ADOLESCENT DRINKING: A LONGITUDINAL STUDY ON THE OUTCOMES OF ATYPICAL AND NORMATIVE TRAJECTORIES OF ALCOHOL USE.

by

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Abstract

Recently, studies on adolescent alcohol use have revealed distinct subgroups of behaviour. While previous research has focused on extreme patterns of use, more prevalent drinking behaviours are garnering increasing attention. This thesis focused on the study of normative alcohol use in adolescence and its implications for long-term outcomes of socio-emotional adjustment in young adulthood. Of primary interest were the differences in adjustment between trajectories of alcohol use groups, particularly those displaying normative alcohol use behaviours, abstinence, and high-risk use. A large sample, representative of the Canadian population was employed to this end. Hierarchical regression models were used to test the associations between emotional intelligence scores, alcohol use trajectories, and a number of additional variables believed to impact these associations. Contrary to expectations, trajectory risk level did not predict emotional intelligence in any of the tested models. Significant effects of the independent variables are discussed, along with implications for future research.

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Alcohol use during adolescence is widespread. In Canada, the results of five national school-based surveys conducted between 1990 and 2006 revealed that the majority of grade 10 students report having been drunk at least once in their lifetime (Elgar, Phillips & Hammond, 2011). In Ontario, 74.9% of 10th grade students report consuming alcohol in the past year, and other provincial surveys conducted in Alberta, British Columbia, Manitoba, Quebec, and the Atlantic provinces report similar rates of previous episodes of intoxication and monthly alcohol consumption consistent with national surveys (AADAC, 2005; Adlaf &Paglia-Boak, 2007; Elgar, Phillips, Hammond & King, 2011; Friesen, Lemaire & Patton, 2007; Perrom &Loiselle, 2002; Poulin & Elliot, 2007; Tronkin, Murphy, Lee et al., 2005).

Recent research has provided evidence for the existence of distinct developmental trajectories of alcohol use throughout adolescence and into early adulthood (Chassin, Prost & Pitts, 2002; Guo et al., 2002; Tucker, Ellickson, Martino & Klein, 2005). These studies illuminate the various pathways to acquisition and subsequent development of alcohol use behaviours. Longitudinal research that has followed individuals and tracked drinking behaviour has identified a variety of homogenous subgroups that follow particular patterns of use (Bates & Labouvie, 1997; Cable & Sacker, 2008; Chassin, Prost & Pitts, 2002; Tucker et al., 2005). While much research has focused on identifying the 'high-risk' subsets of drinkers—those that are most likely to develop alcohol use disorders—more prevalent patterns of use are receiving increasing attention.

In general, alcohol consumption increases steadily during adolescence, peaks in the early 20s, and slightly declines thereafter (Spaeth, Weichold, Silbereisen & Wiesner, 2010; Weisner, Weichold & Silbereisen, 2007). There is, however, a fair amount of heterogeneity in terms of particular aspects of these trajectories. That is, while overall consumption follows a general trend, the antecedents, age of onset, and outcomes associated with drinking patterns may be unique to various subgroups. For example, Zucker and colleagues (1995) differentiated between six subgroups of adolescent alcohol use based on age of onset, chronicity, and comorbid symptoms. While Zucker and colleagues defined these six subgroups rather pejoratively (e.g. "antisocial alcoholism subtype"), others have found that relatively stable high-level patterns of adolescent use did not correlate with deviant or abnormal behaviours or outcomes, such as alcohol dependence (Weisner, Weichold & Silbereisen, 2007) suggesting that even frequent use in adolescence may not necessarily be associated with a 'high-risk' trajectory of alcohol use. In fact, these 'normative' trajectories reflect drinking behaviour that is typical of the average adolescent, and is less likely to be associated with subsequent abuse or dependence.

This thesis focuses on the study of normative alcohol use in adolescence and its implications for long-term outcomes of socio-emotional adjustment in young adulthood. Increasing our understanding of normative alcohol use will not only prove informative for the study of problem use, but will also build on current knowledge of the nature and role of alcohol use throughout crucial developmental periods.

What is 'normative' alcohol use?

Throughout this paper the term 'normative' will be used interchangeably with 'experimental' to describe the patterns of drinking behaviour that are typical of the average adolescent. Longitudinal studies have consistently identified trajectories of alcohol use that are deemed normative because they account for the majority of the sample's drinking behaviour (Chassin, Prost & Pitts, 2002; Schulenberg et al., 1996). As such, some researchers posit that, in terms of development, some experimentation with alcohol during the adolescent years can be considered normative behaviour (Newcomb, 1997; Newcomb and Bentler, 1988; Pedersen, 1993; Pedersen & Kolstad, 2000; Siebenbruner et al., 2006). Despite a substantial body of research confirming these normative patterns of use, the salience of many well established negative outcomes has resulted in much work focusing on problematic levels of use. This has lead to a relative dearth of empirical discussions, and lack of validated theoretical models, that explore normative alcohol use (Babchishin et al., 2010, Maggi, 2005).

Interestingly, the noted lack of normative theory may partially stem from the theoretical approaches that drive research of problematic substance use. For example, Babchishin and colleagues (2010) postulate that factors associated with problematic alcohol use are often assumed by researchers to be necessarily related to normative alcohol consumption. This perspective implies that predictors of normative alcohol use are the same, albeit fewer in number, of those for problem use. Thus, the assumption of a positive linear relationship between antecedent variables and level of drinking behaviour places experimenters between nonusers and abusers on a continuum of psychological adjustment (Shedler & Block, 1990). The fallacy in this approach is evident in the oversimplification of a behaviour that shares correlates in many domains. For example,

measures of childhood aggression or parental intrusiveness would be expected to predict levels of alcohol use in a linear fashion, while in reality the antecedents of distinct trajectories are likely distinct and subtly varying combinations of variables that pertain to multiple aspects of an individuals' life. It follows then that studies employing such an approach would not identify specific predictors of normative behaviour, as they would be considered to exist only insofar as their relation to alcohol abuse and dependence. Further, this configuration may lead to the presumption that, where reduced alcohol use is advantageous over elevated use in terms of psychosocial development, an absence of use must therefore represent the ideal circumstance for later adjustment.

While many researchers have found adolescent alcohol consumption to contribute to negative life outcomes and thus constitute problematic behaviour (Wills, McNamara, Vaccaro & Hirky, 1996), others have found contradictory results. Studies of high-risk alcohol use generally define said behaviour according to established criteria based on quantification of use, for example, two or more binge drinking episodes per week, where binge drinking is defined as the consumption of five or more drinks in an occasion (Schulenberg et al., 1996). In terms of psychosocial outcomes, this conceptualization of high-risk behaviours implies that the lack of alcohol use constitutes low-risk behaviour (Babchishin et al., 2010). However, abstinence has been described as another form of potentially problematic behaviour in past research on adolescent alcohol use (Jones, 1971; Vaillant, 1983). These findings implicate abstinence during adolescence as a hindrance to normal social development and overall psychological adjustment. Extending this notion, more recent studies have been conducted that have found that adolescents who experiment with alcohol use are either as well off as, or at a slight advantage in

terms of later psychosocial adjustment, than their abstaining counterparts (Cook, Young, Taylor & Bedford, 1998; Labouvie, Padina & Johnson, 1991; Shedler & Block, 1990; Wolff & Wolff, 2002). As previously noted, alcohol use research is often guided by epidemiological theories that seek to understand pathology; the body of research that aims to explore the full gamut of adolescent alcohol use pales in comparison. Because of the relative lack of empirical findings, research suggesting that individuals who experiment with alcohol display improved adjustment over those that abstain from substance use is inconclusive at this time. Likewise, aside from direct comparisons to problematic use, the psychosocial impact of complete abstinence during adolescence is not thoroughly understood (Sneed et al., 2004).

Given the diversity of adolescent alcohol use behaviours and their correlates, it is clear that more research is needed in this area before the nature of distinct patterns of drinking and their impact on development are understood. Specifically, it is important to develop an accurate portrait of the characteristics of heterogeneous drinking groups. Studying individuals who abstain from alcohol use, those who engage in experimental or normative levels of use, and those who escalate to problematic levels of use could increase our knowledge of the factors related to the development and maintenance of drinking behaviour, as well as subsequent outcomes related to particular trajectories.

Normative development and risk behaviours

Having employed the ostensibly presumptuous label of 'normative' in describing adolescent alcohol use, it is prudent to provide a brief discourse on normativity as it pertains to adolescent life. When assessing behaviour, the term conjures up that which is

reflective of the statistical mean. However, frequency alone does not sufficiently account for what constitutes a norm. That is not to say one should ignore the largest bar in the histogram; indeed frequency is a large identifier of normativity. That said, the construction of norms is a complex endeavour that transcends mere quantification.

Commencing in childhood, individuals formulate conceptions of different types of norms. These conventions are reasoned based on a contingency of common practice, rules, and authority (Turiel, 2006). Norms are both omnipresent and niche specialized—that is, we adhere to broad principles of governance (moral norms for instance) as well as highly specific norms that only apply in certain circumstances (e.g. refraining from wearing a white dress to a wedding). These "entailing obligations" should be followed, however, to do so universally is not only unfeasible, but highly problematic. As Turiel (2006) points out, people hold to more than one type of norm, which cannot be applied consistently across situations:

> "The coexistence of different domain understandings means that people take various issues into account when arriving at decisions…there is no general or unified norm that would handle all situations. The different domains of social thought that apply to social interactions make for a multiplicity of norms important for different aspects of social life." (pp. 199&205)

Applying this to the adolescent landscape, norms regarding alcohol consumption are not only created and maintained by more influential factors than mere frequency with which the behaviour is believed to occur at, but are weighed against conflicting norms from other domains in decisions of endorsement. The prodigious athletic talent vying for

a prestigious scholarship must balance his or her norms surrounding fitness, nutrition and performance in one domain against potential short-term social benefits in another.

Behaviour that falls under the various norm umbrellas, as they exist in their respective domains, often does so in serving a certain function in said domain. It has long been acknowledged that a propensity for risk-taking behaviour appears to be significantly increased during the period of adolescence (Michael & Ben-Zur, 2007). In her seminal work on theorizing the nature of adolescent delinquency, Terrie Moffit (1993) proposed that the relative spike in delinquent behaviour in adolescence is largely accounted for by the combination of two distinct patterns of offending: adolescent limited, and life course persistent. These two qualitatively distinct categories represent individuals with very different theoretical motives for engaging in antisocial behaviour, which may be concealed by their converging frequency in adolescence. For the life course persistent, it is argued, delinquency during adolescence is simply one point along a continuous antisocial course, with causal factors stemming from early childhood. In contrast, the adolescent limited delinquent's behaviour may have proximal causal factors that are specific to the developmental period. It is this latter category of behaviour that is of particular interest for the present study, as it may share some of the characteristics indicative of adolescent alcohol use. For one, it is noted that during adolescence, rates of criminal activity are elevated to such frequencies that they appear to be a normal aspect of teenage life (Moffit, 1993).

Moving beyond sheer numbers, participation in illegal activity during adolescence may occur when it is profitable to the individual, serving an advantageous function. In

this sense, alcohol use—explicitly illegal in most countries for the majority of the adolescent years—may be viewed as a special case of antisocial behaviour utilized in the same fashion to play a developmental role. While the motives driving the full gamut of delinquent behaviour surely vary, those behind alcohol use fit Moffit's (1993) general pattern by proffering access to some desirable resources (mature status, autonomy, peer group acceptance, opposite sex interaction etc.).

One possible contributor to the noted high frequencies of adolescent risky behaviour is that risk perceptions may be disproportionately low during adolescence. One recent study has demonstrated that a heightened sensitivity to affective information during adolescence may lead to lower risk perceptions during emotionally charged situations (Haase & Silbereisen, 2011). Further, as proximal causal factors are more relevant than distal influences in determining risk behaviour for most (i.e., the "adolescent limited" parallels of alcohol consumption), it is noteworthy that characteristics of immediate environments (chiefly relating to parents and peers) have been demonstrated to be more strongly linked to delinquent behaviour than characteristics of the individuals themselves (Wiesner, & Silbereisen, 2003). Indeed, peer context is a robust predictor of substance use during adolescence (Wiesner, Silbereisen, & Weichold, 2008). Given that alcohol consumption is largely a social behaviour, it is conceivable that adolescents find themselves in circumstances in which positive affective states (e.g. surrounded by friends at a social event) influence ones perception of risk involved in engaging in alcohol use, and that the putative gains of partaking in this illicit behaviour are favourably judged.

Interestingly, in opposition to the adolescent limited delinquency parallel of normative drinking, life course persistent offending shares features with more onerous patterns of alcohol use. In terms of risk, early onset and high alcohol consumption thereafter may be more closely related to personality characteristics and earlier problems in settings in which norms are commonly imparted (such as schools) than peer influences (Wiesner, Silbereisen, & Weichold, 2008). To this end, problematic pathways of alcohol use have been associated with negative temperamental characteristics and social problems with peers in childhood (Speath et al. 2010). This comparison is suggestive of problematic behaviours that cluster in the more extreme cases, representing a larger developmental trajectory along antisocial pathways throughout the life-course.

Focusing on the more common phenomenon of delinquent behaviours limited to adolescence, and thus not reflective of a larger antisocial pattern, the goal of their strategic employment is the gaining of social rewards (Michael &Ben-Zur, 2007). To the extent that risk-behaviour serves a functional role in adolescent development, the timing with which these behaviours are exhibited is important in determining their efficacy in addressing developmental tasks. It should come as no surprise that the experiencing of inherently risky or illegal behaviours at an early age might be associated with a host of negative outcomes later in life. Adolescence, though, is a period of great transition in which individuals stand on the cusp of adulthood in many ways, yet still harbour some features of childhood. Certain behaviours that would not be deemed risky during later stages of life may have a large impact at this time. The premature assumption of adult roles such as entering the workforce and substance use behaviours is associated with disengagement from the family and school, and has been linked to negative

developmental outcomes including social maladjustment, academic underachievement, psychopathology, and substance abuse (Breslin & Adlaf, 2005; Newcomb & Bentler, 1988; Tarter, 2002). Further, dysynchrony in the timing and rate of these developmental trajectories may be maladaptive in either direction; early or late assumption of adult roles and behaviours might contribute to later problems (Pavlova, Haase & Silbereisen, 2011; Tarter, 2002).

To test the effects of temporal variation in behavioural autonomy on psychosocial adjustment, Pavlova, Haase & Silbereisen (2011) examined the correlates of early, on-time, and late curfew autonomy in a large, nationally representative sample of German youth. Psychosocial adjustment included the following four domains: educational attainment, externalizing problem behaviour, subjective well being, and interpersonal relationships. These outcomes were assessed in both young (19-28) and middle (28-37) adulthood. Their results indicated that early behavioural autonomy was associated with poorer adjustment in all four domains than both of the other groups in both early and middle adulthood.

Late curfew autonomy was related to a more complex pattern of adjustment that was dependant on age. At younger ages, the late group was well adjusted in terms of educational attainment and externalizing problems, but reported poorer subjective well-being and interpersonal relationships than the "on-time" group. Interestingly, in middle adulthood, this group demonstrated more favourable results than both other groups in three of four domains (differences in subjective well-being were not significant). The authors conclude that, at younger ages, reduced peer interaction and few romantic

partners may run contrary to normative expectations, depriving the late group of some positive emotional experiences (Pavlova, Haase & Silbereisen, 2011). In the long-term, however, greater academic achievement and abstinence from risky behaviour are the norm in middle adulthood, when careers become a primary focus; missed youthful experiences no longer act as impairments to well being (Pavlova, Haase & Silbereisen, 2011).

Intuitively, it is possible to apply the temporal pathway of behavioural autonomy to risk behaviours—and particularly alcohol consumption—during adolescence. Early exposure to behaviours that adolescents are not mature enough to manage is problematic, while late exposure could mean the forfeiture of age-appropriate normative experiences. Perhaps, as Pavlova, Haase & Silbereisen's (2011) study seems to suggest, the idea of missing the "window of opportunity" in adolescence, as it pertains to experimenting with normative alcohol use and the functional role it plays in social development, only results in maladaptive outcomes in the short-term; these social deficits are mostly relevant in early adulthood, fading thereafter.

Abstinence: behaviour that is prosocial, antisocial, choice or consequence?

In terms of avoiding negative outcomes associated with risky behaviour, it is often thought that complete abstinence is the most effective method of prevention. Vast sums of money are spent on programs touting the benefits of chaste living. In the United States, programs implemented in educational settings not only focus on sexual abstinence as their primary component—as opposed to educating youth on health and safety—but must meet strict criteria in order to receive federal funding (Bogart, Collins, Ellickson & Klein,

2007). Explicitly requiring certain content for their funding, these programs are mandated to teach that abstinence provides social, psychological, and health benefits, and that sexual activity outside the context of marriage is likely to have harmful psychological and physical effects (Brandon, Smith, Trenholm & Devaney, 2010). While the prevention of risky behaviour is a virtuous endeavour, irrefutable evidence of the beneficial outcomes associated with abstinence (through replicable empirical research) remains to be seen. In fact, due to the many confounding variables associated with sexual activity during the adolescent years, findings suggest that associations between sexual abstinence and mental health cannot be deemed causal, nor can sexual abstinence in youth directly account for adult life satisfaction (Bogart, Collins, Ellickson & Klein, 2007; Else-Quest et al, 2005).

Research on other risky behaviours common to adolescence must be approached with respectful consideration of the complex web of influential variables operating in the arena of teenage life. In evaluating the social and psychological merits of abstinence, it is may be easy to overlook individual variability associated with outcomes. For example, ones definition of antisocial behaviour may differ extraordinarily based on his or her values at that particular life-stage. Individuals who chose not to engage in certain risky behaviours may view those who do as antisocial, and vice versa. Moreover, the reasons some engage in, or abstain from a particular behaviour may also differ greatly from those of their peers.

Characteristics and personality styles that render some youth unattractive to their peers, or that make them hesitant to join particular groups, may exclude them from opportunities to engage in these behaviours (Moffit, 1993). For abstainers that have made

a conscious choice not to partake in risky behaviours, motivations behind their decisions may also be quite different from one another. Some abstainers may have simply reasoned that it is in their best interest to avoid behaviour they believe to be harmful. There are, however, unique subgroups of adolescents that may have chosen abstinence as a response to a very specific source of conflict in their lives. Many of these individuals may have experienced, or witnessed detrimental consequences of specific behaviours (e.g. alcoholic family members) and choose abstinence in order to avoid causing harm to themselves or others (Copes & Williams 2007). With regards to alcohol consumption during adolescence, it has been noted that abstinence represents a statistically aberrant behaviour. When considering the subsequent psychosocial outcomes of abstainers, it is important to acknowledge the potential influence of factors contributing to their abstinence.

Normative Development and the Social Function of Alcohol

From a developmental perspective, behaviours that may be labelled as normative are generally regarded as positive facets of an individual's progression from childhood to adulthood. This makes intuitive sense: for the most part, normal behaviours are more likely to result in normal outcomes than abnormal ones. Following this line of thinking, deviation from that which is normative may lead to non-normative outcomes. Surely this deviation is not always a negative one, however, in the social realm it seems as though such deviations may contribute to certain forms of subsequent maladjustment. As previously noted, given the widespread use of alcohol during the adolescent stage of life, some experimentation with drinking may be considered normative behaviour. Thus,

patterns that deviate from experimentation may be regarded as developmentally non-normative and potentially associated with developmental maladjustment (Siebenbruner et al., 2006).

Some researchers have described a profile of personality characteristics that are indicative of non-normative childhood development. These characteristics strongly increased the probability of problematic alcohol use in adolescence (Bates & Labouvie, 1995). It seems reasonable that, for some, problematic alcohol use may simply be a continuation of a trajectory of deviant behaviour throughout the lifespan. In adolescence, problematic levels of drinking may be one specific behavioural manifestation of non-normative personality constellations. Conversely, average or experimental levels of use may be more closely aligned with normative development trajectories; this includes indicators of normal development reaching as far back as early childhood. For example, it has been found that positive social behaviours in childhood were predictive of experimental alcohol use in adolescence, whereas adolescents with problematic alcohol use patterns displayed inadequacies interacting with peers in childhood (Hops, Davis & Lewis, 1999). More recent research has also found social maladjustment in pre-adolescence to predict problematic drinking behaviour later in life (Maggs, Patrick & Feinstein, 2007), and positive childhood adaptation to predict alcohol experimentation—in contrast to abstaining, at risk use or abuse—in adolescence (Siebenbruner et al., 2006).

Developmentally, the period from adolescence to early adulthood is a unique epoch in which norms for alcohol use are distinct from the remainder of post-adolescent life. In a statistical sense, as individuals traverse the years of adolescence, consuming

alcohol gradually becomes normative behaviour, and abstaining accordingly becomes deviant (Pedersen & Kolstad, 2000). What may be considered normal experimentation with alcohol during this time generally involves consumption at levels that would likely reflect problematic use if this behaviour took place later in adulthood. Some researchers have argued that for college students, drinking behaviours and resulting negative consequences experienced, would likely reflect diagnosable alcohol misuse (and even alcohol dependence) at other points in the life span (Schulenberg & Maggs, 2002). So distinct is this period of elevated use that some research has found that it did not accurately predict later adult use (Ghodsian & Power, 1987), and that risk for problematic use assessed at age 18 has no direct, long-term effects on adult use and concomitant consequences later in adulthood (Bates & Labouvie, 1997). Similarly, while drinking may be predictive of outcomes that span many domains, it may be argued that such associations exist partially because of lifestyle factors, as drinking is not causally related to them (Wells, Horwood & Fergusson, 2004). Clusters of personality and lifestyle factors are particularly salient when studying the long-term effects of patterns of alcohol use.

Viewing adolescent alcohol use within the social context, the paradoxical associations between a potentially destructive behaviour and later adjustment become clearer. Adolescence is a dynamic period of growth and change that is inherently shaped by social contexts; roles and behavioural expectations are based on an individual's identification with social groups. As such, that which is deemed normative or deviant is defined by a social context that likely includes the experience of most adolescents (Grabner & Brooks-Gunn, 1996). Further, drinking is largely a social act. Because

situations that involve drinking are usually expressions of social interactions, patterns of drinking are intrinsically related to social variables (Rehm et al., 1996). Not surprisingly, it is in the social realm that adolescent experimentation with alcohol use plays a functional role in development. One of several vital life challenges that are reflected in the critical transition from adolescence to young adulthood is the establishment of autonomous identity (Newcomb, 1997). It has been posited that it is partially through the experimentation with a diverse array of behaviours that adolescents form autonomous identities (Siebenbruner et al., 2006). Alcohol experimentation may express a form of separation from parental control, and activities that contribute to this process may facilitate adolescent identity formation (Pape & Hammer, 1996). In addition, experiences with alcohol during this time period also proffer the potential of building and shaping of one's social relations. For example, increases in experimenting with alcohol have been found to coincide with increases in peer involvement and acceptance, indicating that adolescents may use alcohol as a means of achieving the developmental goal of establishing contact with same-age peers (Maggs & Hurrelmann, 1998). Drinking, and particularly incidents of consuming alcohol for the purpose of becoming intoxicated in social settings, may serve an active developmental function of facilitating the ease with which adolescents experience growth in social processes.

Positive experiences of alcohol are particularly evident, and may be particularly salient, during the transitional period of adolescence to early adulthood when young people experience a variety of personal growth including changes in role definition and identity. One large Scandinavian study examined a number of positive consequences attributed to drinking. Hauge and Irgens-Jensen (1990) noted that these effects—

manifested mostly by a loss of inhibitions in company with other people and an enhanced ability to establish contact with others—appeared to be related mostly to intoxication; the frequency of reported positive consequences increased with increasing frequency of incidents of intoxication. Further, they found that even after controlling for the level of consumption and frequency of intoxication, younger people experience the positive effects of drinking in conjunction with social situations more often than older people (Hauge & Irgens-Jensen, 1990).

Adolescent alcohol use, when employed as a means to a social end, may be interpreted as a form of prosocial behaviour, as it occurs in the context of friends, conversation, relaxation or celebration (Maggs & Hurrelmann, 1998). Experimenting with alcohol use may have a positive effect on social relationships, however, it is important to note that individuals who are already more socially active are more likely to engage in alcohol use. As with many types of behaviour, adolescent alcohol use is partially determined by the personality and biological characteristics that predispose one to the likelihood of engaging in this activity. There is evidence that youth who are more competent with their peers are more likely to engage in this behaviour (Siebenbruner et al., 2006). On one hand, individuals that are more extroverted may be more susceptible to peer influences, and thus more likely to engage in alcohol consumption as part of their regular social interactions (Tucker et al., 1995). On the other hand, youth who are more socially skilled will likely have increased opportunities to partake in incidents of drinking, as they will be more likely to participate in social activities such as parties that facilitate alcohol use (Siebenbruner et al., 2006). Conversely, individuals who are less adept socially are more likely to have reduced exposure to adolescent alcohol

consumption, either by exclusion or choice. Those youth that are most introverted and those who experience internalizing behaviour problems may not be active in their peer culture, and as a result may be more likely to refrain from drinking because of decreased opportunities (Siebenbruner et al., 2006). In order to resist the pressure to drink, adolescents who choose abstinence may also actively avoid situations in which alcohol plays an important role, such as parties and celebrations, consequently also missing out on potential benefits (Leifman et al., 1995). As previously noted, whereas abstinence is quite acceptable during periods in which moderate use is the norm, during the years of experimentation abstinence may be classified as deviant behaviour (Leifman et al., 1995). With the majority of their peers choosing to experiment with alcohol, individuals who abstain from drinking may be at a social disadvantage. Likewise, those who consume alcohol at levels beyond the accepted experimental norm may also be alienating themselves from their peers.

In addition to facilitating social processes, alcohol is also consumed for the purpose of self-medicating, or to relieve oneself of experiencing adverse symptoms. Youth who suffer from social anxiety or social phobia may use alcohol as an attempt to control their symptoms and cope with experiences of peer rejection and loneliness (Spaeth et al, 2010). As noted, the interpersonal domain is an important facet of adolescent life in terms of substance use behaviours. For individuals that are sensitive to stress, or particularly uncomfortable in social situations, alcohol use may be employed as a means to mollify anxiety. This pattern of self-medicating has been found to result in an increased risk for alcohol related problems, as use escalates (Brady, Tolliver & Verduin, 2007). Animal models of anxiety have also shown that stressors lead to increased self-

administration of alcohol and other substances of abuse, and that reinforcing properties of these substances may be heightened by stress (Piazza, 1998).

Evidence of a heightened sensitivity to affective information during adolescence has been previously discussed, and may have particular salience for anxious individuals. For individuals who are substance dependent, emotional stress and negative affective states have been shown to increase craving in lab studies (Sinha et al, 2003). This may be especially problematic for those who use alcohol to counter or control anxiety and subsequently develop onerous alcohol use behaviour, as a vicious cycle of anxiety and drinking would be difficult to break due to heightened sensitivity and increased reinforcement.

Personality characteristics such as introversion or extroversion may also predispose some individuals to social anxiety. Biederman et al. (2001) found that Behavioural Inhibition (BI)—a common index of introversion and a possible harbinger of anxiety problems—was selectively associated with avoidant disorder and social phobia, as well as a lower risk for disruptive behaviour disorders. Further, BI has been shown to be protective against delinquency (Kerr, 1997). Behaviourally inhibited individuals may avoid many forms of social interaction and in so doing, avoid both the positive outcomes and negative consequences of such experiences. Thus, while it is possible that those with more introverted personality styles may choose abstinence—or have abstinence choose them—it is also possible that these individuals may engage in the aforementioned self-medicating alcohol use to cope with anxiety in social settings.

Finally, when discussing the social function of alcohol experimentation during adolescence, it is important to mention the role of gender differences. Since it is consistently reported that males consume alcohol at a greater rate than females, it might be expected that the developmental function of alcohol use also differs by gender. Indeed, as the use patterns indicate, some research has found that alcohol use may be more salient to the development of adolescent males than it is for females. Separation from the family, with different parental expectations for male and female children, is one sex role that demarcates adolescence whereby males spend significantly more time with peers (Montmayor, 1983). It has been argued that alcohol consumption is a more central or integral aspect of male social life than of female social life (Pape & Hammer, 1996; Prentice & Miller, 1993). Given the importance placed on alcohol use for the male adolescent, drinking patterns that are a deviation from mainstream behaviour may also be seen as violation of prevailing sex role norms (Pape & Hammer, 1996). In this vein, the failure to experience specific positive consequences of drinking—such as reduced inhibition in approaching a member of the opposite sex—may have particular importance for young males when considering gender roles. If social pressure to consume alcohol is more salient for males than for females, it follows that subsequent outcomes relating to the adherence or divergence from the normative behavioural trajectory would also have a gender specific impact.

Psychosocial Outcomes Associated With Alcohol Use Trajectories

It is well-established that elevated frequency and intensity of alcohol use represents a significant risk for negative psychosocial outcomes. The associated problems range from rule breaking to crime, and psychopathological and physical symptoms to

significant mental and physical health problems (Chen et al., 2008; Labouvie, Padina & Johnson, 1991). However, as previously noted, less is known about the long-term impact of adolescent moderate or experimental levels of use or abstinence on psychosocial adjustment.

A number of studies have found that experimenters are generally well adjusted (Labouvie, Padina & Johnson, 1991) and in some cases, may be better adjusted than abstainers (Tarter, 2002; Wolff & Wolff, 2002). Experimenting with alcohol in adolescence may be viewed as the expected behaviour of individuals that progress along a trajectory of normative development. Developmental indicators of adaptation, including positive parental behaviour, have been found to be predictive of alcohol experimentation in adolescence (Siebenbruner et al., 2006). Based on their developmental histories, future adjustment is a reasonable prediction for those that experiment with alcohol. In terms of social development, experimentation with alcohol appears to be part of a range of normative social behaviours that adolescents successfully use to facilitate interactions with peers (Maggs & Hurrelmann, 1998). In early adulthood, drinkers with normative patterns of use have been described as having lower rates of psychological distress and poor health than both abstainers and heavy drinkers (Power, Rodgers & Hope, 1998).

Research that has examined outcomes for abstainers is much less abundant, and generally inconclusive. Some studies suggest that abstainers may be more maladjusted than experimenters, albeit in a much less observable manifestation than heavy drinkers (Cook et al., 1998; Jones, 1971; Shedler & Block, 1990; Vaillant, 1983). This maladjustment is surmised to take the form of mild psychological and social inadequacies

that limit ones experience of life on the whole, such as elevated introversion and reduced or abnormal social interaction (Leifman et al., 1995; Pedersen & Kolstad, 2000; Shedler & Block, 1990). Other findings suggest that abstainers may experience a developmental history with indicators of maladjustment (Siebenbruner et al., 2006). Further still, relatively little difference between abstainers and experimenters in terms of psychological adjustment has been demonstrated elsewhere (Milich et al., 2000; Walton & Roberts, 2004).

In addition to patterns concerning the level of alcohol use, the temporal aspects of drinking trajectories may also be of importance when considering psychosocial outcomes. Early alcohol use has been linked to a number of negative psychosocial outcomes including weak social networks and poorer mental health (Pedersen & Kolstad, 2000), risk for later alcoholism (Flory et al 2004; McGue et al., 2001), and lower rates of college completion and higher rates of criminal behaviour than those with a more typical age of onset (Tucker, Orlando & Ellickson, 2003). Newcomb (1997) describes the tenet of pseudo-maturity theory as the interference with the acquisition of psychosocial skills necessary for successful adult roles, due to the premature engagement in adult activities during adolescence. In line with this theory, research has demonstrated that males whose alcohol experimentation debut deviated from that of the mainstream—either too early or too late—showed indications of delayed adjustment to adult roles, and had poorer mental health than both abstainers and individuals with an average debut age (Pape & Hammer, 1996).

Outcomes may also be influenced by the gender of the individual in question. As previously outlined, research has shown that experimentation with alcohol may be more important for the development of males than for females (Pape & Hammer, 1996). Thus, the positive or negative consequences of membership in a particular alcohol use trajectory group may be more pronounced for males than for females. Finally, some findings suggest that any level of alcohol use, including moderate or experimental, is associated with negative outcomes (Cable & Sacker, 2008; Wills, McNamara, Vaccaro & Hirky, 1996). Taken aggregately, the inconclusive nature of the body of research examining alcohol use trajectories and their psychosocial outcomes is, at the very least, a plea for further investigation.

Emotional Intelligence

In recent years the construct of emotional intelligence has received a great deal of attention and has been applied in settings ranging from occupational and academic performance to everyday behaviours (Brackett, Mayer & Warner, 2004; Slaski & Cartwright, 2002)). Currently, there exist three major models conceptualizing emotional intelligence, each with different methods of assessment: Salovey-Mayer's ability-based measure (Mayer & Salovey, 1997), Goleman's (1998) multi-rater assessment, and Bar-On's self-report measured model (Bar-On, 1997). While each model is unique, the subcomponents are generally comparable and consist of both inter- and intrapersonal domains, as well as indexes of adaptation, and various emotionally based competencies and skills. For the purposes of this discussion, the Bar-On model represents the most relevant conceptualization of emotional intelligence, and the construct referred to

hereafter is based on said model, comprised of the following five key components: "the ability to recognize, understand and express emotions and feelings; the ability to understand how others feel and relate with them; the ability to manage change, adapt and solve problems of a personal and interpersonal nature; and the ability to generate positive affect and be self-motivated (Bar-On, 2006)."

Generally, emotional intelligence appears to be a fairly robust predictor of well-being. High emotional intelligence has been associated with a number of positive outcomes including: better coping strategies, quality of life, academic achievement, better social and personal relationships, social network size and quality, higher levels of life satisfaction, and lower levels of psychological distress, depression, and loneliness (Austin, Saklofske & Egan, 2005; Ciarrochi, Chan & Bajgar, 2001; Dwada & Hart, 2000; Limonero, Tomas-Sabado & Fernandez-Castro, 2006; Schutte et al., 1998; Slaski & Cartwright, 2002). The degree to which emotional intelligence relates to these outcomes depends not only on scores of the overall measure, but the individual subscales which may be directly linked to specific behaviours.

Due to the inherently social aspects of emotional intelligence, research on this construct has found significant associations with behaviours of interpersonal functioning. While distinct from personality traits, such as introversion/extroversion (Austin, Saklofske & Egan, 2005; Brackett, Rivers, Shiffman, Lerner & Salovey, 2006), emotional intelligence shares some features of this dimension as an indicator of socialization. However, whereas extroversion has been found to be positively correlated with behaviours such as substance use (Helgason, Fredrikson, Dyba & Steink, 1995),

emotional intelligence appears to have a more complex relationship to these behaviours, likely an artefact of the range of functioning covered by the subcomponents.

Overall emotional intelligence (five-factor scale) has been found to be negatively correlated with self-reported substance use, and low emotional intelligence had been identified as a risk factor for increased alcohol and tobacco use (Brackett, Mayer & Warner, 2004; Hill & Maggi, 2011; Trinidad & Johnson, 2002; Trinidad, Unger, Chou & Johnson, 2004). These associations have been largely attributed to a reduced ability to manage emotions and cope in the face of stress, anxiety and/or social pressures (Hill & Maggi, 2011; Trinidad & Johnson, 2002). Conversely, an enhanced ability to manage negative emotions may prevent the use of substances as a coping mechanism (Kun & Demetrovics, 2010). Indeed, higher emotional intelligence has been demonstrated to be positively associated with more effective (rational or task-focused) coping strategies and negatively associated with (emotion-focused) less effective coping (Bar-On, 1997; Saklofske, Austin, Galloway, & Davidson, 2007). Ostensibly, stress management would appear to be paramount in terms of emotional intelligence's utility as a protective factor for substance use. Other components of emotional intelligence may be differentially related to those behaviours.

Recent research on smoking has demonstrated that compared to non-smokers, individuals who were occasional smokers were more likely to have higher interpersonal competency (Hill & Maggi, 2010). Interestingly, this effect was gender specific, with males demonstrating occasional smoking behaviour alongside increased interpersonal competencies; females did not display this risk. It is possible that the enhanced

interpersonal competency in males is related to the aspects of socialization that expose them to substance experimentation. While the same would be true for females, perhaps unique protective features related to their emotional intelligence outweigh the influence of social pressures.

One robust finding of emotional intelligence research is the differential existence of characteristics and effects of this construct between genders. Brackett, Mayer and Warner (2004) found that low emotional intelligence was an important predictor of negative outcomes and poor adjustment for males, but not for females. Similarly, emotional intelligence has also been shown to be protective against negative outcomes in emotionally charged social interactions, and a good indicator of social competence for males (Brackett et al., 2006). Gender differences in emotional intelligence may not be surprising given the differential processing of emotional information between males and females (Damasio, 1994). Bar-On (2006) notes that when measuring emotional intelligence women routinely display more empathy, are more socially responsible, and relate better interpersonally; men show better self-regard, optimism, cope better with stress, and are more self-reliant than women.

Interestingly, a number of substance use prevention programs for youth appear to incorporate elements of emotional intelligence as they target universal "life skills" as a means of reducing the likelihood of developing these negative behaviours. Described by the WHO (1997) as "skills and competencies that enable children and adolescents to deal adequately with their daily challenges and their developmental tasks", these traverse the inter- and intrapersonal domains, and include—among other things—empathy, coping

with emotion and stress, and building and maintaining relationships (Wenzel et al., 2009). Applied in childhood prior to the development of substance use behaviours, these programs have demonstrated positive effects including reductions in both intentions to use alcohol, and actual rates of alcohol consumption (Spaeth et a., 2010; Wenzel et al., 2009). While effective in preventing later use of alcohol at elevated levels for most, Spaeth and colleagues (2010) found that, this approach was ineffective for high risk users. That is, individuals in a normative behavioural trajectory showed the buffering benefits of the universal life skills program, while those with difficult temperament and peer problems in late childhood did not (Spaeth et al. 2010). It is plausible that the benefits afforded to those that fall into normative groups, in terms of development, offset a variety of risks for negative outcomes. Harkening back to trajectories of overall behaviour, factors related to antisociality may be more influential for those minorities that follow the so called life-course persistent trajectory. As such, the boost to life skills that Spaeth et al. (2010) have observed is relevant for those in normative trajectories, but did not have a beneficial effect for those high risk users; the program's goals likely did not address a more potent set of needs these individuals possess.

Finally, these findings are noteworthy not only because the general and specific skills that these programs focus on appear to closely resemble those measured by emotional intelligence, but, as Bar-On (2006) notes, emotional intelligence is a malleable construct that can be improved with instruction and generally increases with age. This raises the question of directionality when looking at the relationship between emotional intelligence and substance use behaviours. While increased emotional intelligence may buffer against the early start and progression to escalated use, certainly the reverse may

also be true: elevated rates of substance use may lead to lower emotional intelligence (Trinidad & Johnson, 2002). Regardless, emotional intelligence presents a promising avenue of study, as the relationships between this construct and various areas of human behaviour are presently ill-defined. The application of emotional intelligence—and particularly the individual domains assessed by its subcomponents—as an indicator of psychosocial adjustment, and the link between this construct and alcohol use behaviour, represents one of possibly many inquiries.

The Present Study

This study aims to extend current knowledge of the outcomes of adolescent alcohol use patterns in a non-clinical Canadian sample by conducting a follow-up study to that conducted by Babchishin and colleagues (2010). This recent Canadian study used data from the National Longitudinal Study of Children and Youth (NLSCY) to identify trajectories of alcohol use from adolescence to young adulthood. The sample was comprised of 5,059 individuals (2,499 girls and 2,560 boys) that participated in the NLSCY. The distribution of residence location—twenty percent rural and eighty percent urban—was consistent with 2006 census data from Statistics Canada (Statistics Canada, 2009). For a full table of sample demographics see table 1.

Table 1

Demographic Characteristics of National Longitudinal Study of Children and Youth Sample Used to Create Alcohol use Trajectories

Category	%
Gender	
Female	49.4
Male	50.6
Age at cycle 1	
10 years old	53.67
11 years old	46.33
Community context	
Rural	28.9
Small Urban	24.19
Medium Urban	11.52
Large Urban	34.74
Ethnicity	
Canadian	23.4
English	9.6
French	20.6
Eastern-European	31.7
African-Canadian	0.6
Aboriginal	3.4

Asian	0.8
Other	9.9

Note: reproduced with permission from Babchishin et al., 2010

To identify longitudinal trajectories of alcohol use, Babchshin and colleagues (2010) analysed data for participants between 10-11 and 20-21 years of age. The Growth Mixture Modelling (GMM) technique was used with the Proc-TRAJ procedure from the Statistical Analyses Software (SAS) program. This process assigns each participant to a trajectory based on a probabilistic likelihood function by identifying various subgroups within a sample. A model composed of 5 trajectories was determined to be best fitted to the data (Figure 1). The most common trajectory was referred to as the Normative Trajectory based on the fact that the majority of the participants (47.9%) fell into this grouping. In addition, a late onset-infrequent drinking trajectory (10.5%), a late onset-moderate drinking trajectory (18.4%), an early onset-low frequency drinking trajectory (11.3%), and an early onset-moderate drinking trajectory (12%), were identified.

Predictors of membership in these groups were selected based on findings in the literature on adolescent substance use, and include the following: gender, socio-economic status, ethnicity, parental monitoring, parental nurturing and intrusiveness, school integration, school achievement, urban vs. rural residence, and child's behaviour (indirect aggression, physical aggression, prosocial behaviour, emotional/anxiety disorder, hyperactivity/inattention, property offense). Of these predictors, only community of residence, indirect aggression, and parental intrusiveness were significant predictors of trajectory membership (Babchshin et al., 2010).

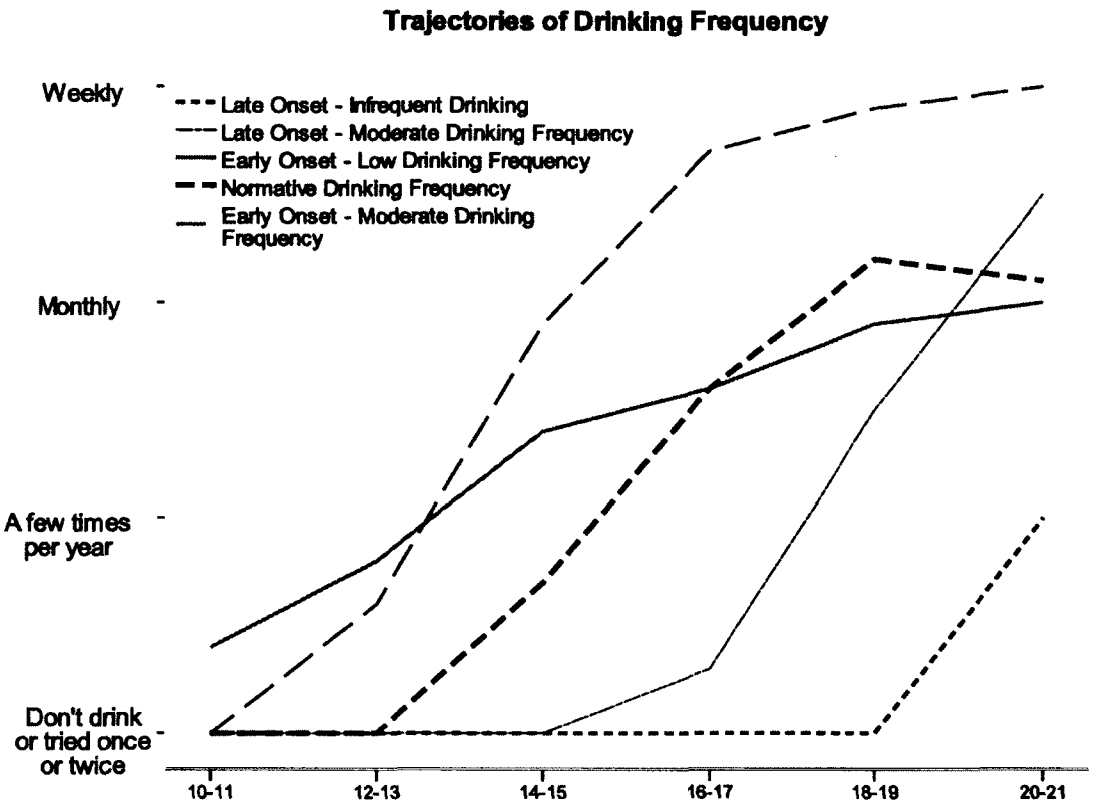

Figure 1. Drinking Frequency Trajectories (reproduced from Babchishin et al., 2010).

The current study seeks to explore psychosocial outcomes that are associated with specific patterns of alcohol use identified by Babchishin et al. (2010) to illuminate the impact that longitudinal drinking trajectories have on developing adolescents. To this end, I tested theory driven models, in which trajectories of drinking patterns were used to predict psychosocial outcomes. While all five previously identified trajectories were included, three of these are of particular theoretical interest in terms of predicting

psychosocial adjustment: the late onset-infrequent drinking trajectory, the normative drinking trajectory, and the early onset-moderate drinking trajectory. These frequencies represented abstinence, normative use, and high-risk drinking patterns respectively. Based on prior research, these three alcohol use behaviour profiles might be linked to developmental benefits and/or risks for later adjustment, and specific hypotheses for each are discussed individually.

Hypotheses: abstinence

The late onset-infrequent trajectory represents those individuals that did not experiment with alcohol during the adolescent years, and either maintained abstinence, or used alcohol infrequently in emerging adulthood. The failure to experience normative processes of socialization that include alcohol experimentation during adolescence was expected to have a negative impact on an individual's interpersonal relations. Further, this statistical relationship was also expected to be dependent on a number of mediating and moderating variables: 1) being male was hypothesized to result in more maladjustment in interpersonal relations, as alcohol experimentation is more central to the male adolescent's social development than that of females; 2) having attended, or being currently enrolled in, college was also hypothesized to result in greater maladjustment. The abstinent or late starting individual is theoretically at a social disadvantage by not participating in potentially meaningful social situations that are associated with alcohol use; this is particularly salient in college environments where alcohol use plays a large role; 3) it was anticipated that social support would also act as a moderator, with members of the abstainer/late starter trajectory who scored highly on this

measure to display more favourable outcomes in terms of interpersonal relations than those with low social support; 4) a high score on a depression scale was also believed to act as a moderator. It was hypothesized that individuals in this trajectory may be more likely to experience symptoms of depression that may be associated with reduced socialization. The elevated depressive symptoms experienced by these individuals may reasonably contribute to later social maladjustment. Similarly, it was expected that individuals who identified social relationships (e.g. family and friends) as their primary source of stress would display poor interpersonal relations. Membership in this trajectory may contribute to the experience of stress related to social interactions, which may in turn impact one's adjustment in terms of interpersonal competency.

Hypotheses: normative drinking

The normative drinking trajectory represents the drinking behaviours of the majority of Canadian adolescents. Experimentation with alcohol may be one of the many, common social behaviours the average adolescent experiences as part of his or her social development. As such, normative drinking was expected to be related to normal psychosocial adjustment as evidenced by efficacy of interpersonal relations. Individuals in the normative trajectory are theoretically at a social advantage as they are more likely to actively participate in social situations that are associated with alcohol use. In addition, a high score on the depression scale was believed to act as a moderator, accounting for a portion of any resulting deficiencies in inter-personal relations of those in the normative drinking trajectory. This may be further impacted by the level of social support the

individual experiences. Overall, it is expected that individuals in the normative trajectory will display average or above average scores on all EQ measures.

Hypotheses: high-risk drinking

Individuals that consume alcohol at an elevated rate during adolescence place themselves at risk for a number of negative outcomes. In terms of psychosocial outcomes, it was postulated here that these individuals would display deficiencies in stress management and adaptability. This statistical relationship was also expected to be dependent on a number of moderating variables: 1) gender was hypothesized to moderate the relationship between this problematic drinking trajectory membership and stress management and adaptability competency. It was expected that females would display poorer outcomes than males; while potentially risky for both genders, it is plausible that some males who drink at elevated levels will remain within the confines of social acceptability. Since drinking seems to be more heavily associated with the male role than the female, adolescent males may be less negatively affected by elevated drinking behaviour than females; 2) having attended, or being currently enrolled in, college was hypothesized to moderate the relationship between elevated drinking trajectory membership and psychosocial outcomes. Individuals in this trajectory are theoretically at risk for later maladjustment, experiencing the collegiate social realm—in which alcohol use plays a prominent role—however, may serve as a buffer to subsequent negative outcomes. As previously discussed, alcohol consumption at an elevated rate is generally widespread among college students; intuitively, elevated consumption may be less onerous for individuals attending college than those who do not; 3) the measure of social

support was also hypothesized to moderate the relationship between problematic drinking trajectory membership and psychosocial outcomes. Individuals who score highly on this measure may display more favourable outcomes in terms stress management and adaptability competency than those with low social support scores; 4) participants that are identified as experiencing moderate depression are expected to perform more poorly in terms of emotional intelligence scores.

Method

Data source

This study utilized data from the National Longitudinal Survey of Children and Youth (NLSCY). This ongoing survey has followed children's development since 1994 nation-wide. The NLSCY is a joint initiative by Statistics Canada and Human Resources and Social Development Canada and was designed for the purpose of informing social policies concerning child and adolescent development (Statistics Canada, 1997). Administered at two-year intervals, the NLSCY collects information concerning the factors found to influence the social, emotional, cognitive and behavioural development of youths.

Collection of data for this survey was conducted through a combination of in-person and over-the-phone interviews. Information was collected from the Person Most Knowledgeable (PMK) about the child; the mother served as PMK in 98% of the cases. For children over the age of 10 years, information is also collected directly via self-report. Individuals over the age of 18 supplied information via self-report only.

Questionnaires were designed by Statistics Canada and Human Resources and Social Development Canada to be age specific. Institutionalized individuals were excluded, as well as those residing on Indian reservations or Crown lands, and in the North West, Yukon, and Nunavut territories.

Participants

Data used for the identification of alcohol use trajectories were collected by Babchishin et al. (2010) from self-reports of participants between the ages of 10-11 and 20-21. Only participants who participated in Babchishin and colleagues' study (2010) and for whom there was data regarding their psychosocial outcomes at age 24-25 were included in this study (N = 869).

Measures

Alcohol use behaviour

Alcohol consumption patterns were determined by Babchishin and colleagues (2010) as previously discussed and readers may refer to said study for a detailed description of the methodology employed to establish trajectory membership. The five identified trajectories were ranked in order of risk level (low to high) for psychosocial maladjustment as follows: 1) normative drinking; 2) late onset moderate use; 3) early onset low frequency use; 4) early onset moderate drinking frequency; and 5) Late onset infrequent use/abstinence.

Psychosocial outcomes

To assess the relationship between substance use trajectories and early adulthood adjustment, the outcome variables of interest were derived from an emotional intelligence scale measured at ages 24-25 years. This measure is comprised of five subscales that evaluate ones adaptability to change, self-motivation, emotional management, social awareness and self esteem. The ability to tap into an individual's inter-personal relationship style and competency with social engagement—essential elements of psychosocial adjustment—makes this scale particularly salient in light of theoretical underpinnings. This Emotional Quotient and its subscales are described in detail in Appendix A.

Independent variables

A number of variables were examined to determine their potential influence and the nature of any such relationship on the outcome variables. Information concerning participants' and PMK reports of emotional and anxiety problems from ages 4-11 was retained from the corresponding data cycles and merged with all subsequent cycles. Data were extracted by this author from self reports of participants at 20-21 and 22-23 years of age for academic information; ages 22-23 for social support, social stress and depression items; and at 24-25 years of age for information concerning psychosocial adjustment and participant's gender, age and SES. These constructs are described in detail in Appendix B.

Procedures

Participants identified based on their trajectory membership were linked to cycles 6, 7 and 8 of the NLSCY database in order to include the most recent information available; data files from the previous cycles were merged with cycle 8 data. Once the data set was appropriately organized, diagnostic analyses were conducted on the sample. The data were thoroughly examined for any potentially important or influential anomalies in score and demographic distribution. As the primary analyses consisted of multiple regression techniques, a number of conditions were to be met. In advance of primary analyses all variables were assessed for these requirements, including but not limited to, missing values, univariate and multivariate outliers, multicolinearity and singularity, normality, linearity, and homoscedasticity. The NLSCY is a complex survey design—utilizing methods such as stratification and resulting in unequal selection probability—requiring the use of longitudinal weights. These weights were used to derive unbiased population estimates from the survey sample.

Analyses and Results

Diagnostic and Descriptive Analyses

Exploring the data using Statistical Package for the Social Sciences (SPSS) revealed no values outside of their expected ranges and means and standard deviations were deemed acceptable.

Of particular importance with a large sample of survey data, missing data were examined to determine both the reason for their absence, as well as how they may affect the outcome of the analyses. A missing value analysis determined that for all variables,

fewer than 5% of the data were missing. It was therefore appropriate to assume that the data were missing completely at random (MCAR), and that the pattern of missingness for each variable was not related to the variable itself or systematically related to any of the other variables in the dataset; the impact these values have on parameter estimates and standard errors is not significant.

Multicolinearity and singularity was assessed through examination of the bivariate correlation matrix of all variables. Singularity was identified for the two variables measuring childhood emotional/anxiety problems as indicated by a perfect correlation. To remedy this redundancy the self-report variable was retained and the PMK response variable was excluded from further analyses. These two variables were so similar that for all intents and purposes either could have been retained; however, it was determined that the self-report version was slightly more related to the outcome variables of interest and would thus be more fit for analyses. None of the other predictor variables displayed evidence of multicolinearity or singularity. In terms of outcome variables, the subscales of the emotional quotient and the five-factor emotional intelligence scale were correlated at levels high enough to cause concern. This was to be expected, as these scales were designed to measure similar aspects of a theoretical construct. Further, since these variables are employed exclusively (and independently) as outcomes in separate regression models, multicolinearity was not deemed problematic. Tolerance values were within acceptable range, And Variance Inflation Factor (VIF) values were not greater than or equal to 10 for each variable, and the average VIF was not substantially greater than 1, indicating no cause for concern in terms of multicolinearity.

There appeared to be a number of univariate outliers, consequently impacting the skewness of the respective variables. Z-scores were computed from the raw scores for the skewed variables. There were a number of cases with Z-scores for childhood emotional/anxiety problems (5%), social stress (5.5%), social support (2.1%) interpersonal competencies (6.8%), intrapersonal competencies (2.4%), adaptability competencies (4.2%) and overall emotional intelligence (2.3%) in excess of 1.96 ($p < .05$, two-tailed test). At the more conservative cut-off value of 2.58 ($p < .01$, two-tailed test), only childhood emotional/anxiety problems (1.8%) social support (2.1%), social stress (5.5%), and interpersonal competencies (4.2%) had outliers. Trajectories of alcohol use were omitted from discussion of univariate outliers because it is a grouping variable. In terms of multivariate outliers, 12 cases had Mahlanobis' distance values in excess of the calculated cut-off value χ^2 (17) = 40.70 ($p > .001$) indicating significant distance of cases from the means of the predictor variables. Cook's distance values, however, were well below 1, indicating that the overall influence of these cases on the model was minimal; the identified outliers were therefore deemed unproblematic.

Because of the tendency of likert scales to be heavily skewed, it was unsurprising that a number of multivariate "outliers" were identified by SPSS. It is believed that it is the combination of heavy skew on multiple variables that is responsible for their identification as multivariate outliers.

Inspection of visual aids (e.g. histograms, box plots etc.) revealed that only two of the original seventeen variables could be confidently considered normally distributed: the overall (five factor) emotional intelligence scale, and SES. Each of the five subscales of

emotional intelligence, while approaching normality, displayed a slight negative skew and appeared leptokurtic. Three of the variables appeared to be positively skewed: trajectory risk level, depression scale scores, and childhood emotional/anxiety problems. Examination of departures of SPSS generated skewness and kurtosis values from zero confirmed the noted visually based conclusions. Inspection of normal probability plots revealed evidence of nonnormality for all variables. With the exception of the trajectory groups, depression scores, and childhood emotional/anxiety problems, however; these departures from normality were slight. Empirical tests of normality (Kolmogorov-Smirnov) were significant for all variables, suggesting evidence of nonormality. It should be noted, however, that this test is highly sensitive to small departures from normality when sample sizes are large, therefore the significance of this test was deemed somewhat meaningless for this sample and was not relied on.

The dichotomous variables age, gender, and college attendance were approximately evenly distributed. While available in full at other cycles, only three items from the social support scale used in the NLSCY were administered to the age group of interest. These three items were highly correlated with each other. To avoid redundancy and multicolinearity, it was decided that one item would be selected as an indicator of social support; "someone to trust when having problems" was the item most highly correlated with the others and was selected to represent social support. This variable was skewed, as the likert scale responses were largely dived among the two categories "agree" and "strongly agree" (30.5% and 67.4% respectively). Due to this characteristic a dichotomous split was performed to create a social support variable representing moderate and high levels of social support.

To address the largely skewed scale score distributions of the depression and childhood anxiety/emotional problems variables, it was determined that a dichotomous split would be most appropriate. Transformation of either distribution to bring them within normal range would interfere with interpretation, as these variables are both derived from meaningful scales indicating levels of psychopathology (Tabachnick & Fidell, 2007). For both variables, dichotomizing resulted in adequate splits (Childhood emotional/anxiety problems = 66% : 34%; depression = 68% : 32%) to proceed with analyses.

Research has found that when considered ordinal scales, scores on likert scales will not be normally distributed, but skewed (Norman, 2010). Further, Wu (2007) reports that skewness is common with likert scales, and that researchers frequently must either accept or ignore assumptions of normality when conducting parametric tests on likert scale data. Norman (2010) used a set of heavily skewed data measured on an ordinal likert scales in order to demonstrate the robustness of parametric tests; with respect to violations of assumptions, the Pearson correlation was deemed extremely robust. Based on these findings it was determined that the trajectory risk group variable would not be altered, and that parametric testing would be conducted as planned, albeit with caution.

Residuals scatterplots were inspected upon testing of the regression models. No problems of linearity or heteroscedasticity were detected. Independence of errors was assessed using the Durbin-Watson coefficient, which was within the appropriate range for all of the tested models. The assumption of independence of cases could not be directly

tested but based on the researcher's knowledge of the data collection procedures, it was determined that this assumption had been met.

Inferential Analyses

To examine the relationships between trajectory membership and psychosocial outcome, it was necessary to determine the appropriate method based on the theoretical underpinnings of alcohol use behaviours. It was hypothesized that, in terms of risk related to outcomes, the trajectories should be ranked in an ordinal fashion. We ordered the trajectories in the following way based on the known and expected consequences of potential negative outcomes of drinking behaviours: 1) normative drinking; 2) late onset moderate use; 3) early onset low frequency use; 4) early onset moderate drinking frequency; and 5) Late onset infrequent use/abstinence. To empirically test this order, and to assure that the trajectories could in fact be treated as such, an ordinal regression with a test for parallel lines was performed. The test for parallel lines was not significant (χ^2 (3) = 3.242, p = .356), indicating that the coefficients of the slopes across the five trajectories were not different. This provided empirical support for the variable to be treated as an ordinal predictor in hierarchical regression models.

Upon carrying out the regression analyses, it was evident that the predicted significant relationship between trajectory membership and psychosocial outcome did not exist. Therefore, there was no logical rationale for examining effects of possible mediation among the set of variables of interest (see individual regression analyses below for the respective F-tests). While initially I had planned to conduct analyses using Structural Equation Modelling (SEM) to test my hypotheses of moderation, the findings

above suggest that hierarchical regressions would be most appropriate in terms of efficiency and parsimony, and SEM would not offer an added value to my analysis.

It should be noted here that the analyses were carried out first on unweighted sample data, then on the same data weighted using the appropriate longitudinal weights that account for attrition longitudinally. Finally, an adjusted weight was calculated by dividing the longitudinal weights by their mean value. This was necessary in order to account for inflation, as the application of unadjusted longitudinal weights drastically increase the sample size and thus affect analyses accordingly. The result of adjusting the weights is such that the relationships between the variables are preserved as they exists on the unweighted sample, and the results become reflective of a national sample.

Hierarchical models were employed with causal priority as the rationale for entering predictors of theoretical interest sequentially. That is, for each model, variables were entered in order of their interest in terms of contribution to the outcome of emotional intelligence as well expected influence. First, trajectory risk level (alcohol consumption trajectory membership ordered by level of risk) was entered in step one. In step two the following five variables were added: enrolment and completion of college at ages 20-21, and 22-23; social stress; gender; social support; and depression. Step three included control variables of age, SES, and childhood emotional/anxiety problems. In all, six models were created using this procedure, each with different dependent variables: one with the overall emotional quotient as the outcome, and one for each of the five emotional intelligence subscales. A final analysis was performed in which interaction

terms were created to test possible moderating effects of the independent variables on emotional intelligence outcomes.

Hierarchical regression analysis one: five factor emotional intelligence

The omnibus F-test for step one of this analysis was not significant ($F(1, 209) = .765, p = .383$), indicating that trajectory group membership alone did not significantly predict overall emotional intelligence. The second model of this analysis was significant ($F(7, 203) = 5.963, p < .001$); addition of the aforementioned variables in the second step resulted in significant prediction of 17.1% of the variability in emotional intelligence scores ($R^2 = .171$). Change statistics indicate that the second model accounted for 16.7% of the variance in emotional intelligence beyond the initial model ($\Delta R^2 = .167$) and the third model accounted for an additional 3.5% ($\Delta R^2 = .035$.). This final model, with all variables included, was also significant ($F(10, 200) = 5.161, p < .001$), and is particularly noteworthy, as it predicts the largest proportion of variability ($R^2 = .205$) in emotional intelligence(20.5%) of the three models, and incorporates all variables of theoretical interest.

The unstandardized regression coefficients (B), the standardized regression coefficients (β), and the 95% confidence interval (CI) for each variable are presented in Table 2. There was a significant effect of gender on overall emotional intelligence ($t(200) = 2.631, p = .009, B = 3.309, SE_B = 1.258$); being female predicts an overall emotional intelligence score increase of 3.309. Depression was also a significant predictor, being moderately depressed resulted in a reduction in overall emotional intelligence scores of 3.32 ($t(200) = -2.56, p = .01, B = -3.23, SE_B = 1.30$). The presence

of childhood emotional/anxiety problems also had a significant effect, with afflicted individuals displaying scores of emotional intelligence 3.74 units lower than those without moderate affective disturbances.

Table 2

Final Model of Hierarchical Regression Analysis for Variables Predicting Emotional Intelligence

Variables	*B*	*SE B*	β	95% CI
Constant	48.65	28.31	N/A	-7.17 to 104.47
Trajectory	0.29	0.44	.04	-0.59 to 1.16
In school at 20-21	2.423	1.278	.13	-0.10 to 4.94
In school or graduated at 22-23	1.43	0.81	.12	-0.18 to 3.03
Social Stress	-0.33	0.43	-.05	-1.18 to 0.53
Gender	3.31	1.26	.18**	0.83 to 5.79
Social Support	0.27	1.31	.01	-2.32 to 2.86
Depression	-3.32	1.30	-.17*	-5.89 to-0.76
Age	0.39	1.16	.02	-1.94 to 2.62
SES	-0.54	0.74	-.05	-2.00 to 0.93
Child probs.	-3.74	1.28	-.20**	-6.26 to -1.23

Note. "Child probs" represents childhood emotional/anxiety problems.
*p < .05, **p < .01.

Hierarchical regression analysis two: interpersonal competency scale

The initial model revealed that alcohol use trajectory was not a significant predictor of interpersonal competency scores ($F(1, 212) = 2.941, p = .088$). Adding the cluster of variables of theoretical interest to the model resulted in significant prediction of interpersonal competency ($F(7, 206) = 7.517, p < .001$), as model two accounted for 20.4% of the variability in this measure ($R^2 = .204$). From model one to model two, an additional 19% of the variability in interpersonal competencies was accounted for ($\Delta R^2 = .190$). The control variables in step three only accounted for an additional 0.4% of the variability in interpersonal competency scores ($\Delta R^2 = .004$). The final model in this analytic stage was also significant ($F(10, 203) = 5.307, p < .001$), and predicted a total of 20.8% of the variability in interpersonal competency scores ($R^2 = .208$). While the omnibus F-test for models two and three were both significant, the individual ratio was larger for model two than for model three. The difference in the proportion of variability predicted by models two and three ($R^2 = .204$ and $R^2 = .208$ respectively), however, was negligible.

All of the predictors in the final model are presented in Table 3. As can be seen in the table, the only variable to significantly predict interpersonal competency scores was gender ($t\ (203) = 5.49, p < .001, B = 1.657, SE_B = .302$). Females could be expected to have scores increased by 1.675 on this scale.

Table 3

Final Model of Hierarchical Regression Analysis for Variables Predicting Interpersonal Competencies

Variables	*B*	*SE B*	β	95% CI
Constant	14.09	6.84	N/A	.62 to 27.57
Trajectory	0.16	0.11	.10	-0.05 to 0.37
In school at 20-21	0.28	0.31	.07	-0.32 to 0.89
In school or graduated at 22-23	0.21	0.20	.07	-0.18 to 0.59
Social Stress	-0.14	0.10	-.09	-0.33 to 0.07
Gender	1.66	.30	.38**	1.06 to 2.25
Social Support	-0.04	0.32	-.01	-0.67 to 0.58
Depression	-0.17	0.32	-.04	-0.79 to 0.45
Age	-0.09	0.28	-.02	-0.64 to 0.46
SES	-0.15	0.18	-.06	-0.50 to 0.21
Child probs.	-0.16	0.30	-.04	-0.77 to 0.44

Note. "Child probs" represents childhood emotional/anxiety problems.
*p < .05, **p < .01.

Hierarchical regression analysis three: intrapersonal competency scale

Alcohol use trajectory did not significantly predict scores on intrapersonal competency as demonstrated by model one ($F(1, 209) = .024, p = .877$). Addition of the variables in step two produced a significant second model ($F(7, 203) = 3.699, p < .001$), as an increase of 11% of the variability accounted for in intrapersonal competency scores ($\Delta R^2 = .113$) was contributed.; the second model accounted for 11.3% of the total variability in the outcome scores ($R^2 = .113$). Including the control variables in step three produced a significant third model ($F(10, 200) = 3.563, p < .001$), adding another 3% of the variability in intrapersonal competency scores accounted for beyond model two ($\Delta R^2 = .034$). This final model accounted for 14.8% of the variability in intrapersonal competency scores ($R^2 = .148$).

Significant effects were found for depression ($t(200) = -3.47, p = .001, B = -1.42, SE_B = 0.41$) and childhood emotional/anxiety problems ($t(200) = -2.43, p < .05, B = -0.98, SE_B = 0.40$); these afflictions were associated with decreases in scores on the intrapersonal competency scale. All other predictors did not contribute significantly to the model. Table 4 shows the coefficients for each variable in the final model.

Table 4

Final Model of Hierarchical Regression Analysis for Variables Predicting Intrapersonal Competencies

Variables	*B*	*SE B*	β	95% CI
Constant	17.23	8.92	N/A	-0.35 to 34.81
Trajectory	-0.04	0.14	-.02	-0.32 to 0.23
In school at 20-21	0.58	0.40	.11	-0.21 to 1.38
In school or graduated at 22-23	0.21	0.26	.06	-0.29 to 0.72
Social Stress	-0.02	0.14	-.01	-0.29 to 0.25
Gender	0.36	0.40	.07	-0.43 to 1.14
Social Support	0.12	0.41	.02	-0.70 to 0.94
Depression	-1.42	0.41	-.24**	-2.23 to -0.61
Age	-0.26	0.36	-.05	-0.97 to 0.46
SES	-0.35	0.23	-.11	-0.81 to 0.11
Child probs.	-0.98	0.40	-.17*	-1.77 to -0.19

Note. "Child probs" represents childhood emotional/anxiety problems.
*p < .05, **p < .01.

Hierarchical regression analysis four: stress management competency scale

The first model $F(1, 211) = .387, p = .534$) was not significant, accounted for only 0.2% of the variance in stress management competency scores ($R^2 = .002$). The second model $F(7, 205) = 1.392, p = .210$) was not also not significant; only 4% of the variability accounted for in stress management competencies was added with the inclusion of variables in step two ($\Delta R^2 = .043$). This model accounted for 4.5% ($R^2 = .045$) of the variability in stress management competency scores. The final model, while contributing an additional 2% of the variance accounted for in stress management competency scores ($\Delta R^2 = .020$), was also not signifcant $F(10, 202) = 1.421, p = .137$) and accounted for 6.6% ($R^2 = .066$) of the variance in stress management competency scores. No significant effects were found for any of the predictors. The individual variables for this model are presented in Table 5.

Table 5

Final Model of Hierarchical Regression Analysis for Variables Predicting Stress Management Competencies

Variables	*B*	*SE B*	β	95% CI
Constant	1.08	9.71	N/A	-18.07 to 20.23
Trajectory	0.06	0.15	.03	-0.24 to 0.36
In school at 20-21	0.74	0.44	.13	-0.12 to 1.60
In school or graduated at 22-23	0.18	0.28	.05	-0.37 to 0.73
Social Stress	-0.02	0.14	-.01	-0.31 to 0.26
Gender	0.39	0.43	.07	-0.45 to 1.24
Social Support	-0.11	0.45	-.02	-0.99 to 0.78
Depression	-0.58	0.45	-.10	-1.46 to 0.30
Age	0.40	0.40	.07	-0.38 to 1.18
SES	-0.34	0.25	-.10	-0.84 to 0.16
Child probs.	-0.65	0.44	-.11	-1.52 to 0.21

Note. "Child probs" represents childhood emotional/anxiety problems.
*p < .05, **p < .01.

Hierarchical regression analysis five: adaptability competency scale

Adaptability competency was not significantly predicted by the first model $F(1, 211) = .009, p = .926$), which accounted for zero of this measures' variability ($R^2 = .00$). The second model represented an improvement of 8.7% of the variability accounted for in adaptability competency scores ($\Delta R^2 = .087$). This model was significant ($F(7, 205) = 2.780, p = .009$) predicting 8.7% of the variability in outcome scores ($R^2 = .087$). The third model predicted an additional 1.8% of the variability in adaptability competency ($\Delta R^2 = .018$) and was also significant $F(10, 202) = 2.353, p = .012$), accounting for a total of 10.4% of the variability in adaptability competency scores ($R^2 = .104$).

The only significant effect detected among the predictors was that of enrolment in post secondary education at the age of 20-21 ($t\,(202) = 2.33, p < .05, B = 0.86, SE_B = 0.37$). Having been enrolled in post secondary education at 20-21 years of age resulted in an increase in adaptability competency scores of 0.86. The unstandardized regression coefficients (B), the standardized regression coefficients (β), and the 95% confidence interval (CI) for each variable are presented in Table 6

Table 6

Final Model of Hierarchical Regression Analysis for Variables Predicting Adaptability Competencies

Variables	*B*	*SE B*	β	95% CI
Constant	6.12	8.27	N/A	-10.19 to 22.43
Trajectory	-0.03	0.13	-.02	-0.28 to 0.23
In school at 20-21	0.86	0.37	.17*	0.13 to 1.60
In school or graduated at 22-23	0.30	0.24	.09	-0.17 to 0.77
Social Stress	-0.03	0.12	-.02	-0.27 to 0.21
Gender	0.17	0.37	.03	-0.56 to 0.89
Social Support	0.36	0.38	.07	-0.40 to 1.12
Depression	-0.26	0.38	-.05	-1.01 to 0.49
Age	0.23	0.34	.05	-0.44 to 0.89
SES	0.07	0.22	.02	-0.35 to 0.50
Child probs.	-0.69	0.37	-.13	-1.42 to 0.05

Note. "Child probs" represents childhood emotional/anxiety problems.
*p < .05, **p < .01.

Hierarchical regression analysis six: general mood competency scale

Once again the initial model failed to significantly predict the outcome measure of interest ($F(1, 212) = 2.050, p = .154$), as only .05% of the variability was accounted for ($R^2 = .005$). The second model reached significance ($F(7, 206) = 5.190, p < .001$), predicting an added 14.1% of outcome variability ($\Delta R^2 = .141$), and accounting for 15% of the total variability in general mood scores ($R^2 = .15$). The final model accounted for a total of 20.1% of the variability in general mood scores ($R^2 = .201$), as inclusion of the control variables ($\Delta R^2 = .051$) contributed 5.1% of the predicted variability in general mood scores; this model was significant ($F(10, 203) = 5.108, p < .001$).

Three of the predictors significantly contributed to the final regression model. Having been enrolled in, or graduated from, post secondary education by the age of 22-23 years resulted in an increased score on the general mood scale of .575 (t (203) = 2.59, p = .01, B = .575, SE_B = .222). Moderate depression resulted in a decrease in general mood scores of 0.973 (t (203) = -2.737, p < .007, B = -0.973, SE_B = 0.356), as did the presence of childhood emotional/anxiety problems (t (203) = -3.504, p = .001, B = -1.219, SE_B = 0.348). Table 7 presents the final model variables for this regression.

Table 7

Final Model of Hierarchical Regression Analysis for Variables Predicting General Mood

Variables	*B*	*SE B*	β	95% CI
Constant	6.48	7.72	N/A	-8.75 to 21.71
Trajectory	0.17	0.12	.09	-0.07 to 0.41
In school at 20-21	0.25	0.35	.05	-0.44 to 0.93
In school or graduated at 22-23	0.58	0.22	0.18*	0.14 to 1.01
Social Stress	-0.03	0.11	-.02	-0.25 to 0.20
Gender	0.52	0.34	.11	-0.16 to 1.19
Social Support	-0.09	0.36	-.02	-0.80 to 0.62
Depression	-0.97	0.36	-.18**	-1.68 to -0.27
Age	0.21	0.32	.04	-0.41 to 0.83
SES	0.06	0.20	.02	-0.33 to 0.46
Child probs.	-1.22	0.35	-.23**	-1.90 to -0.53

Note. "Child probs" represents childhood emotional/anxiety problems.
*$p < .05$, **$p < .01$.

Moderation analyses

A final analysis was carried out to test the possible moderating effects of gender, post secondary education, social support, depression, and social stress. Interaction terms were created for each of these variables with trajectory risk level, and regression models were run with each emotional intelligence scale (overall EQ and the subscales) as the outcome variables. The results of these models were largely not significant and the interaction coefficients did not contribute greater prediction of emotional intelligence than the individual coefficients.

The following interaction terms were significant: for the overall emotional quotient, with moderate depression and trajectory risk level increasing, emotional intelligence scores were 1.5 units lower (t (205) = -2.913, p = .004, B = 1.501, SE_B = .515); for the interpersonal competency scale, with trajectory risk level increasing, females scored .58 units higher (t (205) = 4.396, p < .001, B = .577, SE_B = .131); for intrapersonal competency scores with moderate depression and trajectory risk level increasing, emotional intelligence scores were 0.62 units lower (t (205) = -3.903, p < .001, B = -.617, SE_B = .158); for adaptability competency, with moderate depression and trajectory risk level increasing, emotional intelligence scores were 0.33 units lower (t (205) = -2.29, p = .023, B = -.334, SE_B = .146); for general mood, with moderate depression and trajectory risk level increasing, emotional intelligence scores were 0.42 units lower (t (205) = -2.996, p = .003, B = -.420, SE_B = .14), also, having completed a postsecondary degree or been enrolled at age 22-23, with trajectory risk level increasing, scores were elevated by 0.20 units (t (205) = 2.148, p = .033, B = .205, SE_B = .095).

Discussion

The purpose of this study was to examine the relationship between adolescent alcohol use patterns and subsequent psychosocial adjustment in early adulthood. Of primary interest were the differences in adjustment between the trajectory groups, particularly those displaying normative alcohol use behaviours, abstinence, and high-risk use. A large sample, representative of the Canadian population was employed to this end.

In the current study hierarchical regression models were used to test the associations between emotional intelligence scores, alcohol use trajectories, and a number of additional variables believed to impact these associations. Contrary to expectations, trajectory risk level did not predict emotional intelligence in any of the tested models. Overall emotional intelligence scores, as well as those for the five subscales, were not significantly predicted by alcohol use behaviour groups. It was believed that individuals in the ranked trajectories would display emotional intelligence scores that corresponded to increasing risk level associated with drinking behaviour. That is, those in the lowest risk level trajectory (normative) would display significantly better emotional intelligence to those in the highest risk level (abstinence). This was not reflected in the analyses, negating the need for further analytic techniques that were initially planned to explore these relationships in greater depth. Only five of the ten predictors entered into the regression models were significant contributors to the prediction of emotional intelligence, these are discussed in turn, alongside the subscales of emotional intelligence they impacted.

The first significant finding of note is that of gender differences. Females were found to have better outcomes than males in terms of overall emotional intelligence, as evidenced by significantly elevated scores on the five-factor EQ scale. Gender was also a significant predictor in the final model for the interpersonal competency subscale. This finding comes as no surprise, as emotional intelligence differences by gender have been well documented, with females outperforming males particularly in the interpersonal domain (Bar-On, 2006). This finding adds to the empirical literature that distinguishes gender differences in emotional intelligence.

Depression was a significant predictor of lower scores for overall emotional intelligence, intrapersonal competency, and general mood. This was also somewhat expected, as the experiencing of symptoms of depression is an influential negative life event that reasonably contributes to deficits in a number of areas of functioning. Given the nature of the two subscales impacted, individuals experiencing moderate levels of depression (compared to little or no depression) would justifiably demonstrate poorer results. The intrapersonal competency subscale addresses competencies such understanding and accepting oneself and one's emotions, and skills of self-reliance and emotional independence. The general mood subscale assesses one's optimism and happiness. Clearly it is conceivable, even probable, that individuals displaying moderate depression would score lower on these measures than individuals who do not experience elevated levels of depressive symptoms.

The significant effects of childhood emotional/anxiety problems followed the same pattern as depression. Specifically, experiencing moderate emotional/anxiety

problems in childhood significantly predicted poorer scores for overall emotional intelligence, intrapersonal competency, and general mood. This variable was selected to control for childhood problems that have been identified as a precursor to depressive and anxiety disorders. As the existence of these problems in childhood is closely related to later problems of a similar nature (i.e. depression), these results, like the aforementioned effects of depression, can be reasonably anticipated.

The final two variables that contributed to the significant prediction of emotional intelligence scores are those concerning educational status. Having been enrolled in post secondary education at the age of 20-21 years was predictive of adaptability competencies. Having been enrolled in, or graduated from, post secondary education at the age of 22-23 was predictive of general mood. To address the former, adaptability assesses problem solving, flexibility, and reality testing. These competencies and skills may be related to the experience of the post secondary environment at the age of 20-21 years of age. The latter effect—enhanced general mood scores for those enrolled or graduated at 22-23 years—could be related to the completion or nearing completion of a college level program. Generally speaking, in Canada the majority of post-secondary students are roughly halfway or further along in their program of college or undergraduate study at the age of 20-21. Arguably, navigating the post secondary environment is a good test of one's adaptability as it is tested by the emotional quotient. At 22-23 years of age, most Canadian post secondary students are nearing the completion or have already completed a degree, which would arguably impact ones happiness and optimism in a positive manner. Of course these explanations are merely conjecture. It is unclear why individuals would not score highly on both of these subscales, as one could

see how the relevant factors influencing both age groups might contribute to both outcome scales. While early adulthood is a period of rapid development and change, it is difficult to reconcile these differences over a one-year period. Further, emotional intelligence has been shown to generally increase with age. This would lead to the expectation that those enrolled at 22-23 years of age would at least show similar effects of adaptability competency (having experienced the post secondary environment into a slightly later age).

At the outset of this investigation a number of specific hypotheses were laid out pertaining to individual trajectories of alcohol use behaviour. While all five of the identified trajectories were tested for differences in emotional intelligence, three were of primary interest, as they approximated abstinence, normative, and high-risk use. For the abstinent group it was expected that emotional intelligence would be lower than for participants in the normative group, and that this difference would be driven by a deficit in interpersonal competency scores. Further, it was hypothesized that males, college attendees, depressed individuals, those experiencing social stress, and those with lower social support would fare worse than their counterparts. Participants in the normative group were hypothesized to display better emotional intelligence than the other trajectory groups, driven by increased interpersonal competency scores. The experience of moderate depression symptoms, or low social support, were believed to alter this relationship. Finally, for the trajectory with the greatest frequency of (high-risk) alcohol use, reductions in emotional intelligence relative to the normative group were expected to result from poorer stress management and adaptability scores. Males, college attendees, non-depressed individuals, and those with elevated social supports were expected to

outperform females, non-college goers, and those with low social support or moderate depression.

These hypotheses were largely not borne out in the data. Due to the lack of significant effects of trajectory membership on emotional intelligence and its subscales, these hypotheses were not directly testable, as the necessary relationships could not be established. While no moderating (or possibly mediating) effects of the selected variables were present, direct effects of the five significant predictors were somewhat congruent with the hypotheses. If one were to take the perspective that alcohol use across all trajectories was representative of use patterns in the non-clinical Canadian population, lacking a true high-risk group, it is plausible that for the average consumer, being female, having attended college, and not experiencing moderate levels of depression or childhood emotional/anxiety problems, results in better emotional intelligence, regardless of their pattern of alcohol use.

It is unclear why social support and social stress did not significantly contribute to the prediction of emotional intelligence, but the lack of effects may be related to the nature of the dichotomized variables. Both variables were ultimately reduced to one item, yes/no responses. Instead of representing levels of social support that are expressed in scale scores, the variable was split to represent 'moderate social support' and 'high social support' (as can be seen in Appendix B). It is possible that if the full scale version of social support were included, adding a greater range of responses, differences between high and low scores could have been significant contributors to emotional intelligence.

Social stress was problematic due to the low frequency of responses (less than 10%) which may have resulted in reduced power to detect an effect.

One possible explanation for the lack of differences between trajectory groups is the nature of the sample data. Perhaps the inherently low risk of a community sample representative of the general population resulted in few differences in emotional intelligence scores as a function of alcohol use behaviours. While the NLSCY is a very large survey that is mostly representative of the Canadian population, it is important to note that a number of specific groups are excluded. The NLSCY does not include participants living on Indian reserves or Crown lands, residents of institutions, full-time members of the Canadian Armed Forces, and those living in the territories (Yukon, North West and Nunavut). Not only does this restrict the generalizability of findings, but may also have the adverse effect of diluting the variability in alcohol use behaviours, which could potentially differ among these excluded populations. Further, the sample does not contain a true high-risk alcohol use group. The highest frequency of alcohol use (daily drinking) assessed by the germane items of the NLSCY was endorsed at a prevalence of less than 1% per cycle; this category was omitted from the trajectory analyses conducted by Babchshin (2010). It remains to be seen whether or not inclusion of these participants would result in significant differences in emotional intelligence measures.

Another note on the nature of the participants included for analyses concerns abstinent behaviour during adolescence and the individuals that make up this category. In order to capture the potential influence of abstaining from alcohol during what is generally considered an experimental phase, the lowest frequency of drinking made up a

trajectory that was then viewed as a subgroup. Arguably, there is inherent danger in viewing a group that could be rather diverse in its components as a single entity. To elaborate, abstinence is a behaviour that is complex and may be the result of very different influential factors from one individual to the next. For example, a group in the United States known as "straightedge" consists of abstinent youth who share their experiences with—and more importantly *without*—substances of abuse and sexual behaviours via internet forums. One recent study on the members of this group found patterns in their motivations for abstinence, whereby the majority of members cite negative experiences with close family and/or friends (such as an alcoholic parent or a history of abuse) as the primary reason for their behavioural choice (Copes & Wiliams, 2007). This example represents just one component that may make up the abstinent category, however, one can see how the covariates of abstinent behaviour may be many and varied. In order to further explore the effect of abstinence on later adjustment, it may be useful to employ qualitative research methods that better address the unique differences among individuals that make up the abstinent subgroup of adolescent alcohol use behaviours.

Also it should be noted that the methodology employed in creating the trajectories of alcohol use has come under scrutiny in recent years. Because members are assigned to different trajectories based on probability, trajectories identified by the GMM technique should not be interpreted as inflexible categories (Babchishin et al., 2010). Membership to these groups is probabilistic, thus the trajectories should not be viewed as rigid (Shulenberg & Maggs, 2007). Given the dynamic nature of adolescent behaviours during the developmental transition to adulthood, the probabilistic nature of the grouping

categories may particularly cloud relationships between alcohol use and emotional intelligence. Subtle differences between the groups that may be of significance could be difficult to detect due to a combination of their probabilistic nature and the amorphous character of dynamic factors influencing adolescent behaviour.

Longitudinal research such as the current study must also consider the temporal aspects of shifting behavioural motivation. The goals of early adulthood might be quite different than those of middle adulthood for any one individual. One's benchmark of success and well-being in emerging adulthood likely includes social network size, peer involvement, and romantic partners as significant contributors. Later, in middle adulthood, the primary goals of career establishment and stable satisfactory relationships take precedence and are much less contingent upon the early interpersonal success that may have proffered earlier social benefits. This developmental trend would suggest that by middle adulthood, those individuals that were deprived of some positive interpersonal experiences in youth would no longer see impairments associated with missed opportunities. Indeed, this is just what Pavlova, Haase & Silbereisen (2011) have found in their recent research on behavioural autonomy in adolescence. Higher educational attainment and abstinence from risky behaviour, while a mild hindrance to interpersonal functioning early on (19-28 years), became assets to those in the late autonomy group at older ages (28-37 years), where these individuals surpassed both early and on-time autonomy groups in vocational attainment, partnership quality, social/family support, and had fewer externalizing problems (Pavlova, Haase & Silbereisen, 2011).

Despite the lack of trajectory group differences in the present study—especially in terms of interpersonal competency—distinctions may yet emerge as participants enter new developmental stages. If the same sample is followed into middle adulthood, it is possible that individuals in the abstinent alcohol use trajectory could show positive effects of their prudent decisions in youth that lead to psychosocial benefits over those in other trajectories. Future research should continue to explore the mixed age-graded pattern of adjustment identified by Pavlova, Haase & Silbereisen (2011), with regards to alcohol use behaviours in adolescence.

Alternatively, the lack of trajectory group differences in emotional intelligence scores for this sample may be taken at face value; there is truly no significant effect of the identified alcohol use patterns on socio-emotional adjustment. As with previous research, this study reaffirms the inconclusiveness of adolescent alcohol use and subsequent adjustment by demonstrating that, for a large sample of the non-clinical Canadian population, emotional intelligence outcomes are not significantly impacted by drinking behaviours. In order to further examine this non effect, a post hoc analysis was conducted in which the regression models were recreated with the emotional intelligence scores for the participants at age 20-21 (instead of at age 24-25) used as the dependent variable. The rationale for this approach was that perhaps using an outcome measure that is more proximal to the alcohol use measurements would result in different findings, namely, a greater likelihood of significance. The results of these models were very similar to the initial analyses: trajectory membership did not significantly predict emotional intelligence scores overall, or on any of the subscales. From this it can be concluded that regardless of whether measured at the end of adolescence (age 20-21) or later in emerging adulthood

(age 24-25), emotional intelligence is not significantly impacted by adolescent drinking patterns.

In terms of strengths, this study used a nationally representative sample of the Canadian population to explore alcohol use patterns in adolescence and later outcomes. This is the first known study of its kind to use a large representative sample in Canada in examining alcohol use patterns in adolescence and emotional intelligence in emerging adulthood. It is also relatively novel in the approach to study heterogeneous subgroups of alcohol use behaviours that exist in the general population and explore the socio-emotional adjustment of these individuals. While no significant outcome differences were revealed in this study, unique temporal correlates of alcohol use subgroups may be discovered in future research endeavours. Just as risk factors for problem drinking trajectories have been shown to be distinct from those for normative use patterns (Babchshin et al., 2010), unique clusters of relevant subsequent adjustment variables may exist for these behavioural groups as yet unexposed.

In summary, the present study adds to a growing body of literature on alcohol use patterns from late childhood through adolescence and into early adulthood. The focus on the study of normative alcohol use in adolescence and its implications for long-term outcomes of socio-emotional adjustment is an approach that may prove insightful in future research, despite the lack of significant results presented here. The question of whether or not adolescent abstainers, normative, or high-risk users, place themselves at either advantage or risk in terms of later adjustment was not adequately answered in this study and deserves further exploration.

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Appendix A

Emotional Quotient

A high score on this scale indicates a well developed emotional/social capacity. It is comprised of the following five subscales, each with a score ranging from 0 to 16 (thus the total aggregate EQ score ranges from 0 to 80):

1) *Interpersonal Competency* measures an individual's degree of social awareness
2) *Intrapersonal Competency* measures a participant's social awareness and self esteem
3) *Stress Management* assesses one's emotional management and regulation
4) *Adaptability Competency* measures an individual's ability to manage change
5) *General Mood* is an indicator of a person's level of self motivation.

To assess these measures respondents are asked the question "Tell me how you feel, think, or act most of the time in most situations?" to twenty specific outcomes. Response categories include: "Very seldom true or not true"; "seldom true"; "sometimes true", "often true"; "very often true or true". Individual items for each subscale are as follows:

Inter-personal competency—social awareness

You are sensitive to the feelings of others?

You're good at understanding the way other people feel?

You care what happens to other people?

You have good relations with others?

Intra-personal competency—social awareness and self-esteem

It's hard for you to describe your feelings?

Others think that you lack assertiveness?

You're unable to express your ideas to others?

It's hard for you to make decisions on your own?

Stress management competency—emotional management and regulation

You're impatient?

You have a bad temper?

It is a problem controlling your anger?

You have strong impulses that are hard to control?

Adaptability competency—level of change management

You try to see things the way they are, without fantasizing or daydreaming?

When faced with a difficult situation, you like to collect all the information about it you can?

In handling situations that arise, you think of as many approaches as you can?

When trying to solve a problem, you look at each possibility and then decide on the best way?

General mood—self-motivation

You're optimistic about most things you do?

You believe in your ability to handle most upsetting problems?

You can stay on top of tough situations?

You generally expect things will turn out all right, despite setbacks from time to time?

To address the reliability of the EQ scales Cronbach's Alpha was calculated for this measure and is provided in Statistics Canada's NLSCY user guide. These values are as follows for the instrument used with the current sample:

Interpersonal competency: .712; Intrapersonal competency: .589; Stress management competency: .702; Adaptability competency: .703; General mood: .707; the overall EQ-five factor scale: .843.

Appendix B

Independent Variables

Age

Age was used as a control variable due to the relatively rapid development that occurs of a one year period during adolescence and into emerging adulthood. All participants were within a one-year age difference, however since the NLSCY was not commenced in January, participants were either 10 or 11 years old at the start of the study, and 24 or 25 years of age at conclusion.

Childhood Emotional/Anxiety Problems

In order to control for potentially influential factors of childhood psychopathology, scores on an emotional disorder and anxiety scale were incorporated into analyses. This was assessed when participants were 10-11 years of age. The following items were presented with the question "how often would I say I am (he/she is)...?":

1) Unhappy, sad or depressed?

2) Not as happy as other children? (PMK only)

3) Too fearful or anxious?

4) Am (is) worried a lot?

5) Cry (cries) a lot?

6) Nervous, high strung or tense?

7) Trouble enjoying my (his/her) self?

8) Tend to do things on my (his/her) own—is rather solitary?

9) Feel (appears) miserable, unhappy, tearful or distressed?

Factor analysis was carried out by Statistics Canada for this behaviour scale in order to assess the psychometric properties. The items that loaded onto each construct were compared to the expected result. Cronbach's Alpha for this scale was .794.

College

To capture whether or not participants had experienced at least some college or university education—and the thus the post-secondary environment—educational status at cycles six and seven were retrieved from the NLSCY. Two items in cycle seven addressed the information of concern, with responses of "in post secondary in cycle 6" (age 20-21), and "graduated from post secondary in cycle 6 or 7". These were transformed into dichotomous measures that reflected enrollment at the age of 20-21, and graduation at either 20-21 or 22-23. Both measures were retained to account for the possibility that some students may have been enrolled at 20-21 years of age (thus experiencing the post secondary environment), but may not have obtained a degree at either age.

Depression

A depression scale was derived from 12 items with the question "How often have you felt or behaved this way during the past week?". A high score on this scale indicates the presence of depression symptoms. The following twelve separate responses made up a total a score ranging from 0 to 36:

1) I did not feel like eating; my appetite was poor.

2) I felt that I could not shake off the blues even with help from my family or friends.

3) I had trouble keeping my mind on what I was doing.

4) I felt depressed.

5) I felt that everything I did was an effort.

6) I felt hopeful about the future.

7) My sleep was restless.

8) I was happy.

9) I felt lonely.

10) I enjoyed life.

11) I had crying spells.

12) I felt that people disliked me.

Reliability of this scale was assessed using Cronbach's Alpha, which was .816 for the current sample.

Gender

Participants indicated whether they were male or female.

Social Support

The NLSCY includes a social support scale that centres on the youth's friends and family to address the participant's self reported level of social support. Participants were asked if they strongly disagree, disagree, agree, or strongly agree with eight statements. The total score of this scale ranged from 0-24, with a high score indicating the presence of social support. The eight statements were as follows:

1) If something went wrong, no one would help me.

2) I have family and friends who help me feel safe, secure, and happy.

3) There is someone I trust whom I would turn to for advice if I were having problems.

4) There is no one I feel comfortable talking about problems with.

5) I lack a feeling of closeness with another person.

6) There are people I can count on in an emergency.

7) I feel part of a group of people who share my attitudes and beliefs.

8) There is no one who shares my interests and concerns.

Unfortunately, due to inconsistencies in the NLSCY content from cycle to cycle, it was not possible to obtain full scale scores for the participants in this study. Because only certain items were used from this scale at various cycles, the proxy social support measure ultimately used in analyses for this study was responses to item #3. This item was dichotomized according to response categories. The vast majority of respondents selected either "agree" or "strongly agree", therefore the dichotomization represented "moderate" and "high" social support, as opposed to high and low. Cronbach's Alpha for the original self-reported social support scale was .847, however it must be emphasized that this scale was not used for this sample, as the proxy measure described above was employed in its place.

Social stress

A one question item asked respondents about the primary source of stress in their lives. For the question "what is your main source of stress?", response categories included: 'work', 'financial concerns', 'family/friends', 'school', 'other', 'no stress'. This item was then dichotomized into "family and friends" versus "other or no stress" in order to capture those that identified social interactions as their primary source of stress.

Socio-Economic Status

This variable was comprised of the following information regarding household socio-economic status which was collected from the Person Most Knowledgable (PMK was the child's mother in 98% of cases): occupation, household income, number of years spent in school. A factor score for SES, standardized with a mean of zero and a standard

deviation of one, was created in which higher scores reflect higher SES status. This factor score is composed of five items: 1) the number of years of schooling for the PMK; 2) the number of years of schooling for the spouse/partner; 3) the pineo occupation code for the PMK transformed to the logit distribution; 4) the pineo occupation code for the spouse/partner transformed to the logit distribution; and 5) household income in the thousands.