INTERGENERATIONAL TRANSMISSION OF ALCOHOL USE IN ADOLESCENTS: DRINKING MOTIVES AS A POTENTIAL MEDIATOR IN A CHILD WELFARE SAMPLE

by

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Abstract

The association between parent and offspring alcohol use is well supported. The present study extended previous research (Muller & Kuntsche, 2011; Van Damme et al., 2015) that found that drinking motives mediate this association in the general population by examining the pathway in a sample of severely maltreated child welfare-involved adolescents. The present study investigated whether the association between parental alcohol problems and adolescent alcohol use was mediated by the extent to which adolescents reported coping motives for drinking, and whether that mediation was moderated by the amount of time youth had spent in the care of child protective services.

Participants were 302 (58.3% female) Canadian youth aged 14-19 ($M$ 15.86, $SD$ 1.01) in the care of child welfare (28% had been in care for 10 years or more), part of the Maltreatment and Adolescent Pathways (MAP; See Wekerle, Leung, Goldstein, Thornton, & Tonmyr, 2009) longitudinal study. Participants completed measures assessing their current alcohol use (Alcohol Use Disorders Identification Test; AUDIT-C; Dawson, Grant, Stinson, & Zhou, 2005), coping motives for drinking (Drinking Motives Questionnaire, Revised; DMQ-R; Cooper, 1994), and mother and father alcohol problems (single alcoholism item, Short Michigan Alcohol Screening Test-Family; F-SMAST/M-SMAST; Crews & Sher,
1992). Models were tested using a path analytic framework with the PROCESS macro for SPSS (Hayes, 2013). Results were examined separately for three groups: (a) the full sample; (b) drinkers only; and (c) male and female drinkers.

The rate of alcohol use (55%) was low in the present sample relative to the norm. Results suggest that the association of fathers’ history of alcohol problems with offspring alcohol use is largely indirect, through coping motives, in youth who are in the care of child welfare ($b = .082$, 95% Bootstrapped CI [.024, .133], $\kappa^2 = .126$, full sample). When examined by gender, the mediation held for female, but not male, adolescent drinkers. Analyses did not provide evidence of moderation of the indirect effect by time in care, suggesting that the mediation by coping motives of the relationship between paternal alcohol problems and female adolescent alcohol use is not contingent on time spent in care.
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Chapter One: Introduction

Adolescent alcohol use is a risk factor for a variety of negative health and educational outcomes, including academic difficulties, school drop-out, violence, and alcohol abuse and dependence (for reviews see Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002; Perkins, 2002). Although patterns of alcohol use in Canada show a downward trend in youth alcohol consumption and prevalence of heavy episodic drinking (Ontario Student Drug Use and Health Survey, OSDUHS, Boak, Hamilton, Adlaf & Mann, 2013; Canadian Alcohol and Drug Use Monitoring Survey, CADUMS, Health Canada, 2012), youth drinking is still a significant public health concern. A provincial survey of over 10,000 students found that 49% of adolescents in grades 7 to 12 reported drinking alcohol in the past year (OSDUHS, 2013), and a national population survey by Health Canada found that the prevalence of drinking is still higher (70%) when the age bracket is shifted up (from high school) to ages 15-24 (CADUMS, 2012). Given that alcohol use problems have been found to increase between the ages of 18 and 22 (Casswell, Pledger, & Pratap, 2002), adolescence is a key age-group to focus on in terms of improving our understanding of the mechanisms that lead to hazardous alcohol use.

Hazardous alcohol use can be understood in a variety of ways, including frequency and typical quantity of consumption and frequency of binge drinking (consuming 5 or more drinks on one occasion). In order to quantify risk in consumption, the Canadian government has published guidelines for low-risk alcohol use (limit of 2 drinks for females and 3 drinks for males; Butt, Beirness, Gliksman, Paradis, & Stockwell, 2011). Although these guidelines
were developed for drinkers who have reached the legal drinking age, if these guidelines are applied to age ranges that span the legal age, young adults show more risky patterns of drinking than adults, with 24% of drinkers age 15-24 exceeding the low-risk drinking guidelines. In the high school population, rates of binge drinking (defined as consuming 5 or more drinks on a single occasion for boys and 4 or more drinks for girls) increase with grade level, reaching 39% among Grade 12 students (drinkers and nondrinkers) (OSDUHS, 2013). Measures of hazardous drinking assess higher levels of alcohol use and include symptoms of physiological dependence and experiences of harm related to alcohol use, such as the commonly used Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) developed by the World Health Organization. Scores of eight or more on the AUDIT are used to identify individuals who might meet criteria for an alcohol use disorder. Using this eight or more standard, about 16% of Ontario high school students, or 32% of past year drinkers, report hazardous drinking (OSDUHS, 2013). Hazardous drinking increases over the course of high school, peaking at 32% of students (drinkers and nondrinkers) in Grade 12 (OSDUHS, 2013). Rates of drinking do not differ significantly by gender in Ontario high schools, with males and females equally likely to report drinking, binge drinking, and hazardous drinking in the past month (OSDUHS, 2013). However, females are more likely than males to report concurrent distress (i.e., symptoms of anxiety and depression) and drinking (11% vs. 6%) (OSDUHS, 2013). Given these high rates of alcohol use among youth and the many consequences associated with drinking during this time period, it is important to identify factors that contribute to hazardous drinking in adolescence, including exposure to parental alcohol use, drinking to cope with negative affect, childhood maltreatment, and possibly child welfare involvement.
The Relationship Between Parental Alcohol Use and Adolescent Alcohol Use

It is well established that parental alcohol use is a significant predictor of adolescent offspring alcohol use, with several studies confirming this relationship across multiple samples using both cross-sectional (Campbell & Oei, 2010b) and longitudinal study designs (Seljamo et al., 2006). The intergenerational transmission of alcohol problems is also well-supported, with parental alcohol problems significantly predicting the initiation and maintenance of problem drinking in adolescents, and a related tendency for alcohol problems to aggregate in families (see Campbell & Oei, 2010b; Hartman, Lessem, Hopfer, Crowley, & Stallings, 2006; White, Johnson, & Buyske, 2000 for reviews). For example, a review of studies estimated that family (shared environmental) factors accounted for 10% of the variance (Verhulst, Neale, & Kendler, 2015) in alcohol use disorders, while genetic factors accounted for 49% of the variance, and the influence of non-shared environmental factors varied widely by study. The next step in understanding this association is to illuminate the mechanisms through which alcohol use behaviours are transmitted. Answering the question of why adolescents drink is a critical step in both understanding the etiology of drinking behaviour and designing effective prevention and intervention programs (Stewart et al., 2005).

The well-established association between parent and adolescent alcohol use and problems is likely the product of both genetic and environmental factors. Although genetic factors are equally important in considering the intergenerational transmission of alcohol use and alcohol problems, the current study focuses on environmental factors and there is a specific focus on family influences. Ellis, Zucker, and Fitzgerald (1997) categorized risk factors in the family environment of offspring of alcoholics as either alcohol-specific or alcohol-nonspecific in terms of their selectiveness in predicting alcohol problems. Using
this framework, risk factors that are particular to alcohol problems include modeling of parental drinking behaviour and development of alcohol expectancies and motives for drinking. Family risk factors that are associated with diverse adverse outcomes, including mental health, physical, and behavioural, include childhood maltreatment (Edwards, Holden, Anda, & Felitti, 2003; Hager & Runtz, 2012; Kim & Cicchetti, 2010), inadequate parenting (Duncan et al., 2006), and parental and family psychopathology (Ellis et al., 1997; Jaffee, Moffitt, Caspi, and Taylor, 2003), with the associated disruptions in early parent-child relationships and development of coping and regulatory skills. Although multiple environmental mechanisms are likely at play in the development of hazardous alcohol use in adolescents, as these distal risk factors (e.g., early caregiving environment) are removed in time from the behaviour in question (adolescent drinking), opportunities for intervention may be sought beyond historical risk factors. A practical argument can be made for studying a more proximal pathway through which environmental influences are mediated, including motives for alcohol use, which may reflect a desire to regulate or cope with some of the negative emotions that arise due to childhood histories of maltreatment.

**Models of Alcohol Use**

Multiple theories have been proposed to explain alcohol use and its intergenerational transmission (see Armeli, Conner, Cullum, & Tennen, 2010; see also Greeley & Oei, 1999 for a review). Two frameworks particularly relevant to the present study are social learning theory (SLT, also known as Social Cognitive Theory; Bandura, 1977; Bandura, 1986; Bandura & Walters, 1963, as cited in Grusec, 1992) and the motivational model of alcohol use (Cox & Klinger, 1988; Kuntsche, Knibbe, Gmel, & Engels, 2005). These models overlap in that, according to Cox and Klinger’s (1988) motivational model of alcohol use, parental history of alcohol use would be one of the historical environmental factors in the
overall decisional framework of whether or not to drink. However, each model provides its own important contribution to understanding the intergenerational transmission of alcohol use.

**Social learning theory.** Social learning theory (SLT, also known as Social Cognitive Theory; Bandura & Walters, 1963; Bandura, 1977; Bandura, 1986; as cited in Grusec, 1992; see Grusec, 1992, for a review in the context of developmental psychology; see also Wall & McKee, 2002, for a review in the context of alcohol use and maltreatment) is a model of behaviour and attitude acquisition that emphasizes observational learning. According to SLT, offspring behaviour is shaped through observation of their parents’ behaviour and its consequences. The information provided by social experiences is integrated into cognitive models that influence future behaviour and development (Grusec, 1992). As such, the child does not need to directly experience the consequence of a behaviour in order for that behaviour to be acquired and disinhibited or inhibited in the future. In the case of alcohol use, offspring model parental drinking patterns, including contexts and motivations for use (White et al., 2000), such as parental alcohol use as a means of coping with stressful experiences (Ellis et al., 1997). As such, specific motives to consume alcohol may be partly shaped by past exposure to the drinking practices of parents.

According to SLT, the decision to drink results from a reciprocal interaction between an individual’s environment, cognitions (including motives), and behaviour (Bandura, 1986, as cited in Wall & McKee, 2002). These internal and external factors interact to determine whether a behaviour is initiated in a particular situation. According to SLT, learned behaviours are highly context-specific. As a result, it is expected that coping motivated drinking would be activated in stressful situations that were previously associated with parental drinking. If the function of the behaviour, in this case alleviation of negative affect,
is positive and highly valued, it increases the likelihood of performance of that behaviour. Reinforcement of drinking, in the form of alleviation of negative affect through the pharmacological effects of alcohol, further solidifies the response (Petraitis, Flay, & Miller, 1995). Through this process, hazardous use of alcohol can emerge as a learned, maladaptive coping response to stress or unwanted negative affect.

In addition to the perceived match between the original and current context, and the functional value of the behaviour, demonstration of a learned behaviour depends, to a lesser extent, on model characteristics (Wall & McKee, 2002). As such, the extent to which an adolescent identifies with, or feels close to, a parent is hypothesized to be positively related to the likelihood that they will display the (drinking) behaviours they observed in that parent (Wall & McKee, 2002). Indeed, this process has been supported for adolescents (Andrews, Hops, & Duncan, 1997; Cooper, Peirce, & Tidwell, 1995) and college-age youth (Jung, 1995). One study found gender effects, in that adolescents modeled father’s, but not mother’s, alcohol use if their relationship was moderate or better (Andrews, Hops, & Duncan, 1997), and another found a trend toward a stronger effect with female caregivers (Cooper, Peirce, & Tidwell, 1995). Together, these studies point to the importance of adolescent identification with the drinking parent, rather than the quantity of parent alcohol use per se, in predicting adolescent alcohol use. This is consistent with SLT in that valued models have a greater influence on behaviour. The aforementioned studies provide support for SLT as a framework for understanding the intergenerational transmission of alcohol use from parents to offspring.

**Motivational model of alcohol use.** Motives, also sometimes called (conscious or unconscious) reasons for drinking (e.g., Comasco, Berglund, Oreland, & Nilsson, 2010; Kuntsche et al., 2005), are a good candidate for explaining the pathway between parental and
adolescent drinking behaviour, as well as informing intervention approaches (Cooper, 1994). The model adopted for the present study, that of Kuntsche and colleagues (2005), is a combination of an early influential model (Cox & Klinger, 1988) and a more recent adaptation that highlights the importance of drinking to achieve affective change (Cooper, 1994). In this model, four motives for drinking exist: enhancement; coping; social; and conformity. The two internal motives are coping and enhancement, which are associated with reduction of negative affect and enhancement of positive affect, respectively. The two external motives, social and conformity motives, are associated with obtaining social rewards and avoiding social rejection, respectively. Cooper (1994) confirmed the four-factor model of drinking motives as well as the clinical and research utility of the Drinking Motives Questionnaire – Revised (DMQ-R), and identified unique patterns of alcohol use and consequences using an adolescent population. Different motives have been linked to different patterns of alcohol consumption and outcomes in both adolescents and adults, suggesting the existence of distinct etiologic pathways (Cooper, Frone, Russell, & Mudar, 1995), and making drinking motives a valuable lens through which to better understand adolescent drinking behaviour.

Researchers have found that motives emerge throughout development in a reliable way: prior to early adolescence, motives for drinking tend to be undifferentiated (Kuntsche, Knibbe, Gmel & Engels, 2006), after which point differences emerge. Gender differences have been described in adolescence, although not always confirmed (Kuntsche et al., 2006). Coping motives tend to be endorsed somewhat more commonly by girls than boys in early adolescence (13-15 years), whereas the reverse is true in later adolescence (18-19 years), with boys being more likely to endorse coping motives (Cooper, 1994). Gendered patterns are clearer for social and enhancement motives. Adolescent boys have been shown to
endorse social and enhancement motives more strongly than girls throughout adolescence and through university (e.g., Cooper, 1994; Gire, 2002; Kairouz, Gliksman, Demers, & Adlaf, 2002; Kuntsche et al., 2006; Simons, Correia, & Carey, 2000; Wild, Hinson, Cunningham, & Bacchiochi, 2001). Preliminary evidence suggests a difference between mothers’ and fathers’ transmission of motives to their offspring, with coping motives and enhancement motives most strongly associated with offspring motives for mothers and fathers, respectively (Mares, Lichtwarck-Aschoff, & Engels, 2013).

As distinct patterns of drinking correspond to specific drinking motives, drinking motives may provide a deeper understanding of the development of hazardous alcohol use. By far the most commonly endorsed motives are social motives. Although there are some exceptions (see e.g., Schelleman-Offermans, Kuntsche, & Knibbe, 2011), social motives tend to be associated with moderate alcohol use (for Canadian examples, see Feldman, Harvey, Holowaty, & Shortt, 1999; Kairouz et al., 2002), and tend not to be associated with alcohol problems, or may have a negative association with alcohol problems (Labouvie & Bates, 2002). In the middle range of endorsement is enhancement motivated drinking, which tends to be associated more with social incentives, is characterized as a more normative behaviour, and is associated largely indirectly (through higher levels of alcohol consumption) with alcohol problems (Cooper et al., 1995; Magid, MacLean, & Colder, 2007; Merrill & Read, 2010; see also Kuntsche et al., 2005, for a review), although contrary evidence also exists (e.g., Labouvie & Bates, 2002; Read, Kahler, Wood, Maddock, & Palfai, 2003; Simons et al., 2000). Enhancement motives have been associated with moderate drinking as well as heavy episodic drinking (e.g., Feldman et al., 1999; Kairouz et al., 2002), depending on the nature of the measure used (Kuntsche et al., 2005).
Finally, the two negative reinforcement motives—coping and conformity—are endorsed less strongly than enhancement and social motives, and are consequently less normative (Cooper, 1994). Coping motives for alcohol use are defined as the use of alcohol to regulate negative affect (Cooper et al., 1995). A review of studies examining motives for alcohol use and consequences of drinking in adolescents (Kuntsche et al., 2005) revealed that, although coping motives are the least frequently reported reason for drinking, they are problematic because of their association with both alcohol use (see also Comasco et al., 2010; Griffiths et al., 2006; Ham, Bonin, & Hope, 2007) and, more importantly, alcohol problems (Cooper et al., 1995; Comasco et al., 2010; Mares et al., 2013; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007; Simons, Gaher, Correia, Hansen, & Christopher, 2005). For instance, coping motives have been found to be associated with alcohol-related problems (academic problems, risky behaviours, and poor self-care), partially independent of level (composite of frequency, quantity, and frequency of binge drinking) of alcohol use (Merrill & Read, 2010). The unique association between alcohol problems and coping-motivated drinking has been found to continue into adulthood with an association with alcohol dependence (e.g., Carpenter & Hasin, 1999; Holahan, Moos, Holahan, Cronkite, & Randall, 2001; Holahan, Moos, Holahan, Cronkite, & Randall, 2003). In summary, the literature is consistent in identifying coping motives as risky in that they are the only type of motives directly associated with alcohol problems, whereas other motives are associated with problems indirectly, via alcohol consumption.

Drinking-to-cope is thought to operate as an alternative to more adaptive coping skills (e.g., Kassel, Jackson, & Unrod, 2000), particularly in individuals who are prone to frequent experiences of negative affect (Loukas, Krull, Chassin, & Carle, 2000; Stewart, Loughlin, & Rhyno, 2001). Indeed, there is a high rate of psychiatric comorbidity in adolescent substance
use, including depression and anxiety (see Eschmann, Zimprich, Metzke, & Steinhausen, 2011), and convincing support exists for the importance of motives as a mediator between affect and drinking behaviours (e.g., Cooper et al., 1995). Related to this is a growing body of research that associates drinking to cope with high levels of neuroticism, or vulnerability to negative affect (see e.g., Cooper, Agocha, & Sheldon, 2000; Loukas et al., 2000; Stewart & Devine, 2000; Stewart et al., 2001). Alcohol use motivated by the need to cope with negative affect, while effective, is really a short-term solution hypothesized to hamper the development of other coping skills (Cooper, 1994; Cooper et al., 1995). By obscuring the source of negative affect and narrowing the choices for responding, the individual becomes vulnerable to relying on the use of alcohol and the development of problematic use (Cooper et al., 1995; Kassel et al., 2000; Kuntsche et al., 2006). Given the difficulties associated with coping related drinking, the transfer of coping motives merits further study in and of itself, including the question of whether parent history of alcohol problems is significantly associated with offspring coping motives. The main focus of the present study is an examination of coping motives as a potential mechanism for intergenerational transfer of hazardous alcohol use.

**Drinking Motives as a Mechanism for Intergenerational Transfer of Alcohol Use**

Although coping motives are a potentially important path from parent drinking to adolescent alcohol problems, the potential role of drinking motives in mediating the intergenerational transfer of alcohol use has received very little attention (Muller & Kuntsche, 2011). A small number of studies have investigated drinking motives as a potential mediator between a range of indicators of childhood adversity and adolescent and emerging adult drinking, including maltreatment (Goldstein, Flett, and Wekerle, 2010) and sexual abuse more specifically (Grayson & Nolen-Hoeksema, 2005). For example, coping motives
mediated the relationship between childhood abuse and alcohol consequences (but not alcohol consumption; as measured by the AUDIT) for women, whereas enhancement motives mediated this relationship for men (Goldstein et al., 2010). Related research that took into account the impact of negative affect found that in undergraduate women, coping motives moderated the mediation of the relationship between childhood sexual abuse and consequences of alcohol use by distress, in that distress predicted alcohol consequences for those with high coping motives but not low coping motives (Smith, Smith, & Grekin, 2014). While research supports coping motives as a proximal mediator (common pathway) from adversity to alcohol-related consequences, with the presence of gender effects, only two studies (Muller & Kuntsche, 2011; Van Damme et al., 2015) were found that examined whether drinking motives mediate the relationship between parental history of alcohol use and adolescent drinking behaviours.

In a Swiss community sample of 2,069 13- to 15-year-old students who had consumed alcohol in the past year, Muller and Kuntsche (2011) found support for partial mediation of the link between parental and adolescent drinking by coping, enhancement, and social motives, with frequency of recent consumption as the outcome. Full mediation of the intergenerational relationship was found by coping and enhancement motives when the outcome of interest was frequency of drunkenness. Interestingly, the drinking habits of mothers were a slightly better predictor of heavy drinking by offspring of both genders, which speaks to the potential presence of gender differences in transmission of these hazardous behaviours. Parental drinking was measured according to adolescent report of typical parent drinking volume (frequency x typical quantity). A recent longitudinal study by Van Damme and colleagues (2015) used a prospective design to examine relationships between parent and adolescent drinking behaviour and motives (measured at age 18 and 19)
in Belgium. Unlike Muller and Kuntsche (2011), Van Damme and colleagues included abstaining offspring, or non-drinkers (roughly 9% of their sample), in their analyses. Parental frequency of drinking was measured (by parent report) during childhood (mean age of 11 years) and amount of emerging adult drinking (frequency x typical quantity) and drinking motives were measured 8 years later (mean age 19 years). While all motives, including coping, were found to be significantly associated with amount of emerging adult drinking, no indirect effect was found by coping motives, contrary to the findings of Muller and Kuntsche (2011). Rather, maternal drinking indirectly affected offspring drinking through social motives, and paternal drinking indirectly affected offspring drinking through enhancement motives. As there was a significant interaction effect between maternal drinking and offspring gender, the analyses were stratified by gender, and the significant mediated effect remained only in boys (Van Damme et al., 2015). Inconsistencies in prior research relating to the potential role of coping motives in mediating the intergenerational transfer of alcohol use and potential gender effects indicates the need for further work to better understand the relationships between parent and adolescent drinking and coping motives, and the conditions under which coping is a mediator. Examining these relationships in a child welfare sample would extend the research in this area beyond community samples.

**Relationship Between History of Maltreatment and Alcohol Use**

One may expect the relationships between parental and offspring drinking and coping motives to be particularly salient within a population of youth who have experienced child maltreatment because of the higher prevalence of alcohol use among those with history of maltreatment. A review by Tonmyr, Thornton, Draca, and Wekerle (2010) found a significant association between childhood maltreatment and later alcohol use/abuse in adolescence in community and school samples. The majority of studies reviewed found a
statistically significant relationship between physical and sexual abuse and the use of alcohol. Of the small number of studies examining emotional maltreatment, neglect, and witnessing domestic violence, all found a significant association with the use of alcohol. The cumulative effect of maltreatment was also found to be a significant factor in that the experience of both physical and sexual abuse had a stronger association with later use of alcohol and other substances than was the experience of only one type of abuse (Tonmyr et al., 2010).

Similarly, Singh, Thornton, and Tonmyr (2011) found that a significant proportion (nearly 14%) of Canadian children who had been the subject of a child abuse investigation were abusing substances. Moreover, the severity (measured by physical harm) of the maltreatment experienced was significantly related to substance abuse, even after controlling for other variables (Singh et al., 2011). Consistent with findings in clinical samples (see e.g., Blood & Cornwall, 1996), support was also found for the association between a younger age of alcohol use initiation and a history of child maltreatment (Tonmyr et al., 2010; Wekerle, Leung, Goldstein, Thornton, & Tonmyr, 2009), wherein there was an increased likelihood of early initiation (by age 14) (Hussey, Chang, & Kotch, 2006; Moran, Vuchinich, & Hall, 2004), for all forms of maltreatment, except when considering emotional maltreatment (Tonmyr et al., 2010), in community samples. This is important as research suggests that early initiation results in a greater risk of progressing to later substance abuse and dependence (Jackson & Sher, 2005; see also Marti, Stice, and Springer, 2010). Indeed, not only does maltreatment predict the onset of alcohol problems, it also predicts the persistence of those issues (McLaughlin, Conron, Koenen, & Gilman, 2010), and negative affect might be an important mechanism for understanding why child maltreatment places an individual at risk for earlier initiation and persistence of alcohol use and alcohol problems.
By its nature, child maltreatment results in a toxic or “pathogenic relational environment” (Cicchetti & Toth, 2005, p. 414). Maltreatment has been found to predispose youth to increased experiences of negative affect (see e.g., De Marco, Tonmyr, Fallon, & Trocmé, 2007; Hanson et al., 2006) which has been hypothesized to relate to alcohol consumption, via motivation to cope with those experiences through drinking (Schuck & Widom, 2001; Shin, Edwards, Heeren, & Amodeo, 2009). Early (i.e., in infancy) child maltreatment has been shown to have particularly strong adverse neurocognitive effects on early child development (Cowell, Cicchetti, Rogosch, & Toth, 2015). Maltreated children are more likely to experience negative outcomes that are logically related to substance use, including deficits in emotion processing (Cicchetti & Toth, 2005). Evidence exists for the presence of difficulties in regulating and modulating affect as well as greater emotional reactivity in children who have experienced maltreatment (Kim & Cicchetti, 2010). Related to this, the maltreatment literature shows greater prevalence of mental health symptoms and diagnoses, including depressive symptoms (Hanson et al., 2006; Toth & Cicchetti, 1996; Toth, Manly, & Cicchetti, 1992) in maltreated as compared to nonmaltreated children and adults (Stein, Leslie, & Nyamathi, 2002). In addition, adolescents with a history of maltreatment are more likely than their nonmaltreated peers to have deficits in social skills and academic performance (Eckenrode, Laird, & Doris, 1993; Fantuzzo, delGaudio Weiss, Atkins, Meyers, & Noone, 1998), which may indirectly result in increased experiences of negative affect. Not surprisingly, negative affect, in the form of depression, has been associated with risk for alcohol use (Graham, Massak, Demers, & Rehm, 2007). Furthermore, the ability to tolerate negative affect has been found to be an independent predictor of alcohol use, over and above other emotion regulation skills (Berking et al., 2011).
Child welfare involvement also places youth at risk for alcohol use and problems. (Hovdestad, Tonmyr, Wekerle, & Thornton, 2011; Traube, James, Zhang, & Landsverk, 2012), although research is in the early stages. Gaining a better understanding of the proximal determinants of alcohol use in a child welfare population would potentially open up possibilities for intervention and prevention efforts. Thus far, findings have been somewhat mixed regarding the impact of child welfare involvement on risk for hazardous alcohol use. Two studies using nationally representative samples that compared prevalence rates of substance use in adolescents involved with child welfare and community adolescents found similar (Fettes, Aarons, & Green, 2013) or lower (Wekerle, Leung, et al., 2009) rates of alcohol use in the adolescents involved with child welfare, suggesting a protective effect of child welfare involvement. However, a recent Swiss population-based cohort study that looked at former foster children, among other groups, found that foster children had at least fourfold elevated hazard ratio (HR) for substance abuse outcomes compared to majority population peers, although the HR decreased to approximately 1.5 when parental substance abuse was accounted for (von Borczyskowski, Vinnerljung, & Hjern, 2013). An earlier study also suggested an elevated risk of alcohol use disorders for adolescents involved with child welfare services compared to community samples, with a prevalence of 17% among youth involved in child welfare (Aarons, Brown, Hough, Garland, & Wood, 2001; see also Aarons et al., 2008). Indeed, the relationship between child welfare involvement and intergenerational transference of drinking behaviour is likely to be a complex one, as competing factors are at play. Youth removed from their parents’ care provide a unique opportunity to examine the extent of the impact of exposure to parental alcohol problems, as the greater the amount of time spent in care, the lesser the opportunity for modeling of parental alcohol use. Therefore, the present study examines the potential mediation of the
relationship between parental and offspring alcohol use, as well as the potential moderation of the indirect effect by time spent in care, specifically in a child maltreatment sample. Although some research has found a lack of support for the impact of parental warmth or hostility on drinking (e.g., Barnes, White, Johnson, & Buyske, 2000), by definition, the child welfare sample used in the present study has experienced severe maltreatment that goes beyond normative variations in early caregiving. Finally, as findings have been inconsistent as to potential gender effects in the intergenerational transmission of alcohol use, this remains an area for exploration.

Current Study

The risk of later alcohol problems in the context of a history of parental alcohol use has been hypothesized to partly stem from the use of alcohol as a means of coping with unpleasant affect (Campbell & Oei, 2010a); however, the specific mechanism of transfer largely remains untested. Motivations for drinking have been extensively studied in adolescent populations, as such motives are generally accepted to be the ‘final common pathway’ to alcohol use (Cooper, 1994; Cox & Klinger, 1988; Kuntsche et al., 2005). The pathway of interest in the present study is whether drinking to cope with negative emotion mediates the relationship between parental history of alcohol problems and adolescent alcohol use.

For the most part, the alcohol use literature has focused on the influence of parental drinking and has neglected to examine the special case of youth who are involved with child welfare and no longer have their parents as their legal guardians (Fettes, Aarons, & Green, 2013). This is an overlooked population that merits further study, as maltreated youth are at high risk for alcohol use and persistent alcohol problems (Hovdestad, Tonmyr, Wekerle, & Thornton, 2011; Traube, James, Zhang, & Landsverk, 2012). Relatively little is known about
parental influences among youth involved in child welfare. However, there is a growing recognition of the consequences for this population and the possibilities for intervention (e.g., Traube et al., 2012). Indeed, caregiver alcohol problems are fairly common in this population; a national survey found that caregiver alcohol abuse was present in 21% of substantiated child maltreatment investigations in Canada (Canadian Incidence Study of Reported Child Abuse and Neglect – 2008; Public Health Agency of Canada, 2010). In spite of this data, no study to date has been found that combines the two predisposing risk factors of maltreatment and parental history of alcohol problems for adolescent alcohol use. Although research involving youth currently involved with child welfare services is still in the early stages, findings thus far indicate that the predictive strength of early maltreatment for adolescent substance use is such that parents’ drinking and the provision of child welfare services may not add significantly to the risk profile (Cheng & Lo, 2010). Other authors argue that specific risk factors exist but remain obscured (Traube et al., 2012). Factors such as the presence of internalizing or externalizing disorders and an older age of entry into child welfare services (Aarons et al., 2008) seem to contribute to later substance use. Hovdestad et al. (2011) suggested potential explanatory models for the positive association between maltreatment and substance use, including trauma-based, attachment-based, and development of low self-esteem, affective, and aggressive problems as a consequence of maltreatment, suggesting avenues for future research. Of most relevance to this study, the impact of negative affect in this population is unclear, as research results are mixed with a large study spanning three years failing to find a predictive role of depressive symptoms in this population, although depressive symptoms were associated with recent substance use at baseline (Traube et al., 2012).
The present study involves a sample of youth who had significant involvement in child welfare. Given their child welfare involvement, youth in the current sample have all experienced severe maltreatment at some point, but have variable lengths of exposure to parental drinking behaviours (range of 0.25 to 17 years). Of the sub-sample of drinkers, approximately one quarter (24.4%) were removed from their homes as young children and have therefore been in care for 10 years or more; roughly the same amount (27.6%) have been in care for 6-10 years; 33.3% have had 1-5 years of CAS involvement; and 14.7% have been involved with the CAS for one year or less. While multiple mechanisms are likely at play for all individuals in the sample, depending on whether exposure to problematic alcohol use by parents was recent or historical, exposure to parental drinking attitudes and behaviour may play a larger or smaller role in passing along affect-relevant drinking motives. This unique sample allows an examination of the role of environmental effects, using social learning theory (Bandura, 1977, as cited in Grusec, 1992) and the motivational model of alcohol use (Kuntsche et al., 2005; Cox & Klinger, 1988) as theoretical frameworks to understand the impact of length of exposure to parental drinking behaviour.

In the current sample of adolescents with a history of child maltreatment, two important processes are likely to be at work: an early exposure to parents who are using alcohol, which provides the opportunity for the passing on of drinking behaviours and motives, but might vary due to youth having different amounts of time in their parents’ home; and early exposure to severe maltreatment, which may increase the experience of negative affect and interfere with the development of core adaptive emotion regulation skills with which to cope with negative emotions, which may translate into use of maladaptive coping strategies, including drinking to cope. Although early entry into care may be associated with a lower risk of alcohol use and alcohol problems due to less exposure to
drinking parents, risk might increased due to early experiences of maltreatment that resulted in entry into care, combined with the challenges of a longer time involved with the child welfare system.

**Purpose.** The first objective of the study was to confirm the established relationship between parental and offspring drinking in a child welfare sample, where there were variable periods of exposure to parental alcohol use. The second objective was to investigate whether the expected effect of parental alcohol problems on adolescent alcohol use was mediated through coping motives for drinking, whether this indirect effect depends on time in care (moderator), and whether any direct effect of parental alcohol problems remaining after accounting for coping motives depends on time in care.

**Hypotheses.** Based on previous research, parental drinking was expected to be directly associated with offspring drinking. Coping motives (drinking to cope with negative affect) were expected to mediate the association between parental history of alcohol problems (Muller & Kuntsche, 2011), as motives have been shown to be a proximal determinant of alcohol use behaviour. Possible gender effects were explored in this model, as the literature suggested this possibility, but inconsistent findings preclude specification. Time in care was expected to weaken the association between parental alcohol problems and adolescent alcohol use. It was hypothesized that later entry into care would strengthen the mediation because youth would have had more exposure to parental alcohol use (and thus modeling and problems in parenting related to parental alcohol use). Early entry into care, on the other hand, would have resulted in less exposure to alcohol use by caregivers, and was therefore expected weaken the mediation. As such, time in the care of child welfare was expected to moderate the predicted mediation model (moderated mediation).
Figure 1. Conceptual model of the hypothesized mediation of the relationship between parental alcohol problems and adolescent alcohol use by coping motives.
Figure 2. Conceptual model of the hypothesized moderated mediation: Moderation by time in care of the indirect effect of parent alcohol problems on adolescent alcohol use through coping motives.
Chapter Two: Method

Participants

Participants were 302 (58.3% female) adolescents, aged 14 to 19 ($M = 15.86$, $SD = 1.01$) years at initial recruitment, involved in the Maltreatment and Adolescent Pathways (MAP) Longitudinal Study (Wekerle, Leung, Goldstein et al., 2009; see Wekerle, Leung, Wall et al., 2009 for details of methods), a project that examined multiple childhood maltreatment outcomes in a child welfare sample. MAP participants were randomly selected youth who were in the care of child welfare in Ontario, meaning that they were the subject of a child protection order. The sample was 27.2% White, 24.4% Black, 28.9% Mixed race, and 19.5% “other.” The majority of participants (61.9%) were under Crown wardship orders (parental rights are terminated and the Crown assumes the role of legal guardian), followed by community care (19.2%; voluntary placement in the care of extended family or ethnocultural/religious community members), Society wards (14.2%; placement in the care of a child welfare agency for a period of up to 12 months, after which point the Order may be terminated or a Crown wardship Order made), and temporary care (4.6%; temporary placement in the care of a designated child welfare agency, usually due to a recent apprehension, awaiting a child protection hearing). Just over a quarter (28%) of the sample had been in the care of child welfare services for 10 years or more. Data were collected from youth at six-month intervals over a period of three years. Questionnaires and demographic information were completed by the adolescent (administered to participants in person), with the exception of status (e.g., Crown Ward), which was provided by the caseworker at recruitment. Data for the current study are drawn from two assessment points: initial and one year. See Table 1 for a summary of the timepoints for each of the measures.
Table 1

Summary of Timepoints for Measures

<table>
<thead>
<tr>
<th>Construct</th>
<th>Measure</th>
<th>Collection Timepoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics</td>
<td>Background Questions</td>
<td>X</td>
</tr>
<tr>
<td>Parental history of alcohol problems</td>
<td>F-SMAST/ M-SMAST</td>
<td>X</td>
</tr>
<tr>
<td>Adolescent alcohol use</td>
<td>AUDIT-C; AUDIT</td>
<td>X</td>
</tr>
<tr>
<td>Adolescent Alcohol Use (Demographics)</td>
<td>OSDUHS</td>
<td>X</td>
</tr>
<tr>
<td>Adolescent Drinking Motives</td>
<td>DMQ-R</td>
<td>X</td>
</tr>
</tbody>
</table>

Measures

Adolescent alcohol use. The Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993), a self-report screening test, was used to measure both (hazardous) alcohol use, and alcohol problems (harmful drinking/abuse and dependence symptoms) in the past year. The alcohol use variable in the current study was based on the AUDIT consumption composite (AUDIT-C; Dawson, Grant, Stinson, & Zhou, 2005), which consists of the sum of the first three items of the AUDIT (How often do you have a drink containing alcohol?; How many drinks containing alcohol do you have on a typical day when you are drinking?; How often do you have five or more drinks on one occasion?). The third item (How often do you have five or more drinks on one occasion?) was altered from the original AUDIT (which referred to 6 or more drinks) to maintain consistency with research on binge
drinking in this age group (e.g., OSDUHS, Paglia-Boak et al., 2013). Although the full AUDIT was administered, only the consumption items were used for the current analyses (AUDIT-C). The AUDIT-C was chosen because it is a short and valid questionnaire for adolescents (Rumpf et al., 2013) that captures heavy episodic drinking in addition to frequency and typical quantity of alcohol use. In addition, a previous factor analysis of the AUDIT identified distinct factors of consumption (which corresponds to the AUDIT-C) and alcohol-related consequences (the remaining AUDIT items, also known as the problem total) (Doyle, Donovan, & Kivlahan, 2007). Both AUDIT sub-scores (consumption and problem totals) were very highly correlated with the AUDIT total score, as indicated by bivariate correlations of .91 with the consumption total and .87 with the problem total ($p < .001$). Due to the restricted range of the problem total and the particularly high correlation between the AUDIT total and consumption scores, the consumption score (AUDIT-C) was used in subsequent analyses as the measure of adolescent alcohol use.

The inclusion of binge drinking in the AUDIT-C is important, as heavy episodic drinking in adolescence has been associated with later problems with alcohol use (Hill, White, Chung, Hawkins, & Catalano, 2000). As recommended cut-points differ (Kelly, Donovan, Chung, Bukstein, & Cornelius, 2009; Rumpf, Wohlert, Freyer-Adam, Grothues, & Bischof, 2013), the AUDIT-C score was used as a continuous variable except when describing the sample. A higher value on the AUDIT-C indicates greater endorsement of alcohol consumption (higher frequency, typical quantity, and frequency of heavy episodic drinking).

The total score of the AUDIT was also reported as a descriptive variable. Although a cut-off point of 8 is used for adult samples, a cut-off point of 3 is recommended for the AUDIT as a screening instrument to capture hazardous drinking (5 for harmful; 7 for
dependent) in adolescents (Santis, Garmendia, Acuna, Alvarado, & Arteaga, 2009). To allow comparison with Ontario high school student survey data (OSDUHS, Boak et al., 2013), which uses a cut-point of 8 for hazardous drinking, both cut-points are reported here. In addition, grade at drinking initiation is also reported to provide additional descriptive information regarding drinking patterns in the sample.

**Drinking motives.** Drinking motives were assessed using the 20-item Drinking Motives Questionnaire, Revised (DMQ-R; Cooper, 1994), the most commonly used measure of drinking motives (Kuntsche et al., 2005). Only the Coping subscale score, which reflects coping motives for alcohol use, was used in the present study. The Coping subscale consists of five items (e.g., I drink alcohol to forget my worries). Participants indicate on a five point Likert scale how frequently they drink for each motive item (1=Almost never/never; 2=Some of the time; 3=Half of the time; 4=Most of the time; 5=Almost always). The mean item score was used in analyses.

**Parental history of alcohol problems.** Parental history of alcohol problems was assessed using one item (Do you think your biological mother is/was an alcoholic?) from the 10-item Short Michigan Alcohol Screening Test-Family (F-SMAST/M-SMAST; Crews & Sher, 1992). The measure asks adolescents to separately rate their biological mother and biological father. Response options are dichotomous (0=No; 1=Yes). As the measure specifies, “for each person you lived with,” the N/A option was available for participants who did not live with a particular caregiver (e.g., if they never lived with their biological father). The single item rating of biological mother’s and father’s alcoholism has been shown to be comparable in specificity and to have reasonable sensitivity compared to administering the full measure with the recommended cut-score of 3 or 4 (Crews & Sher, 1992). Furthermore, the global rating was found to have excellent test-retest stability and moderately
high agreement with the corresponding parent’s self-rating of having had “problem(s) with drinking” (Crews & Sher, 1992).

**Procedure**

The target population consisted of adolescents aged 14–17 years old at the time of the initial assessment who were under the care of child welfare. Adolescents were screened for eligibility by caseworkers and were considered to be ineligible for participation if any of the following criteria were met: the adolescent was outside the target age range \( n = 39 \), had a developmental delay \( n = 122 \), was absent without leave (i.e., had terminated contact with their child welfare caseworker; \( n = 75 \)), or was deemed to be in crisis (psychiatric, self-harm, residential; \( n = 85 \)). Of those deemed eligible by their child welfare caseworker \( n = 837 \), the recruitment rate was 67.0%, resulting in an initial sample of 561 adolescents (52.0% female). Youth aged 16 and over provided their own consent, and consent was obtained from a legal guardian for those under 16 years of age. Participants completed self-report questionnaires via laptop in the presence of a research assistant (2.5 hours per session), and were reimbursed $28 per session. Participants who were 18 or 19 at the initial assessment were retained in the analysis under the assumption that they were 17 when initially recruited by their caseworker. Participants with more than 20% missing values in the Coping Motives scale, missing data in both parents’ alcohol problem items, or missing data on the first item of the AUDIT-C (used to classify drinkers vs. abstainers) were then discarded \( n = 259 \). The final sample consisted of 302 participants. As such, the present sample consisted of 36.1% of those initially deemed eligible, and 53.8% of recruited participants. The MAP study was approved by the research ethics board at the University of Western Ontario, where the PI (Dr. Christine Wekerle) was located during the tenure of the study. In addition, all ethics committees at participating child protective agencies reviewed the ethics protocol and/or
provided REB approval. The current study involves secondary data analysis of the MAP dataset, which was held and securely stored at the University of Toronto, under the supervision of Dr. Abby Goldstein, who received ethical approval to use the data through the University of Toronto (see Appendix A).

**Statistical Analyses**

Pearson’s chi square analysis was used to investigate whether categorical demographic variables of interest, including parental alcohol problems, child protection status (and Crown ward status more specifically), time in care (10 years or more), current living situation, number of moves in the past 5 years (0-1; 2-3; more than 4), and ethnicity were associated with drinker status (drinker vs. non-drinker). Gender was used as a layering variable in order to examine whether associations differed for males compared to females. The Mann-Whitney U Test was used to examine whether number of moves in the past 5 years, as a continuous variable, was significantly associated with drinker status in the full sample or with gender in the subsample of drinkers. This non-parametric test was chosen as the data was not normally distributed. Pearson’s chi-square analysis was also used to examine the association between gender and several alcohol consumption variables: grade of initiation of drinking, frequency of drinking, typical drinking quantity, and frequency of binge drinking.

Bivariate relationships were then tested between the predictor (parental alcohol problems), proposed mediator (coping motives), outcome (alcohol use) variables, and age in the full sample. Pearson product-moment correlations were used to identify significant associations between coping motives, alcohol use, and age. Biserial correlation coefficients ($r_b$; calculated by applying the appropriate equation to the point biserial correlation coefficient) were used to investigate associations with parental alcohol problems, as mother
and father alcohol problems are continuous dichotomous variables. In order to investigate potential differences by drinker status or by gender, the above bivariate relationships were also examined in the subsample of drinkers, and then examined separately for male drinkers and female drinkers.

**Analysis of hypothesized mediation.** The indirect relationship, through coping motives (mediator, M), was examined between parent history of alcohol problems (predictor, X) and adolescent alcohol use (outcome, Y) (see Figure 3 for the statistical model). To reduce the number of analyses, the mediation model was investigated only where there was a significant bivariate association between the proposed mediator and both the predictor and outcome variables. Analyses were carried out for the full sample, the subsample of drinkers only, and then broken down to examine male and female drinkers separately. Indirect effects were examined by calculating bias-corrected 95% confidence intervals using bootstrapping (with $n = 1,000$ resamples), via the PROCESS procedure for SPSS (PROCESS macro v2.13.2, Hayes, 2014; PROCESS model 4). PROCESS uses a logistic regression-based path analytic framework for estimating effects in mediation and moderation models (Hayes, 2012; Hayes, 2013). This procedure is consistent with current recommendations (Hayes & Sharkow, 2013), and is particularly useful, as bootstrapping does not require that an outcome variable be normally distributed (Hayes & Sharkow, 2013). The absence of zero within a confidence interval leads to rejection of the null hypothesis.
Figure 3. Statistical model of the hypothesized mediation.

Note.

\( a_1 \) = results of the simple regression of coping motives predicted from parent alcohol problems (the effect of X on M)

\( b_1 \) = results of the regression of adolescent alcohol use predicted from coping motives when parent alcohol problems are included in the model (the effect of M on Y controlling for X)

\( c'_1 \) = results of the regression of adolescent alcohol use predicted from parent alcohol problems when coping motives are included as a predictor in the model (direct effect of X on Y)

\( c_1 \) = total effect of parent alcohol problems on adolescent alcohol use when coping motives is not present in the model (also equal to the sum of the direct and indirect effects)

\( a_1b_1 \) = indirect effect of parent alcohol problems on adolescent alcohol use through coping motives (product of the effect of X on M and the effect of M on Y controlling for X; equal to the difference between the total and direct effects of X)
Analysis of hypothesized moderated mediation. Conditional process modeling (Hayes & Preacher, in press, as cited in Hayes, 2013; PROCESS model 8) was then used to further examine scenarios where there was evidence of a mediated relationship between the predictor and outcome variables by investigating the hypothesized moderated mediation (see Figure 4 for the statistical model). It was hypothesized that the extent of the indirect effect of father alcohol problems (X) on adolescent alcohol use (Y) through coping motives (M) may depend on the hypothesized moderator (W), time in care. Further, it was proposed that the mediation process was moderated at both the level of the direct effect of X on Y (See pathway $c'\beta$ in Figure 4) and at the level of the indirect effect of X on Y, through M (See pathway $a_3$ in Figure 4). The moderated mediation, or conditional indirect effect, was examined by considering: (a) whether the indirect effect of parent alcohol problems on adolescent alcohol use through coping motives depends on time in care, and (b) whether any effect of parent alcohol problems that remains after taking into account coping motives depends on time in care. Evidence of moderation of the indirect effect by W would be found in a statistically significant interaction between X and W in the model of M (pathway $a_3$). Given that $X \rightarrow M$ was moderated, this would mean the indirect effect of X on Y through M (the product of the $X \rightarrow M$ effect (which is conditional on W) and the unconditional $M \rightarrow Y$ effect), $(a_1 + a_3W)b_1$ was also moderated. If the first stage of the mediation model ($X \rightarrow M$) was moderated, the next stage would be to examine the relevant coefficient for the direct effect (pathway $c'\beta$) for evidence of moderation of the direct effect.
Figure 4. Statistical model of the hypothesized moderated mediation.

Note.

$a_1$ = effect of $X$ on $M$, controlling for $W$ (results of the regression of coping motives predicted from parent alcohol problems when time in care is included in the model)

$a_2$ = effect of $W$ on $M$, controlling for $X$ (results of the regression of coping motives predicted from time in care when parent alcohol problems is included in the model)

$a_3$ = effect of $X$ on $M$, modeled as contingent on $W$ (results of the regression of coping motives predicted from the interaction of parent alcohol problems and time in care)
$b_1$ = unconditional effect of M on Y (effect of coping motives on adolescent alcohol use, controlling for parent alcohol problems and time in care)

c’$_1$ = effect of X on Y, controlling for M and W (results of the regression of adolescent alcohol use predicted from parent alcohol problems when coping motives, time in care, and the interaction between parent alcohol problems and time in care are included in the model)

c’$_2$ = effect of W on Y, controlling for X and M

c’$_3$ = direct effect of X on Y, modeled as contingent on W (results of the regression of adolescent alcohol use predicted from the interaction of parent alcohol problems and time in care)

$a_1 + a_3W$ = conditional effect of X on M (the effect of X on M, modeled as contingent on W)

$(a_1 + a_3W)b_1$ = conditional indirect effect of X on Y through M (product of the conditional effect of X on M and the unconditional effect of M on Y)

$c’_1 + c’_3W$ = conditional direct effect of X on Y
Chapter Three: Results

Full Sample (Drinkers and Nondrinkers)

To capture the effect of parental alcohol problems on the full range of drinking behaviours, including abstaining from use, both drinkers and non-drinkers were included in the initial analyses. As can be seen in Table 2, 62% of the sample were Crown Wards, meaning that they had been permanently removed from their parents care (see Table 2 for more details regarding child protection status), and 28% of participants had been involved with child welfare for 10 years or more. The majority of participants (48.5%) in the full sample lived with foster or adoptive parents, and another substantial portion (22.5%) lived in a group home (See Table 2 for further placement details). The number of moves reported by participants over the past five years ranged from zero to 22 ($M = 3.26$, $SD = 3.00$) in the full sample. Twenty-one percent of participants reported maternal alcohol problems and 35% reported paternal alcohol problems. The prevalence of parental alcohol problems was similar in the full sample as compared to the drinkers-only sample (see Table 2). None of the above demographic factors were significantly associated with drinker status, as determined by chi-square analysis ($p > .05$), and results did not differ when the associations where examined separately for male and female drinkers. However, when number of moves was examined as a continuous variable, using the Mann-Whitney U (non-parametric) test, the distribution of the number of moves variable was not the same across drinker status categories (drinkers and non-drinkers) in the full sample ($p < .05$). There was not a significant effect of gender found for number of moves in the subsample of drinkers, using the Mann-Whitney U test ($p > .05$).

Information regarding the primary ethnicity of participants can also be found in Table 2. Using chi-square analysis, there was a significant association between ethnicity whether
or not participants drank (drinker status) in the full sample \( \chi^2(3) = 8.53, p < .05 \). Cramer’s statistic was .17 out of a possible maximum value of 1. This represents a small association between ethnicity and drinker status. This seems to represent the slightly greater likelihood of participants who drank identifying as Mixed ethnicity (See Table 2). Ethnicity was not significantly associated with gender among the drinker subsample, as determined by chi-square analysis \( (p < .05) \).

The prevalence of drinking (past 12 months) in the total sample was 54.6%, and there was a weak positive relationship between alcohol use and age \( (r = .172, p < .01) \) (see Table 3 for correlations).
Table 2

**Descriptive Statistics for Sociodemographic Characteristics, Alcohol Use, and Drinking Motives as well as Parental Alcohol Problems by Drinker Status and Gender**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Range (full sample, N=302)</th>
<th>Full Sample (N=302)</th>
<th>Drinkers (n=165)</th>
<th>Female Drinkers (n=98)</th>
<th>Male Drinkers (n=67)</th>
<th>Non-drinkers (n=137)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD) or %</td>
<td>M (SD) or %</td>
<td>M (SD) or %</td>
<td>M (SD) or %</td>
<td>M (SD) or %</td>
<td>M (SD) or %</td>
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<tr>
<td>Sociodemographic characteristics</td>
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</tr>
<tr>
<td>Age, in years (at Year 1)</td>
<td>15-20</td>
<td>16.86 (1.01)</td>
<td>17.02 (1.01)</td>
<td>17.07 (1.05)</td>
<td>16.96 (0.94)</td>
<td>16.66 (0.98)</td>
</tr>
<tr>
<td>Sex, % Female</td>
<td>58.3 (100.0)</td>
<td>59.4 (3.54)</td>
<td>100.0 (3.54)</td>
<td>19.1 (6.09)</td>
<td>22.6 (5.90)</td>
<td>18.3 (6.09)</td>
</tr>
<tr>
<td>Ethnicity, primary</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>% White</td>
<td>27.2 (23.7)</td>
<td>23.7 (3.54)</td>
<td>18.1 (3.54)</td>
<td>32.3 (6.09)</td>
<td>29.0 (5.90)</td>
<td>31.3 (6.09)</td>
</tr>
<tr>
<td>% Black</td>
<td>24.4 (20.5)</td>
<td>20.5 (3.54)</td>
<td>25.5 (3.54)</td>
<td>12.9 (5.90)</td>
<td>29.0 (5.90)</td>
<td>10.2 (5.90)</td>
</tr>
<tr>
<td>% Mixed</td>
<td>28.9 (35.3)</td>
<td>35.3 (3.54)</td>
<td>37.2 (3.54)</td>
<td>32.3 (6.09)</td>
<td>21.4 (5.90)</td>
<td>21.4 (5.90)</td>
</tr>
<tr>
<td>% Other (collapsed)</td>
<td>19.5 (20.5)</td>
<td>20.5 (3.54)</td>
<td>19.1 (3.54)</td>
<td>22.6 (6.09)</td>
<td>18.3 (5.90)</td>
<td>18.3 (6.09)</td>
</tr>
<tr>
<td>Child Welfare Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Crown Ward</td>
<td>61.9 (59.4)</td>
<td>59.4 (3.54)</td>
<td>57.1 (3.54)</td>
<td>62.7 (6.09)</td>
<td>65.0 (5.90)</td>
<td>66.0 (5.90)</td>
</tr>
<tr>
<td>% Community care</td>
<td>19.2 (18.2)</td>
<td>18.2 (3.54)</td>
<td>22.4 (3.54)</td>
<td>11.9 (5.90)</td>
<td>20.4 (5.90)</td>
<td>20.4 (5.90)</td>
</tr>
<tr>
<td>% Society Ward</td>
<td>14.2 (17.6)</td>
<td>17.6 (3.54)</td>
<td>15.3 (3.54)</td>
<td>20.9 (6.09)</td>
<td>10.2 (5.90)</td>
<td>10.2 (5.90)</td>
</tr>
<tr>
<td>% Temporary care</td>
<td>4.6 (4.8)</td>
<td>4.8 (3.54)</td>
<td>5.1 (3.54)</td>
<td>4.5 (5.90)</td>
<td>4.4 (5.90)</td>
<td>4.4 (5.90)</td>
</tr>
<tr>
<td>Moves in past 5 years (#)</td>
<td>0-22</td>
<td>3.26 (3.00)</td>
<td>3.54 (2.97)</td>
<td>3.84 (3.20)</td>
<td>3.09 (2.55)</td>
<td>2.90 (3.02)</td>
</tr>
<tr>
<td>% 0-1</td>
<td>35.3 (33.1)</td>
<td>33.1 (3.54)</td>
<td>32.6 (3.54)</td>
<td>33.9 (3.09)</td>
<td>38.1 (2.90)</td>
<td>38.1 (2.90)</td>
</tr>
<tr>
<td>% 2-3</td>
<td>29.7 (28.0)</td>
<td>28.0 (3.54)</td>
<td>25.3 (3.54)</td>
<td>32.3 (3.09)</td>
<td>31.7 (2.90)</td>
<td>31.7 (2.90)</td>
</tr>
<tr>
<td>% 4 or more</td>
<td>35.0 (38.9)</td>
<td>38.9 (3.54)</td>
<td>42.1 (3.54)</td>
<td>33.9 (3.09)</td>
<td>30.2 (2.90)</td>
<td>30.2 (2.90)</td>
</tr>
<tr>
<td>Current Living Situation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% 2 parents, at least 1 biological</td>
<td>8.5 (8.3)</td>
<td>8.3 (3.54)</td>
<td>11.6 (3.54)</td>
<td>3.3 (6.09)</td>
<td>8.8 (5.90)</td>
<td>8.8 (6.09)</td>
</tr>
<tr>
<td>% Single parent</td>
<td>10.0 (9.0)</td>
<td>9.0 (3.54)</td>
<td>10.5 (3.54)</td>
<td>6.6 (6.09)</td>
<td>11.3 (5.90)</td>
<td>11.3 (5.90)</td>
</tr>
<tr>
<td>% Foster or adoptive parents</td>
<td>48.5 (48.1)</td>
<td>48.1 (3.54)</td>
<td>44.2 (3.54)</td>
<td>54.1 (6.09)</td>
<td>49.2 (5.90)</td>
<td>49.2 (5.90)</td>
</tr>
<tr>
<td>% Group home</td>
<td>22.5 (21.8)</td>
<td>21.8 (3.54)</td>
<td>17.9 (3.54)</td>
<td>27.9 (6.09)</td>
<td>23.4 (5.90)</td>
<td>23.4 (5.90)</td>
</tr>
<tr>
<td>% Other relatives</td>
<td>4.3 (3.2)</td>
<td>3.2 (3.54)</td>
<td>3.2 (3.54)</td>
<td>3.3 (6.09)</td>
<td>5.6 (5.90)</td>
<td>5.6 (5.90)</td>
</tr>
<tr>
<td>% Other</td>
<td>6.1 (9.6)</td>
<td>9.6 (3.54)</td>
<td>12.7 (3.54)</td>
<td>4.9 (6.09)</td>
<td>1.6 (5.90)</td>
<td>1.6 (5.90)</td>
</tr>
<tr>
<td>Time in care, in years</td>
<td>0.25-17</td>
<td>5.90 (4.28)</td>
<td>5.93 (4.46)</td>
<td>5.75 (4.38)</td>
<td>6.19 (4.60)</td>
<td>5.84 (4.04)</td>
</tr>
<tr>
<td>% More than 10 years in child welfare</td>
<td>27.8 (24.4)</td>
<td>24.4 (3.54)</td>
<td>22.3 (3.54)</td>
<td>27.4 (6.09)</td>
<td>32.0 (5.90)</td>
<td>32.0 (5.90)</td>
</tr>
</tbody>
</table>
Table 2, Continued

Descriptive Statistics for Sociodemographic Characteristics, Alcohol Use, and Drinking

Motives as well as Parental Alcohol Problems by Drinker Status and Gender

<table>
<thead>
<tr>
<th>Variable</th>
<th>Range (full sample, N=302)</th>
<th>Full Sample (N=302) M (SD) or %</th>
<th>Drinkers (n=165) M (SD) or %</th>
<th>Female Drinkers (n=98) M (SD) or %</th>
<th>Male Drinkers (n=67) M (SD) or %</th>
<th>Non-drinkers (n=137) M (SD) or %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent Alcohol Problems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother, % alcoholic</td>
<td></td>
<td>21.3</td>
<td>23.2</td>
<td>21.3</td>
<td>30.5</td>
<td>19.0</td>
</tr>
<tr>
<td>Father, % alcoholic</td>
<td></td>
<td>34.6</td>
<td>39.6</td>
<td>39.8</td>
<td>50.0</td>
<td>28.5</td>
</tr>
<tr>
<td>Coping Motives, mean total</td>
<td>1-4</td>
<td>1.50</td>
<td>1.82</td>
<td>1.77</td>
<td>1.90</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.85)</td>
<td>(0.96)</td>
<td>(0.94)</td>
<td>(0.99)</td>
<td></td>
</tr>
<tr>
<td>Adolescent Alcohol Use</td>
<td>0-25</td>
<td>3.41</td>
<td>6.05</td>
<td>5.45</td>
<td>6.93</td>
<td></td>
</tr>
<tr>
<td>AUDIT Total (points out of 40)</td>
<td></td>
<td>(5.23)</td>
<td>(5.83)</td>
<td>(5.89)</td>
<td>(5.67)</td>
<td></td>
</tr>
<tr>
<td>Alcohol Use (AUDIT-C; points out of 12)</td>
<td>0-12</td>
<td>2.13</td>
<td>3.81</td>
<td>3.42</td>
<td>4.37</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.81)</td>
<td>(2.83)</td>
<td>(2.77)</td>
<td>(2.85)</td>
<td></td>
</tr>
<tr>
<td>% Met 8-point cut-off for problem drinking (AUDIT Total)</td>
<td></td>
<td>14.9</td>
<td>27.3</td>
<td>22.4</td>
<td>34.3</td>
<td></td>
</tr>
<tr>
<td>% Met 3-point cut-off (AUDIT-C)</td>
<td></td>
<td>31.6</td>
<td>56.8</td>
<td>51.1</td>
<td>65.1</td>
<td></td>
</tr>
<tr>
<td>% Early alcohol initiation (grade 8 or earlier)</td>
<td></td>
<td>32.4</td>
<td>48.8</td>
<td>48.5</td>
<td>49.3</td>
<td></td>
</tr>
</tbody>
</table>
It was hypothesized that there would be significant, positive relationships between parental history of alcohol problems, adolescent alcohol use, and coping motives for drinking. Bivariate and biserial (i.e., when one variable was dichotomous) correlations confirmed some of these relationships (see Table 3). Specifically, greater endorsement of coping motives was significantly and strongly associated with greater adolescent drinking ($r = .604, p < .01$), and the effect size remained large when controlling for age ($r = .596, p < .01$). With respect to parental history of alcohol problems, fathers’ history of alcohol problems (yes/no) was significantly associated with both adolescent alcohol use ($r_b = .133, p < .05$) and coping motives ($r_b = .182, p < .01$), although the effect sizes were small. Mothers’ history of alcohol problems, on the other hand, was not significantly associated with either adolescent alcohol use ($r_b = .118$) or coping motives ($r_b = .010$) at the .05 level. The weak direct association between father alcohol problems and adolescent alcohol use made the investigation of a potential mediating effect of coping motives all the more important. As significant associations between the predictor and mediator were found only for father alcohol problems, the mediation model was tested for father alcohol problems only.
Table 3

Correlations (one-tailed) Between Adolescent Alcohol Use, Coping Motives, and Age in Full Sample (N = 302)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Mother alcohol problems</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Father alcohol problems</td>
<td></td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Adolescent alcohol use</td>
<td>.118</td>
<td>.133*</td>
<td>--</td>
<td>.596**</td>
</tr>
<tr>
<td>4 Coping motives</td>
<td>.010</td>
<td>.182**</td>
<td>.604**</td>
<td>--</td>
</tr>
<tr>
<td>5 Age</td>
<td>.173*</td>
<td>.072</td>
<td>.172**</td>
<td>.118*</td>
</tr>
</tbody>
</table>

Note. Bivariate and biserial correlations are below the diagonal. Partial correlations, controlling for age, are above the diagonal.

*p<.05. **p<.01.

Mediation model. As only fathers’ alcohol problems were significantly correlated with coping-motivated drinking, the mediation model was not tested using mothers’ alcohol problems as the predictor. The indirect relationship, through coping motives, was examined between father alcohol problems and adolescent alcohol use in the full sample (see Table 4 for a full list of effects). There was a significant indirect effect of father alcohol problems on adolescent alcohol use through coping motives, \( b = 0.0819, 95\% \text{ Boot CI [0.242, 0.133]} \). This represents a kappa-squared effect size of \( \kappa^2 = .1261, 95\% \text{ Boot CI [0.0379, 0.1998]} \). In other words, the indirect effect was about 12.6% of the “maximum possible indirect effect that could have occurred, had the constituent effects been as large as the design and data permitted” (Preacher & Hayes, 2011, p. 106). The analysis was then repeated with age as a
covariate of the mediator and outcome. The indirect effect of father alcohol problems on adolescent drinking through coping motives, $b = 0.0821$, Boot CI [0.0238, 0.1320] remained significant. The standardized indirect effect, an estimate of effect size, for this model was 0.113 Boot CI [.030, .177]. See Table 4 for a full list of effects. In summary, the indirect relation between father alcohol problems and adolescent alcohol use through coping motives was statistically significant in the full sample, even when controlling for age.

\[ b = .075, \, p < .01 \]

\[ b = 1.097, \, p < .001 \]

Figure 5. Path coefficients for the mediation model of the relationship between father alcohol problems and adolescent alcohol use by coping motives in the full sample estimated using PROCESS.
Table 4

Path Coefficients and Effect Sizes for the 6 Models Estimated Using PROCESS

<table>
<thead>
<tr>
<th>Effects; $b$ (SE)</th>
<th>Mediation Models</th>
<th>Moderated Mediation Models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full Sample</td>
<td>Female Drinkers</td>
</tr>
<tr>
<td>$a_1$</td>
<td>0.0747** (0.0238)</td>
<td>0.0981** (0.0335)</td>
</tr>
<tr>
<td>$a_2$</td>
<td>-0.0002 (0.0030)</td>
<td>0.0000 (0.0042)</td>
</tr>
<tr>
<td>$a_3$ (Interaction)</td>
<td>0.0048 (0.0063)</td>
<td>-0.0012 (0.0082)</td>
</tr>
<tr>
<td>$b_1$</td>
<td>1.0973*** (0.0875)</td>
<td>0.4438*** (0.0938)</td>
</tr>
<tr>
<td>$c'_1$</td>
<td>0.0305 (0.0355)</td>
<td>0.0250 (0.0397)</td>
</tr>
<tr>
<td>$c'_2$</td>
<td>0.0003 (0.0044)</td>
<td>-0.0030 (0.0045)</td>
</tr>
<tr>
<td>$c'_3$ (Interaction)</td>
<td>0.0070 (0.0094)</td>
<td>0.0058 (0.0095)</td>
</tr>
<tr>
<td>$c_1$</td>
<td>0.1124* (0.0435)</td>
<td>0.0686 (0.0412)</td>
</tr>
</tbody>
</table>

+ $p < .10$     * $p < .05$     ** $p < .01$     *** $p < .001$
<table>
<thead>
<tr>
<th>Effects; $b$ (SE)</th>
<th>Mediation Models</th>
<th>Moderated Mediation Models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full Sample</td>
<td>Female Drinkers</td>
</tr>
<tr>
<td>Indirect effect</td>
<td>0.0819</td>
<td>0.0435</td>
</tr>
<tr>
<td>[Boot 95% CI]</td>
<td>[.0242, .1330]</td>
<td>[.0166, .0876]</td>
</tr>
<tr>
<td>Effect size ($\kappa^2$)</td>
<td>0.1261</td>
<td>0.0864</td>
</tr>
<tr>
<td>[Boot 95% CI]</td>
<td>[.0379, .1998]</td>
<td>[.0338, .1658]</td>
</tr>
<tr>
<td>Index of moderated mediation</td>
<td></td>
<td>0.0052</td>
</tr>
<tr>
<td>[Boot 95% CI]</td>
<td>[-.0072, .0173]</td>
<td>[-.0081, .0061]</td>
</tr>
</tbody>
</table>

$+ p < .10 \quad * p < .05 \quad ** p < .01 \quad *** p < .001$

*Note.* Standard errors are in parentheses. Key effects are bolded. See Appendices B through D for PROCESS output.
**Moderated mediation model.** It was hypothesized that the extent of the indirect effect of father alcohol problems (X) on adolescent alcohol use (Y) through the coping motives mediator (M) may depend on the hypothesized moderator (W), time in care. Further, it was proposed that the mediation process was moderated at both the level of the direct effect of X on Y and at the level of the indirect effect of X on Y. Analyses did not provide evidence of moderation of the indirect effect by time in care (see Table 4 for a full list of effects). Firstly, there was not a statistically significant interaction between X and W in the model of M (a_3 = .0048; p > .05), which showed a lack of evidence of moderation of the indirect effect. Therefore, the indirect effect of X on Y through M, (a_1 + a_3W) b_1, was not relevant. As the first stage of the mediation model (X→M) was not moderated, the hypothesized model did not stand. In the interest of clarity, the relevant coefficient for the direct effect was not statistically significant (c’_3 = .0070; p > .05), indicating a lack of evidence for moderation of the direct effect. Given the above, time in care did not have a statistically significant effect on the mediated relationship between father alcohol problems and adolescent alcohol use in the full sample. Thus, coping motives mediated the effect father’s alcohol problems on adolescent alcohol use in the full sample, irrespective of the length of time spent in the care of child welfare.

**Drinker Subsample**

Table 5 shows the prevalence of past year alcohol use for each of the three items that made up the measure of adolescent alcohol use (AUDIT-C) for the subsample of drinkers (n=165): frequency of drinking, typical quantity, and frequency of binge drinking. None of these consumption items differed significantly at the .05 level by gender. Over half (61%) of participants reported drinking once a month or less, roughly a quarter (23%) reported drinking 2-4 times per month, and the remaining participants (16%) reported drinking 2 or
more times per week. In terms of typical quantity of alcohol consumed, half (50%) the sample reported drinking 1-2 drinks on a typical occasion and the other half reported drinking 3 or more drinks on a typical occasion. The proportion of participants who reported that they had not engaged in binge drinking in the last year (35%) was roughly equal to the proportions who reported binge drinking less than once a month (32%) and once a month or more (33%).

Almost half (48.8%) the drinkers (n = 165) in the sample began drinking in Grade 8 or earlier, 36.6% began in Grade 9 or 10, and only 10.4% began in Grade 10 or later. The relationship between alcohol use and age was not significant at the .05 level (r = .081, p > .05) among drinkers. Results of Pearson’s chi-square analysis indicated that there was not a significant association between gender and age of initiation of drinking, $\chi^2(1) = 4.32, p = .23$. In terms of motives for drinking, the coping motives mean item score ranged, in drinkers, from 1 to 4 ($M=1.82, SD=0.96$), out of a possible score of 5. The coping motives scores were similar for males compared to females (see Table 2).

Bivariate relationships were similar in the subsample of drinkers (See Table 6) as compared to the full sample, with the exception of the relationship between father alcohol problems and adolescent alcohol use, which was nonsignificant ($r_b = .109, p > .05$) among drinkers. In addition, while still highly significant, the magnitude of the association between coping motives and adolescent alcohol use was somewhat smaller in drinkers (medium effect; $r = .374, p < .01$) as compared to the full sample. Pearson’s chi-square was used to determine whether there was an association between father or mother alcohol problem status (presence/absence, separately by parent) and typical quantity of alcohol use (nondrinkers; 1-2 drinks; 3 or more drinks on a typical occasion). There was not a significant association
between whether or not mothers had alcohol problems and the risk-level of adolescent 
alcohol use $\chi^2(1) = 2.88, p = .09$, nor was there a significant association in the case of fathers 
$\chi^2(1) = 1.72, p = .19$. Results of Pearson’s chi-square analysis also indicated that there was 
not a significant association between gender and typical quantity (non-drinker; 1-2 drinks; 3 
or more drinks) $\chi^2(1) = 0.19, p = .67$. 
Table 5

*Prevalence of Past Year Adolescent Alcohol Use by Gender*

<table>
<thead>
<tr>
<th>Frequency drinking</th>
<th>% Female drinkers</th>
<th>% Male drinkers</th>
<th>% Drinkers</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once a month or less</td>
<td>65.3</td>
<td>53.7</td>
<td>60.6</td>
<td>&gt; .05</td>
</tr>
<tr>
<td>2-4 times per month</td>
<td>18.4</td>
<td>29.9</td>
<td>23.0</td>
<td></td>
</tr>
<tr>
<td>2 or more times per week</td>
<td>16.3</td>
<td>16.4</td>
<td>16.4</td>
<td></td>
</tr>
<tr>
<td>Typical quantity</td>
<td></td>
<td></td>
<td></td>
<td>&gt;.05</td>
</tr>
<tr>
<td>1-2 drinks</td>
<td>58.7</td>
<td>37.5</td>
<td>50.0</td>
<td></td>
</tr>
<tr>
<td>3 or more drinks</td>
<td>41.3</td>
<td>62.5</td>
<td>50.0</td>
<td></td>
</tr>
<tr>
<td>Frequency binge drinking</td>
<td></td>
<td></td>
<td></td>
<td>&gt;.05</td>
</tr>
<tr>
<td>Never in the last 12 months</td>
<td>42.3</td>
<td>25.0</td>
<td>35.4</td>
<td></td>
</tr>
<tr>
<td>Less than once a month</td>
<td>27.8</td>
<td>37.5</td>
<td>31.7</td>
<td></td>
</tr>
<tr>
<td>Once a month or more</td>
<td>29.9</td>
<td>37.5</td>
<td>32.9</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* P-value refers to the significance level of the association between past year alcohol use and gender variables, measured using Pearson’s chi-square analyses, where $p < .05$ indicates a significant association.
Table 6

*Correlations (one-tailed) Between Adolescent Alcohol Use, Coping Motives, and Age in Subsample of Drinkers (n = 164)*

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Mother alcohol problems</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Father alcohol problems</td>
<td></td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Adolescent alcohol use</td>
<td>.155</td>
<td>.109</td>
<td>--</td>
<td>.375**</td>
</tr>
<tr>
<td>4 Coping motives</td>
<td>.025</td>
<td>.237**</td>
<td>.374**</td>
<td>--</td>
</tr>
<tr>
<td>5 Age</td>
<td>.146</td>
<td>.108</td>
<td>.081</td>
<td>.002</td>
</tr>
</tbody>
</table>

*Note.* Bivariate and biserial correlations are below the diagonal.
Partial correlations, controlling for age, are above the diagonal.

*p<.05. **p<.01.

**Mediation model.** Mediation analysis was performed in the sub-sample of drinkers in order to examine the hypothesized model in those individuals for whom reasons for drinking are most salient. Again, due to the lack of significant associations with mother alcohol problems, the model was only tested for father alcohol problems as the predictor. There was a significant indirect effect of father alcohol problems on adolescent alcohol use through coping motives, \( b = 0.0435, \) Boot 95% CI [0.0166, 0.0876]. This represents a relatively small effect size of kappa-squared = 0.0864, 95% Boot CI [0.0338, 0.1658]. In other words, the indirect effect is about 8.6% of the maximum value that it could have been, given the study design. As age was not significantly associated with the mediator or outcome, it was not included as a covariate. See Table 4 for a full list of effects.
Figure 6. Path coefficients for the model of the mediation of the relationship between father alcohol problems and adolescent alcohol use by coping motives in the subsample of drinkers estimated using PROCESS.

Moderated mediation model. Analyses in the subsample of drinkers did not provide evidence of moderation of the indirect effect by time in care (see Table 4 for a full list of effects). Firstly, there was not a statistically significant interaction between X and W in the model of M \((a_3 = -0.0012; p > .05)\), which showed a lack of evidence of moderation of the indirect effect. As the first stage of the mediation model \((X \rightarrow M)\) was not moderated, the hypothesized model did not stand. Further, the direct effect was not statistically significant \((c'_3 = .0058; p > .05)\), confirming the lack of evidence for moderation of the direct effect. Once again, time in care did not have a statistically significant effect on the mediated relationship between father alcohol problems and adolescent alcohol use in the subsample of drinkers. Thus, coping motives mediated the effect father’s alcohol problems on adolescent alcohol use in drinkers, irrespective of the length of time spent in the care of child welfare.

Drinkers by Gender

As can be seen in Table 2, the prevalence of parental alcohol problems was somewhat different for males as compared to females, with male drinkers reporting somewhat higher
rates of both mother and father alcohol problems (31% and 50%, respectively) than females (21% and 40%); however, as reported previously, presence of parental alcohol problems was not significantly associated with drinker status for either males or females ($p > .05$).

Table 5 shows the prevalence of past year alcohol use for each of the three items that made up the measure (AUDIT-C) of adolescent alcohol use for the subsample of drinkers broken down by gender. Although there was not a significant difference on any of these three items by gender, some trends in the direction of consumption of a larger typical quantity of alcohol by males, as well as more frequent binge drinking, emerged.

Bivariate relationships were examined separately for male and female drinkers. Relationships were investigated between parent alcohol problems, adolescent alcohol use, and endorsement of coping motives. There was a significant positive relationship between coping motives and adolescent alcohol use, and the strength of the relationship was greater in female ($r = .445, p < .01$) as compared to male ($r = .253, p < .05$) drinkers. An association between father alcohol problems and coping motives was present in the subsample of female drinkers ($r_b = .456, p < .01$), but not in the subsample of male drinkers ($r_b = .082, p > .05$). Mother alcohol problems was not significantly associated with either female ($r_b = .093, p > .05$) or male ($r_b = .188, p > .05$) adolescent coping motives. The relationship between parental history of alcohol problems and adolescent alcohol use was weak and nonsignificant for both mothers and fathers. This last point again emphasized the importance of investigating a potential mediating effect of coping motives. As the association between father alcohol problems and coping motives was significant for female, but not male, drinkers, the model was tested only in the subsample of female drinkers.
Table 7

*Correlations (one-tailed) Between Adolescent Alcohol Use, Coping Motives, and Age in Subsample of Female Drinkers (n = 98)*

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<td>1 Mother Alcohol Problems</td>
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<td>3 Adolescent Alcohol Use</td>
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<td>.450**</td>
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<tr>
<td>4 Coping Motives</td>
<td>.093</td>
<td>.456**</td>
<td>.445**</td>
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<td>5 Age</td>
<td>.074</td>
<td>.218*</td>
<td>.051</td>
<td>.069</td>
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*p<.05. **p<.01.

Table 8

*Correlations (one-tailed) Between Adolescent Alcohol Use, Coping Motives, and Age in Subsample of Male Drinkers (n = 67)*

<table>
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<td>2 Father Alcohol Problems</td>
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<tr>
<td>3 Adolescent Alcohol Use</td>
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<td>.239*</td>
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<tr>
<td>4 Coping Motives</td>
<td>.188</td>
<td>.082</td>
<td>.253*</td>
<td>--</td>
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<tr>
<td>5 Age</td>
<td>.197</td>
<td>.075</td>
<td>.172</td>
<td>.112</td>
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</table>

*p<.05. **p<.01.
**Mediation model.** As reported above, the hypothesized direct relationship between parental history of alcohol problems and adolescent drinking was not found, but there was a significant association between father alcohol problems and coping motives, and a significant association between coping motives and alcohol use in female adolescent drinkers. Thus, the hypothesized indirect relation between the predictor and outcome through coping motives was tested. The indirect effect is the combined effect of the paths from the predictor to the mediator and from the mediator to the outcome. Non-significance of the direct relationship does not impact the suitability of a test for mediation; presence of relationships between the predictor and mediator and between the mediator and outcome are sufficient for a test of mediation (Hayes, 2009). Thus, we tested whether coping motives mediated the relation between parental history of alcohol problems and adolescent drinking.

The indirect relationship, through coping motives, was examined between the father history of alcohol problems and adolescent alcohol use in female drinkers. The indirect relation between father alcohol problems and adolescent alcohol use through coping motives was statistically significant in the subsample of female drinkers. There was a significant indirect effect of father alcohol problems on female adolescent alcohol use through coping motives, $b = 0.0898$, Boot CI [0.0412, 0.1696]. This represents a medium effect, kappa-squared = .1801, 95% Boot CI [0.0869, 0.2988]. In other words, the indirect effect is about 18% of the maximum indirect effect possible in this study. See Table 4 for a full list of effects.
Figure 7. Path coefficients for the model of the mediation of the relationship between father alcohol problems and adolescent alcohol use by coping motives in the subsample of female drinkers estimated using PROCESS.

**Moderated mediation model.** Analyses in the subsample of female drinkers did not provide evidence of moderation of the indirect effect by time in care (see Table 4 for a full list of effects). Firstly, there was not a statistically significant interaction between X and W in the model of M ($a_3 = .0062; p > .05$), which showed a lack of evidence of moderation of the indirect effect. As the first stage of the mediation model ($X \rightarrow M$) was not moderated, the hypothesized model did not stand. Further, the direct effect was not statistically significant ($c’_3 = .0042; p > .05$), confirming the lack of evidence for moderation of the direct effect. Once again, time in care did not have a statistically significant effect on the mediated relationship between father alcohol problems and adolescent alcohol use in the subsample of female drinkers. Thus, coping motives mediated the effect father’s alcohol problems on female adolescent alcohol use, irrespective of the length of time spent in the care of child welfare. Results across all three sample showed that the effect of parental alcohol problems on adolescent alcohol use through coping motives is not contingent on time in care.
Chapter Four: Discussion

The objective of the present study was to examine whether coping motives mediate the relationship between parent alcohol problems and adolescent drinking in a sample of severely maltreated children who were involved with child welfare. Given the established association between coping motives for drinking and hazardous alcohol use (see e.g., Comasco et al., 2010; Mares et al., 2013), and given the relevance of coping with negative affect to a child welfare sample (see e.g., Hanson et al., 2006), this study focused on coping motivated drinking. The present study further aimed to determine whether the mediation of the relationship between parental and adolescent drinking by coping motives is moderated by length of exposure to parental models of drinking, measured by time spent in the care of child protective services. Mediation and moderated mediation models were tested using a logistic regression-based path analytic framework with the PROCESS macro for SPSS (Hayes, 2013). Results were examined separately for the full sample, drinkers only, and male and female drinkers. There was a strong association between coping motives and drinking in this sample. Overall, results showed that coping motives for drinking mediate the effect of fathers’ alcohol problems on offspring alcohol use (in the full sample, drinkers only, and female drinkers) in severely maltreated children, irrespective of the length of time spent in the care of child welfare. The present findings corroborate those of Muller and Kuntsche (2011) with the exception of the gender effects, which were not replicated here, providing further support for a meditational model of intergenerational transference of hazardous alcohol use through drinking motives.

Other interesting findings to emerge from this work concerned patterns of drinking in this high-risk sample. Specifically, compared to community samples, the prevalence of
alcohol use was lower than expected, though among youth who did drink, the prevalence of hazardous alcohol use was somewhat higher than expected. There was only one significant relationship between drinker status and demographic variables, contrary to expectations. Each of these findings is discussed in turn, followed by the results of the mediation analysis.

Perhaps the most striking finding was that the prevalence of alcohol use was unexpectedly low in the present sample, relative to the norm. Nearly half of this sample of child welfare involved youth abstained from drinking alcohol (see also Wekerle, Leung, Goldstein, et al., 2009). Based on provincial population data on normative use, the expected proportion of drinkers in Grades 10, 11, and 12 is 54%, 68%, and 74%, respectively (OSDUHS, 2013); whereas, in the present sample, rates of drinking in Grades 10, 11, and 12 were 31%, 52%, and 54%, respectively. One possible explanation for this finding is increased monitoring and availability of support and resources owing to the involvement of caseworkers and child welfare more generally (Wekerle, Leung, Goldstein, et al., 2009), particularly in the case of Crown Wards, who made up the majority of the sample. In related research, McWey, Cui, and Pazdera (2010) found that youth’s externalizing problems decreased significantly over time spent in foster care, particularly for males, suggesting beneficial effects of child welfare involvement. Another explanation, which relates back to SLT, is that abstinence may be a deliberate choice following exposure to parental alcohol use in the context of maltreatment (Wekerle, Leung, Goldstein, et al., 2009). Whether or not a learned behaviour is accessed in a particular context depends on the perceived functional value of the behaviour as well as model characteristics (Wall & McKee, 2002). Adolescents exposed to maltreatment may wish to distance themselves from parents, and therefore choose not to use the same maladaptive coping strategies they observed, particularly if drinking was associated with the aversive context of maltreatment. Irrespective of the reason, current
results show that a significant proportion of adolescents exposed to severe maltreatment who are involved with child welfare choose not to drink.

Among youth who do drink, however, rates of hazardous drinking tended to be higher than normative levels. The finding that drinkers in the present sample seem to have a somewhat higher rate of consumption, in terms of both binge drinking and typical quantity of alcohol, as well as younger age of initiation, compared to normative data, suggests higher risk for later alcohol problems for adolescents involved with child welfare who drink. Specifically, rates of binge drinking were proportionately slightly higher than expected, with 65% of drinkers in the present sample reporting binge drinking at least once in the past 12 months, compared to 57% of high school students who drink in the community (OSDUHS, 2013). Regarding typical quantity, the OSDUHS provincial student survey is not readily comparable to the present study due to differing response options; therefore, data from the CADUMS (2012) national survey (ages 15-24) provides a better comparison. In the current sample of female drinkers, 51% exceeded the Canadian adult guidelines for hazardous use (Butt et al., 2011; CADUMS, 2012) for typical quantity, which is twice the rate reported (for males and females) in the CADUMS (2012). It is also important to note that any drinking in this sample, in which most participants were under legal age, is hazardous.

Consistent with previous studies of maltreated youth, the current study also found a low mean age of initiation (14 years in the present sample compared to a normative mean age of 16, CADUMS, 2012) (Tonmyr et al., 2010; Wekerle, Leung, Goldstein, et al., 2009). The younger age of initiation in the child welfare population is cause for concern, given the association between early drinking and later problems with substance use (Jackson & Sher, 2005). Taken together, the above findings of patterns of hazardous alcohol use suggest an increased risk of later alcohol problems for drinkers in the present sample.
With respect to potential relationships between demographic factors and alcohol use in adolescents, only number of moves and ethnicity were significantly associated with drinker status in the present sample. Number of moves has previously been found to be an important unique risk factor for substance use among adolescents in child welfare (Aarons et al., 2008). Although race or ethnicity has previously been identified as a correlate of alcohol use in adolescents, with levels of alcohol use and related problems higher among white versus minority participants (See e.g., Khan, Cleland, Scheidell, & Berger, 2014), the present finding is not in the direction expected. However, neither number of moves nor ethnicity can explain the gender effects found in the mediation analysis (namely, that the mediation held only for fathers and daughters), as neither of these demographic variables were significantly associated with gender in the subsample of drinkers. Furthermore, it is important to note that the effect size for ethnicity was very small. Although the scant research on alcohol use in child welfare samples makes formation of hypotheses challenging, alcohol use may be expected to be associated with certain living arrangements (i.e., group home) more than others (i.e., foster or adoptive parents), owing to hypothesized differences in monitoring and delinquent peer involvement, factors which have been shown to impact alcohol use in adolescents (Aarons et al., 2008; Singh, Thornton, & Tonmyr, 2011). What’s more, adolescents living with foster or adoptive parents would be expected to have an increased opportunity for observational learning from adults demonstrating adaptive coping behaviours and a less chaotic and more supportive living situation, other factors shown to impact substance use in offspring of alcoholics (Cooper, Peirce, & Tidwell, 1995). However, contrary to expectation, neither current living situation (placement type) nor care status (e.g., Crown Ward) were associated with whether or not adolescents drank alcohol (drinker status) in the present sample.
This study found support for a meditational model that linked father’s history of alcohol problems to adolescent girls’ hazardous alcohol use, mediated through coping motives. These relationships were not supported for boys or mothers. Potential explanations for these gender effects are tentative, as previous findings have been mixed (Marsden et al., 2005; Muller & Kuntsche, 2011; Seljamo et al., 2006; Van Damme et al., 2015). Some studies have suggested a slightly greater effect for mothers in predicting offspring hazardous drinking (e.g., Marsden et al., 2005; Muller & Kuntsche, 2011), while one study found a stronger association with father’s alcohol use (Seljamo et al., 2006), and yet another found that either a heavy drinking father or two heavy drinking parents predicted hazardous alcohol use in adolescents (Vermeulen-Smit et al., 2012). Although Muller and Kuntsche (2011) found differences in the association between mother versus father alcohol use and adolescent alcohol use, they found that drinking habits of mothers were a slightly better predictor of hazardous drinking in offspring of both genders in a community sample. Van Damme and colleagues (2015) also found differences by parent; however, when stratified by gender, the significant mediated effect remained only in boys. Specifically, paternal drinking indirectly affected offspring drinking through enhancement motives (Van Damme et al., 2015).

Gender findings in the present study might be related to an internalizing pathway to hazardous alcohol use for that is stronger for girls than boys. Past research has found that, in response to childhood adversity, there is a tendency for adolescent girls to exhibit more internalizing problems (Martel, 2013), while adolescent boys tend to exhibit more externalizing problems (Castelao & Kroner-herwig, 2014; Keiley, Lofthouse, Bates, Dodge, & Pettit, 2003). Given that the present study examined coping motives for drinking, or drinking to manage negative affect, it follows that a higher incidence of symptoms of depression, anxiety, and somatization would facilitate this internalizing pathway to hazardous
alcohol use in girls. Indeed, in the present study, the positive association between coping motives for drinking and adolescent alcohol use (supporting previous research, see e.g., Comasco et al., 2010; Cooper et al., 2000; Van Damme et al., 2015), was stronger in female as compared to male drinkers. Community survey data supports this internalizing hypothesis in that girls more frequently reported symptoms of anxiety and depression and coexisting hazardous levels of drinking (OSDUHS, 2013) compared to boys, suggesting a stronger association between negative affect and hazardous drinking for females. Although in the early stages, research examining gender differences in children of alcoholics also found that daughters of alcoholics were more vulnerable to internalizing symptoms (see e.g., Furtado, Laucht, & Schmidt, 2006; Hussong, Flora, Curran, Chassin, & Zucker, 2008; see also Park & Schepp, 2015 for a review), while sons of alcoholics were more vulnerable to externalizing symptoms (see Park & Schepp, 2015 for a review).

This explanation is also relevant to a child welfare sample. While findings of gender differences associated with exposure to maltreatment are variable, with high rates of co-occurring internalizing and externalizing symptoms for boys and girls (Cicchetti & Toth, 2005; Godinet, Li, & Berg, 2014), there is some consistency in the direction of girls showing an increase in internalizing symptoms over time as compared to boys (Brensiver, Negriff, Mennen, & Trickett, 2011). Additional evidence for this is that past studies have found that, for girls, relationships between drinking motives and alcohol-related consequences are stronger for coping motives (e.g., Kuntsche et al., 2006), suggesting different etiological pathways to hazardous alcohol use for males and females. For example, enhancement and coping motives have been found to mediate the relationship in males and females, respectively, between alcohol use and both history of maltreatment (Goldstein et al., 2010) and parental alcohol use (Muller & Kuntsche, 2011). Taken together, this research provides
some support for increased vulnerability to internalizing symptoms for female offspring of alcoholic fathers, which would logically increase motivation to cope with that distress, potentially by drinking. With respect to the present findings, it may be that the pathway linking internalizing symptoms and hazardous drinking is stronger for girls than boys.

The present findings also point to the potential significance of the father-daughter relationship in the transmission of hazardous alcohol use through coping motives for drinking. This finding is somewhat difficult to explain using a social learning framework. According to SLT, motivational processes that affect performance of behaviours are impacted by the extent to which the adolescent values or identifies with the model parent (see Wall & McKee, 2002), which would more readily explain an association between father and son alcohol use. An alternate potential explanation refers to the association between paternal alcoholism and childhood family stressors such as job instability (see e.g., Sher, Gershuny, Peterson, & Raskin, 1997). Family stress and adversity leads to greater internalizing problems for girls as compared to boys, based on the research cited above. Conversely, father’s positive involvement (e.g., use of positive parenting behaviours) have been shown to be associated with lower internalizing scores in children, although potential gender effects remain obscured (see Pougnet et al., 2011 for a review). This hypothesized link between fathers and daughters references back to internalizing as a pathway to hazardous drinking for girls, but not boys. With regard to the present sample of youth in the care of child welfare, father alcohol problems, particularly in the maltreatment context, may in part reflect family stress, which in turn may be associated with internalizing symptoms in girls and therefore potentially strengthen the pathway to hazardous drinking through coping motives.

Contrary to hypothesis, there was no support for moderation by time in care of the indirect effect of father’s alcohol problems on adolescent alcohol use through coping
motives. Building on the social learning framework used in this study, it was hypothesized that there would be a weakening of the relationship between parent and adolescent alcohol use, through coping motives, with increased time in care and consequent reduction in parent exposure. However, in this sample, endorsement of coping motives mediated the effect of fathers’ alcohol problems on female adolescent alcohol use irrespective of the length of time spent in the care of child welfare. Four possible explanations for the lack of support for a moderating effect of time in care will be discussed in turn: the complexity of the construct of time in care; the strong impact of genetics on hazardous alcohol use; the insufficiency of a social learning framework and the need for the complexity of a developmental psychopathology approach to take into account the impact of severe maltreatment; or simply that adolescents who have been removed from their parents’ care may vary in their ability to report parental alcoholism, related to age of removal from their parents’ care.

The first potential explanation for the lack of support of moderation by time in care is that the construct of time in care is not straightforward. On one hand, greater time in care encompasses decreased exposure to alcoholic parents, including less opportunity to learn to use alcohol to cope with negative affect (if, indeed, this was the process for parents) and removal from a toxic environment. On the other hand, increased time spent in the child welfare system, possibly with the instability of multiple caregivers, may itself contribute to drinking over time (see Traube et al., 2012 for a review). As foster care has been associated with internalizing (as well as externalizing) problems (Simmel, Barth, & Brooks, 2007), a potential counter-effect to the benefit of removal from the family home, adolescents in foster care may drink for coping reasons. With respect to the present sample, increased stress and internalizing symptoms in girls resulting from child welfare involvement may be associated with coping-motivated hazardous drinking, countering the effect of reduced opportunity for
modeling of coping motivated drinking. Whatever the pathway, coping motivated drinking may become a generalized response to aversive conditions due to deficits in coping skills (Bandura, 1999; see also Wall & McKee, 2002) associated with a maladaptive early caregiving environment.

A second potential explanation relates to the strong heritability of hazardous alcohol use, which is unrelated to time in care. Research shows that genetic factors strongly influence intergenerational transmission of alcohol use. A recent meta-analysis of twin and adoption studies (Verhulst, Neale, & Kendler, 2015) estimated heritability of alcohol use disorders at 49%, with shared environmental effects accounting for only 10% of the variance, and non-shared environmental influences varying widely by study. These substantial genetic effects are present irrespective of length of parental involvement and may overshadow the impact of social learning.

A third potential explanation relates to the need to take into account multiple interacting factors when considering risk factors for hazardous alcohol use, necessitating moving beyond a social learning model. In addition to the impact of exposure to drinking parents, the impact of maltreatment is substantial. Multiple distal risk factors, including genetics, gene by environment interactions (Bucholz et al., 2006), early relationships, and social learning likely influence the proximal risk factor of coping motives for alcohol use. However, the sheer complexity of these interacting factors makes measurement challenging. Observational learning may play a role, but social learning in isolation is likely insufficient to account for the development of hazardous drinking (Wall & McKee, 2002). The developmental psychopathology perspective (Cicchetti & Sroufe, 2000; Sroufe, 2013) is an alternate theory that provides a useful lens through which to view the multiple mechanisms by which drinking behaviour is transferred between generations. According to the model,
the disruption of developmental processes and compromise of opportunities for adaptation interact with the individual’s unique risk and resiliency (e.g., compensatory mechanisms) in ways that make the individual more vulnerable to the emergence of maladjustment (Sroufe, 2013). Risk or vulnerability to hazardous alcohol use may be conferred by various mechanisms, including genetic and environmental factors. This is similar to the idea of a “double whammy” of genetic and environmental risk factors that Jaffee, Moffitt, Caspi, and Taylor (2003) described for offspring of fathers with a history of antisocial behaviour. As national data (Canadian Incidence Study of Reported Child Abuse and Neglect – 2008; Public Health Agency of Canada, 2010) has shown that caregiver alcohol abuse was documented, in 21% of substantiated child maltreatment investigations in Canada, a substantial minority of children are exposed to the dual risk factors of parental alcohol problems and maltreatment. In terms of classification, family (shared) environmental factors can be broken down into alcohol-specific and alcohol-nonspecific influences (Ellis et al., 1997). Alcohol-specific influences include exposure to parental alcohol use and associated modeling of alcohol consumption generally, as well as drinking to cope with negative affect. Alcohol-nonspecific influences include maltreatment (Cicchetti & Toth, 2005) and problems in parenting related to parental alcohol use (Duncan et al., 2006). In the present child welfare sample, the impact of the alcohol-nonspecific factor of maltreatment may be critical to understanding the full extent of risk for hazardous alcohol use. There is evidence that maltreatment is a significant risk factor for adolescent alcohol use, even controlling for potential mediating factors, including parental alcohol abuse (Shin et al., 2009), age, gender, and race (Shin et al., 2009), and that maltreatment experiences contribute to alcohol use in this sample (Goldstein, Flett, & Wekerle, 2010). Similarly, Hanson and colleagues (2006) examined parental alcohol use as a potential moderator of the relationship between history of
maltreatment and adolescent substance use problems. While the researchers found that parental alcohol use was independently associated with substance use, it did not exert a moderating effect. As research suggests the presence of increased negative affect related to childhood maltreatment (Cicchetti & Toth, 2005), it may be that, in the present sample, the need for coping with maltreatment-related distress, and consequently the motivation to drink to cope, is a significant contributor to the pathway to adolescent hazardous drinking. Consequently, consideration of the total picture of adverse experiences better captures the extent of the risk factors faced by this population than social learning in isolation.

A final possible explanation for the lack of moderation by time in care, which would also impact findings regarding the direct effect of parental alcohol problems on adolescent alcohol use, is the differential accuracy of reporting parental alcoholism related to time in care. Specifically, the length of time a youth has been in care affects how removed they are from their biological parents, which in turn may affect their perception of their parents’ behaviour. For example, those individuals who were removed from their parents’ care at a young age would have had limited exposure to their parents’ alcohol use and may therefore be less aware of parent alcohol problems. In addition, the likelihood of father absence (i.e., no involvement) may be assumed to be higher in a child welfare sample, such that offspring reports may be based on hearsay or limited knowledge of father. So, in the present sample, it may be that participants who are Crown Wards and therefore out of their parents’ care for longer may have less knowledge of their parents’ alcohol use than those who have been in care for a shorter time. This inaccuracy in reporting may have obscured relationships between parent and youth alcohol use.
Limitations

It is important to note that there are some limitations of this study. Firstly, as just discussed, the present study relied on offspring report of parental alcohol problems (SMAST), with a lack of corroboration or outside information. This is a limitation, as time in care may have influenced adolescents’ report of their parents’ alcohol problems. As the majority of participants in the present sample were Crown Wards, meaning that parental rights were terminated, and as ability to report accurately on parent behaviour may vary according to age at removal from parental care, a significant number of adolescents in the present sample may be unreliable reporters of their parents’ alcohol problems. Therefore, additional caution should be used in interpreting the lack of direct association between parent alcohol problems and adolescent alcohol use among drinkers, over and above that being exercised due to the solid evidence of strong heritability of alcohol use disorders (see Verhulst et al., 2015, for a recent metaanalysis). As the relations presented in this study rely on youth-report, it would be advisable for future studies to include parent report of past alcohol problems or other corroborating data, such as caseworker’s report or file review to determine whether substance use was identified as part of the investigation.

Other aspects of the study suggest some caution in interpretation of the finding of a meditational model of intergenerational transference of alcohol use among fathers and daughters. Relationships were not strong between some of the variables, most notably between father alcohol problems and both coping motives and adolescent alcohol use, and a relatively small amount of variance (18%) was explained by the meditational model. Although the present study found some evidence for the proximal association between coping motives and adolescent alcohol use in girls, greater understanding is needed with regard to other predictors of hazardous alcohol use before targets for intervention can be
confirmed. Moreover, the gender effects found in the present study have not been replicated and are inconsistent with some other studies, as discussed earlier. Further, due to limitations of sample size combined with normative patterns by gender, there were relatively few alcohol problems in mothers as compared to fathers; consequently, the finding of a father effect may be a result of limited power, necessitating replication with a larger sample size.

The inability of the present study to account for the substantial genetic effects, which account for almost half the variance in intergenerational transmission of alcohol use (Verhulst, Neale, & Kendler, 2015), is an additional limitation. It has been suggested that drinking to manage affect (including coping motives) overlaps with genetic variation in alcohol use disorders to such an extent that it is actually a reflection of genetic risk, rather than a mediator of that risk (Prescott, Cross, Kuhn, Horn, & Kendler, 2004); however, the gender effects found in the present study suggest a more complex relationship, potentially involving interactions between genes and the environment. The present study found a moderate association between father's history of alcohol use and coping motives in female adolescents and a weak but significant association between the same variables in male adolescents. As recent metaanalysis (Verhulst, Neale, & Kendler, 2015) did not find evidence for sex differences in heritability, future researcher must look to environmental influences and gene by environment interactions for a deeper understanding gender effects. By including genetic factors, and examining gene by environment interactions, future research may begin to tease apart genetic from environmental contributors to coping motives and to understand why this relationship may differ for males vs. females.

Another limitation of the present study is the exclusive analysis of one type of motive for drinking. While inconclusive, previous research has pointed to gender effects as well as the possibility of a lack of specificity in the transmission of drinking motives from parents to
offspring (Mares et al., 2013). Therefore, it may be that the weak association between parental alcohol problems and coping motives in boys in the present study was partly due to the exclusive inclusion of one type of motive in the current analysis.

While not seen as a limitation of the present study, it is important to note that measurement of maltreatment experiences were somewhat narrow, due to the use of adolescent report in a sample of adolescents, many of whom would have had very early experiences maltreatment (e.g., 28% of participants had been in child protection for 10 years or more). Information about the circumstances of apprehension and the chronicity, severity, and precise nature of the maltreatment was not available. Such information may be relevant in determining alcohol use trajectories and therefore may be included in future studies if available (e.g., case worker report). For instance, persistent maltreatment and maltreatment experienced during adolescence have been found to be most strongly associated with substance use in adolescence compared to other types of childhood maltreatment (Tonmyr et al., 2010).

Finally, the sample used for the present study is limited in terms of representativeness, as adolescents were considered ineligible for participation if they had a developmental delay, were absent without leave (i.e., had terminated contact with their child welfare caseworker), or were deemed to be in psychiatric crisis. What’s more, the recruitment rate was 67.0%, indicating a further process of self-selection. The final sample consisted of only 36.1% of those initially deemed eligible for the MAP study, due in part to missing data on key measures. As such, participants in the present study were relatively stable in terms of mental health, in contact with their case worker, of broadly average cognitive ability, and willing to answer a lengthy questionnaire including items relating to their own and parents’ alcohol use. While selection bias is a common phenomenon, it is
important to keep in mind that the present sample is not representative of the full spectrum of the child welfare population.

**Future Directions**

Replication of the present findings is essential, particularly in order to determine whether the relationship between fathers’ alcohol problems and daughters’ later hazardous alcohol use was unique to this sample. The relatively low rates of drinking in the present sample also mark the need for replication of findings. Secondly, a study using longitudinal data is necessary to elucidate causal relationships. Such a study could measure changes in offspring alcohol use over time in order to allow for possible latent effects that emerge in early adulthood. A potential moderating effect of time in care may be more clearly seen when adolescent alcohol use and problems are measured over time in those individuals who have been permanently removed from their parents’ care (i.e., Crown Wards).

Although much research has looked at biological fathers’ presence, other studies showing the beneficial impact of consistent father involvement on child emotion regulation in toddlerhood have not discriminated between biological and non-biological (or social) fathers (e.g., Vogel, Bradley, Raikes, Boller, & Shears, 2006). Future research that broadens the focus from biological to social fathers would allow for exploration of the impact of foster parent drinking. Coupled with a measure of father involvement, this may also serve to further elucidate genetic vs. various family environmental influences. In the present sample, the majority of participants (61.5%) identified their biological mother as their mother figure, while less than half of participants (46.9%) identified their biological father as their father figure. A fair portion identified another adult as their father (34.6%) figure, with the remainder not identifying a father figure. This is not seen as a limitation of the present study, as complex caregiving relationships are to be expected in a sample with a large proportion of
Crown Wards, and parental history of alcohol problems referred specifically to biological parents. However, future analysis of differences in consumption or motives related to father figure identification would be particularly relevant in a child welfare sample such as the present one.

Given the suggestion of gender effects in the present study and previous research that points to differing effects of maltreatment and parent alcohol problems in boys vs. girls, future research is needed to better understand the effects of parental alcohol problems on boys. As enhancement motives have been found to mediate the relationship between alcohol use and both history of maltreatment (Goldstein et al., 2010) and parental alcohol use (Muller & Kuntsche, 2011) in males, where the same studies have found a meditational role of coping motives for females, and as the present study found a moderate association between coping motives and alcohol use in girls as compared to a weak association between coping motives and alcohol use in boys, the inclusion of enhancement motives seems important to future research. Also, given the tendency for boys to show more externalizing problems in response to early stressors, it may be that, if an externalizing measure (e.g., involvement with antisocial peers) were included, a strong father effect may have been seen for boys. By including enhancement motives, which also relate to affect regulation, and an externalizing measure, future research may elucidate important mechanisms accounting for the transmission of intergenerational alcohol use for males in a maltreatment sample.

**Clinical Implications**

Interesting sample characteristics emerged from the present study that highlight the need for increased understanding of the various contributors to both hazardous alcohol use and abstention from alcohol in the context of child maltreatment, child welfare involvement, and, for some, parental alcohol problems. The unexpectedly low prevalence of alcohol use in
the present sample points to the need for investigation of the specific factors that inform the choice not to drink, which may well inform future prevention programs as well as intervention efforts for drinkers in this population. At the same time, those who did drink showed some indicators of risk in their patterns of alcohol consumption, including early age of initiation and levels of binge drinking and typical quantity of consumption above the norm. This highlights the need to screen for and think about hazardous drinking among drinkers involved with child welfare, and suggests the practicality of focused intervention efforts for hazardous drinkers.

More work needs to be done in understanding the proximal factors for boys who engage in hazardous drinking, as the present study only spoke to potential pathways in girls. Given the present findings, a secondary prevention strategy may be most efficiently aimed at female adolescents involved in child welfare who drink to cope with negative affect. Intervention may help to lessen the likelihood of going on to develop alcohol problems in adulthood, perhaps in part by developing adaptive strategies to tolerate or otherwise manage negative affect, which may reduce motivation to drink in the face of negative affect, although this remains an area for further study. Confirmation of the proximal risk factor of coping motives for drinking in a child welfare sample opens up potential opportunities for identification of those at risk and avenues of inquiry for intervention, particularly in girls.

Although viewed cautiously, the lack of a clear association between parental alcohol problems and adolescent alcohol use in the present sample is an argument for looking at more proximal predictors of adolescent alcohol use for youth in child welfare. Future research is needed that also broadens the lens in order to inform future intervention efforts for in this very high-risk group of adolescents. The relatively small amount of variance explained by the mediation model in a certain segment of the population (i.e., fathers and daughters)
speaks to the need for greater understanding of the various and potentially interacting risk factors involved in intergenerational transmission of hazardous drinking in the context of child maltreatment.

**Conclusions**

The present study extends the existing literature on the pathways to adolescent alcohol use by using data from a high-risk child welfare sample and examining both historic environmental factors (i.e., parent alcohol problems), and current coping motives for drinking. Youth in child welfare are largely a neglected population, in spite of their high level of risk for impairment (see e.g., Cicchetti & Toth, 2005; Hovdestad, Tonmyr, Wekerle, & Thornton, 2011) and the strong association between maltreatment and alcohol (and other substance) use and problems in adolescence (see e.g., Shin et al., 2009; Tonmyr et al., 2010) and across the lifespan (Green et al., 2010; Tonmyr, Wekerle, Zangeneh, & Fallon, 2011). Use of a child welfare population provided unique opportunities for inquiry in the present study, including increased salience of the associations because of the expected higher prevalence of hazardous alcohol use as well as the chance to examine the impact of length of exposure to parental alcohol use by virtue of varying lengths of time spent in care.

This study provides some early evidence of a meditational model of intergenerational transfer of alcohol use for fathers and daughters in a child welfare sample. Coping motives for alcohol use mediated the relationship between fathers’ alcohol problems and adolescent alcohol use in female, but not male, adolescent drinkers. As such, data was obtained for girls regarding the proximal predictor of coping motives, which seems to be related to internalizing coping with negative affect, for alcohol use. With respect to gender effects in the relationship between parents’ and offspring alcohol use, the present study added to already mixed findings in this area.
The impact of father alcohol use on coping motives was not moderated by the amount of time adolescents had been in the care of child welfare, suggesting that exclusive use of a social learning framework is insufficient for understanding this complex population. Consistent with the developmental psychopathology model, the untested hypothesis is that several distal risk factors, including maltreatment, impaired development of adaptive coping skills, and modeling of maladaptive coping behaviours, along with strong genetic risks and gene by environment interactions, feed into the proximal risk factor of drinking to cope with negative emotions.

Finally, the stratification of the present high-risk sample into abstainers and hazardous drinkers points to a need for increased understanding of the various influences on alcohol use for adolescents with a history of severe maltreatment involved with child welfare. The question of why a substantial proportion of the present sample chose not to drink during adolescence remains unanswered; prevalence data from the current sample open up interesting questions about nondrinking, and answering them promises to deepen our understanding of this oft neglected, high-risk population and to inform future prevention efforts.
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