 (170)</td>
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Table 3. Unweighted sampling characteristics for excluded siblings and final sample

*Combination of two groups: ‘single mother + partner’ and ‘other’

*p < .0083
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Table 5. Descriptive statistics on problem drinking and depressive symptoms
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Table 6. Descriptive statistics on union status and parental status
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† Mother report
†† Adolescent report

Table 7. Descriptive statistics of time - constant variables
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†† Adolescent report
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*p < .05  **p < .01  ***p < .001
†† Adolescent report

Table 11. Intercorrelation matrix for Sibling 1 and Sibling 2 variables
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Table 12. Multilevel model results for unconditional and final models for Mother sample (significant Level 2 covariates only)
Table 12.

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<td>1.04(1.01-1.07)</td>
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<td>S1 Pubertal status</td>
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<td>1.10(.91-1.33)</td>
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ERR = event – rate ratio, CI = confidence interval
*p < .05 **p < .01 ***p < .001
Table 13. Multilevel model results for unconditional and final models for Father sample (significant Level 2 covariates only)
Table 13.

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<td>1.13(.91-1.41)</td>
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<td>.42(.28-.73)</td>
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<td>Other race</td>
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<td>.55(.27-1.09)</td>
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<tr>
<td>Both Girls</td>
<td>-.52(.20)**</td>
<td>.42(.28-.73)</td>
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<td>.46(.30-.75)</td>
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<td>1.10(.88-1.36)</td>
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<td>Black/AA</td>
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<td>Other race</td>
<td>-.73(.30)*</td>
<td>.55(.27-1.09)</td>
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<td>Both Girls</td>
<td>-.52(.20)**</td>
<td>.42(.28-.73)</td>
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<td>Older male</td>
<td>-.67(.22)**</td>
<td>.46(.30-.75)</td>
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<td>S2 Differential tx</td>
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<td>Intercept</td>
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<td>S1 Union status w3</td>
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<tr>
<td>S2 Union status w3</td>
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<td>.28(,13-59)</td>
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<td>.92(,86-99)</td>
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<td>S2 Pubertal status</td>
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<td>.88(,83-94)</td>
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<td>.95(,91-1.00)</td>
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<td>S1 Dad connection</td>
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<td>1.05(1.01-1.09)</td>
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<td>S2 Dad connection × Autonomy</td>
<td>.01(.004)</td>
<td>1.01(1.00-1.02)</td>
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<td>S2 Differential tx</td>
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<td>.53(,33-86)</td>
</tr>
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<td>Quadratic slope</td>
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<tr>
<td>Intercept</td>
<td>-.66(.04)***</td>
<td>.51(,47-.56)</td>
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<tr>
<td>S2 Pubertal status</td>
<td>.06(.02)**</td>
<td>1.06(1.02-1.09)</td>
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<td>1.43(1.10-1.88)</td>
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<td>.98(,96-1.00)</td>
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<td>1.34(1.05-1.72)</td>
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<table>
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<tr>
<th></th>
<th>Standard deviation (SD)</th>
<th>Variance component</th>
<th>Standard deviation (SD)</th>
<th>Variance component</th>
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<td>1.16***</td>
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<td>1.09</td>
<td>1.20****</td>
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<td>.06***</td>
<td>.23</td>
<td>.05***</td>
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ERR = event – rate ratio, CI = confidence interval
* p < .05  ** p < .01  *** p < .001  † p = .05
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<thead>
<tr>
<th>Fixed Effects</th>
<th>Father sample</th>
<th>Mother sample</th>
<th>Parent sample</th>
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<td>ERR (95% CI)</td>
<td>Coefficient (SE)</td>
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<td>Intercept</td>
<td>1.00(0.08)**</td>
<td>2.71(2.32-3.17)</td>
<td>.92(0.08)**</td>
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<td>Sibling indicator</td>
<td>-.04(.05)</td>
<td>.96(.88-1.05)</td>
<td>-.03(.03)</td>
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<tr>
<td>Linear slope</td>
<td>1.42(0.18)**</td>
<td>4.13(2.89-5.89)</td>
<td>.19(.06)**</td>
</tr>
<tr>
<td>Quadratic slope</td>
<td>-.66(0.04)**</td>
<td>.52(.48-.56)</td>
<td>-.58(.07)**</td>
</tr>
<tr>
<td>Sib×Linear</td>
<td>-.09(0.03)**</td>
<td>.92(.87-.97)</td>
<td>-.09(.02)**</td>
</tr>
<tr>
<td>Sib×Quadratic</td>
<td>.07(0.04)</td>
<td>1.07(1.00-1.16)</td>
<td>.07(0.04)</td>
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<tr>
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<th>Variance component</th>
<th>Standard deviation (SD)</th>
<th>Variance component</th>
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<td>.81***</td>
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<td>1.01***</td>
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<td>Linear slope</td>
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<td>.18***</td>
<td>.69</td>
<td>.48***</td>
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<td>Quadratic slope</td>
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<td>.44***</td>
<td>.85</td>
<td>.72***</td>
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ERR = event – rate ratio  
CI = confidence interval  
*p < .05 **p < .01 ***p < .001

Table 14. Multilevel model results for test of differences between the average linear and quadratic slopes of Sibling 1 and Sibling 2 in Mother and Father samples
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<tr>
<th></th>
<th>Sibling 1 Model</th>
<th></th>
<th>Sibling 2 Model</th>
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<tr>
<td>Intercept</td>
<td></td>
<td></td>
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<tr>
<td>Intercept</td>
<td>.88(.19)****</td>
<td>2.42(1.79-3.26)</td>
<td>1.64(.18)****</td>
<td>5.14(3.60-7.33)</td>
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<tr>
<td>Black/AA</td>
<td>-.71(.17)****</td>
<td>.49(.34-.72)</td>
<td>-1.20(.23)****</td>
<td>.30(.19-.48)</td>
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<tr>
<td>Hispanic</td>
<td>ns</td>
<td>-.67(.25)**</td>
<td>-</td>
<td>.51(.32-.83)</td>
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<tr>
<td>Other</td>
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<td>.50(.26-.95)</td>
<td>-1.13(.42)****</td>
<td>.32(.14-.74)</td>
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<tr>
<td>Both Girls</td>
<td>ns</td>
<td>-</td>
<td>-.73(.18)****</td>
<td>.48(.34-.69)</td>
</tr>
<tr>
<td>Both Boys</td>
<td>ns</td>
<td>-</td>
<td>-.45(.19)*</td>
<td>1.57(1.07-2.30)</td>
</tr>
<tr>
<td>Older Male</td>
<td>ns</td>
<td>-</td>
<td>-.75(.21)****</td>
<td>.47(.32-.71)</td>
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<tr>
<td>S1 Puberty</td>
<td>.08(.02)**</td>
<td>1.08(1.03-1.13)</td>
<td>.07(.02)**</td>
<td>1.07(1.03-1.13)</td>
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<tr>
<td><strong>Linear slope</strong></td>
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<tr>
<td>Intercept</td>
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<td>1.51(1.21-1.90)</td>
<td>.44(.26)</td>
<td>1.55(1.93-2.57)</td>
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<td>Black/AA</td>
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<td>1.55(1.04-2.33)</td>
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<td>.65(43-.98)</td>
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<td>.91(.45)*</td>
<td>2.49(1.04-6.00)</td>
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<td>Older Male</td>
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<td>-.56(.18)****</td>
<td>1.76(1.24-2.48)</td>
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<td>S2 Age</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-1.12(.04)*</td>
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<td>S1 Parental status w4</td>
<td>-.33(.11)**</td>
<td>.72(.58-.89)</td>
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<tr>
<td>S2 Parental status w4</td>
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<td>-</td>
<td>-.38(11)**</td>
<td>.68(.55-.85)</td>
</tr>
<tr>
<td>S2 Depressive</td>
<td>-</td>
<td>-</td>
<td>-.04(02)**</td>
<td>.96(.93-.99)</td>
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<td>S1 College</td>
<td>-</td>
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<td>.31(12)*</td>
<td>1.36(1.07-1.73)</td>
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<td>Mother College</td>
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<td>-.23(11)*</td>
<td>.79(.63-.99)</td>
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<td>-.05(02)*</td>
<td>.95(.91-.99)</td>
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<td>-.01(.002)†</td>
<td>.99(.98-1.01)</td>
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<tr>
<td>S2 Autonomy</td>
<td>-.03(02)*</td>
<td>.97(.94-1.00)</td>
<td>-.05(02)**</td>
<td>.95(.92-.98)</td>
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<tr>
<td>Intercept</td>
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<td>.58(.41-.82)</td>
<td>-1.12(.16)****</td>
<td>.33(.24-.45)</td>
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<td>1.32(.96-1.81)</td>
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<td>ns</td>
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<td>.05(02)**</td>
<td>1.05(1.01-1.08)</td>
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<td>1.42****</td>
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<td>1.51**</td>
<td>1.19</td>
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<td><strong>ERR = event – rate ratio</strong></td>
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<td><strong>CI = confidence interval</strong></td>
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<td>*p &lt; .05 **p &lt; .01 ***p &lt; .001 †p = .05</td>
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Table 15. Multilevel model results for separate Sibling 1 and Sibling 2 final models in Mother sample (significant Level 2 covariates only)
### Table 16. Multilevel model results for separate Sibling 1 and Sibling 2 final models in Father sample (significant Level 2 covariates only)

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<td>1.14 (.19)</td>
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<td>Black/AA</td>
<td>-.61 (.22)**</td>
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<td>Other</td>
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<td>.38 (.21-.71)</td>
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<tr>
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<td>-</td>
</tr>
<tr>
<td>Both Boys</td>
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<td>-</td>
</tr>
<tr>
<td>Older Male</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>S1 Age</td>
<td>-.13 (.05)**</td>
<td>.88 (.80-.97)</td>
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<tr>
<td>S1 Pubertal status</td>
<td>.09 (.03)**</td>
<td>1.10 (1.05-1.15)</td>
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<tr>
<td>Linear slope</td>
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<tr>
<td>Intercept</td>
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<td>Other</td>
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<tr>
<td>Older Male</td>
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<td>-</td>
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<td>.71 (.53-.95)</td>
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<td>S1 Dad connection</td>
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<td>.09 (.03)**</td>
<td>1.10 (1.04-1.16)</td>
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<table>
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<tr>
<th>Random Effects</th>
<th>Standard deviation (SD)</th>
<th>Variance component</th>
<th>Standard deviation (SD)</th>
<th>Variance component</th>
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<td>Intercept</td>
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<td>1.32***</td>
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<td>Linear slope</td>
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<td>.64***</td>
<td>.85</td>
<td>.73***</td>
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<td>Quadratic slope</td>
<td>1.21</td>
<td>1.47***</td>
<td>.93</td>
<td>.86***</td>
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</tbody>
</table>

ERR = event–rate ratio  
CI = confidence interval  
*p < .05 **p < .01 ***p < .001 †p = .050 ††p = .051
Figure 1. Sibling 1 parental status at Wave III predicting the incidence rate of problem drinking
Figure 2. Sibling 1 parental status at Wave IV predicting the incidence rate of problem drinking
Figure 3. The interaction of Sibling 2’s report of autonomy and connectedness with father on the incidence rate of problem drinking.
Figure 4. The interaction of Sibling 1’s report of autonomy and connectedness with mother on the incidence rate of problem drinking
Figure 5. The relationship between Sibling 2’s report of differential treatment and the incidence rate of problem drinking.
Figure 6. The relationship between Sibling 2’s report of autonomy during adolescence and the incidence rate of Sibling 1’s problem drinking.