Interpreting Benefits and Risks: Analysis of Risk-Taking in Emerging Adulthood

by

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Abstract

Engagement in risk-taking behaviours can have adverse health impacts for individuals across their lifetimes. Understanding how individuals perceive the benefits and risks involved with various types of risk behaviour is instrumental in implementing effective prevention and intervention initiatives. Researchers suggest that risk-taking behaviours often emerge in adolescence; however, the trajectory of cognitive development is thought to continue until the age of 25. Therefore, the current study sought to gain a clearer understanding of risk-taking behaviours, specifically by examining the cognitive appraisals of individuals in the transitional period of emerging adulthood. In examining the impact of individual differences of past experiences, including individuals' propensity for reactive and reasoned risk-taking and appraisals of benefits and risks, we hope to gain clarity in what motivates expected future risk-taking. The sample comprised of 105 participants ($M_{age} = 21.9$) and considered four distinct domains of risk-taking behaviours: (a) sexual activities, (b) heavy drinking, (c) drug use, (d) drinking and driving behaviours. Zero-order correlations were used to examine the associations among the participants' demographic and psychosocial variables and expected future involvement. Four separate hierarchical multiple regression analyses were conducted to assess if individuals' perceived benefits and risks influence their expected future involvement in risk-taking behaviours after controlling for age (Step 1), and furthermore, to assess if participants' reactive or reasoned past experiences contributed to explaining expected future involvement in risk-taking behaviours (Step 2). Age and sex were not significant predictors of future risk-taking behaviour in the current study. Consistent with previous research, perceived benefits predicted expected involvement in future risk-taking behaviours across all four domains. Sexual activities and drinking and driving behaviours were predicted only by perceived benefits whereas,

perceived benefits and past experiences of reasoned risk-taking behaviour were significant predictors of expected future heavy drinking. Only in the domain of drug use was the expected future involvement predicted by perceived benefits and risks and past experiences of reactive and reasoned risk-taking behaviours. Implications of the current research findings include considerations for supporting the health and well-being of emerging adults and reducing harm in terms of risk-taking behaviours.

Preface

This thesis is an original work by Erika Makowecki. The research project, of which this thesis is a part, received ethics approval from the University of Alberta Research Ethics Board (Pro00097989).

Dedications

To my parents, for their endless love and encouragement and for supporting me through my undergraduate and graduate education, their help will never go unnoticed. Thank you for giving me the opportunities and experiences that have made me who I am.

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Introduction

Risk-taking behaviours such as risky sexual activities, substance use, or risky driving often break societal norms and jeopardize the health and well-being of individuals and those around them (Maslowsky et al., 2019). These behaviours can increase the likelihood of negative health outcomes since habits that can result from risk-taking behaviours developed in adolescence and emerging adulthood can last a lifetime (Reyna & Farley, 2006). Examples of negative health outcomes can include sexually transmitted diseases, poisoning or addiction from alcohol or drug overdoses, and unintentional injury due to risky driving.

In Canada, recent statistics indicate that prevalence rates of alcohol and drug use are highest among the emerging adulthood population (i.e., 20 to 24 years old) as opposed to adolescents and adults (Statistics Canada, 2021a). In regard to sexual activity, more than half (54.0%) of the respondents from the Canadian Community Health Survey (2015/2016) ages 15 to 24 years old reported having sexual intercourse in the past 12 months and roughly one-third (37.0%) of those individuals reported having multiple sexual partners (Rotermann & McKay, 2020). Although nearly two-thirds (60.0%) of the individuals reported using a condom during their latest sexual encounter, the data also suggested that condom use declines with age. The Public Health Agency of Canada (2017) highlights the consequences of these risky sexual behaviours, reporting dramatic increases in the rates of sexually transmitted diseases over the past decade (2008-2017).

Given these recent statistics, it is important to consider the factors that give rise to risk-taking engagement. Notably, there are many factors that contribute to individuals' propensity for risk-taking. Personality traits such as sensation seeking (Katz et al., 2000; Maslowsky et al., 2011) and cognitive control processes such as working memory and impulse control (Khurana et

al., 2012; Steinberg, 2008) have both been implicated in risk-taking behaviour. Additionally, there are various aspects of an individual's experience that are associated with a greater likelihood of future risk-taking behaviour such as the impact of past risk-taking involvement (Babad et al., 2019; Katz et al., 2000; Pomery et al., 2009), the number of opportunities presented to engage in risk behaviours (Boyer & Byrnes, 2009; Figner & Weber, 2011), and the perceived benefits and risks of engagement (Maslowsky et al., 2019; Pomery et al., 2009). Engagement in high-risk behaviours can have negative impacts on developmental trajectories and transitions to adulthood (Maslowsky et al., 2019). In order to implement preventative and supportive approaches to reduce the rates of high-risk behaviours, we need to understand the factors underlying these behaviours.

Two distinct subtypes of risk-taking behaviour have been proposed: reactive risk (e.g., unplanned impulsive behaviour) and reasoned risk (e.g., strategically planned behaviour; Maslowsky et al., 2019). An individual's ability to weigh perceived benefits as greater than perceived risks is related to a greater propensity for reasoned risk-taking behaviour (Katz et al., 2000; Maslowsky et al., 2010). Reasoned risk-taking can be considered more purposeful and deliberate and, therefore, may have further practical implications for consideration in prevention practices to minimize harm. Increases in reasoned versus reactive risk-taking behaviours have been described as part of natural maturation, as cognitive processes develop (Maslowsky et al., 2019). Specifically, there is a positive association between reasoned risk-taking and maturation of working memory capacities. Better working memory enables individuals to incorporate past experiences more effectively in the decision-making process, therefore, engaging in more purposeful risk-taking (Khurana et al., 2012; Maslowsky et al., 2019). Past experiences of risk-taking behaviour also impact an individual's ability to anticipate outcomes; therefore, it will also

lead to increased awareness of the benefits and risks involved in engagement (Pomery et al., 2009).

Risk-taking behaviours are often considered most predominant in the adolescence period (Maslowsky et al., 2019, Pharo et al., 2011) and have generated a fair amount of research considering the various mechanisms involved; however, researchers suggest cognitive processes are not fully developed until at least 25 years of age (Steinberg, 2008). Therefore, continuing to examine risk-taking behaviour beyond adolescence and into the emerging adulthood period of development will enhance our understanding of risk-taking. Emerging adulthood represents a unique developmental stage for individuals transitioning from adolescence to early adulthood (Tanner & Arnett, 2017). Arnett (2000) coined the term *emerging adulthood* to describe the distinct period of exploration during the late teens and early twenties (i.e., 18 to 25 years old). The individual may experiment to obtain a broad range of life experiences during this period of diminished parental surveillance and increased independence (Arnett, 2000). The experiences one may pursue might include a variety of romantic and sexual experiences before settling in a relationship or discovering the states of consciousness induced through substances as a means of further exploring identity (Arnett, 2000). Hence, the current study considered several factors involved in risk-taking behaviours and the implications for future risk-taking involvement in the emerging adulthood context.

Literature Review

Risk-taking behaviours are defined in the developmental literature as engagement associated with some probability of undesirable results (Boyer & Byrnes, 2009; Maslowsky et al., 2019; Steinberg, 2008). These behaviours can include but are not limited to sexual activities, heavy drinking, drug use, interpersonal aggression, and antisocial behaviours. The engagement

in risky behaviours has generated a lot of discussion and inquiry into the underlying mechanisms involved. Some mechanisms under investigation include the development of cognitive processes (Boyer & Byrnes, 2009; Maslowsky et al., 2019; Steinberg, 2010), perceptions of potential benefits and risks (Katz et al., 2000; Pomery et al., 2009), and environmental factors (Babad et al., 2019; Boyer & Byrnes, 2009; Figner & Weber, 2011).

Rates of engagement in risk behaviours, known as risk-taking rates, are commonly included in research studies, and are measured through interviews and self-report questionnaires (Boyer & Byrnes, 2009; Maslowsky et al., 2010, 2019; Reniers et al., 2016; Steinberg, 2008). Alternative methods such as computerized risk tasks are used in laboratory settings to measure risk-taking rates (Maslowsky et al., 2019; Steinberg, 2008). Although these computerized tests may be a more artificial resemblance of risk-taking tasks, the goal is to provide analogues in which the individual can organically engage in risk-taking behaviour rather than merely report their level of engagement. Additionally, conducting the risk tasks in a laboratory setting allows the researchers to control for extraneous variables (Boyer, 2006). Some computer tasks utilized in the literature include Tower of London, Go/No-Go Task, Balloon Analogue Risk Task, and Stoplight. Although measuring risk-taking rates provides further information necessary to understand the frequency of risk behaviours, the cognitive processing underlying these actions are at the core of the research.

Several factors have been considered when analyzing the development of risk-taking behaviours (e.g., frequency of risk-taking behaviours, cognitive development, perceptions of risks and benefits, individual differences, and environmental factors). There are a few critical models and theories that consider adolescent risk-taking behaviours, which will be discussed in this literature review.

Process Models to Risk-taking

The following information provides an overview of several models that consider the potential processes involved when individuals are faced with an opportunity to engage in risk-taking behaviour. In each of these models, perception of risks plays an important role.

Dual Systems Model

The dual systems model applies a neurobiological lens to conceptualize adolescent risk-taking. Developed by Steinberg (2008), the dual systems model suggests the increase in risk-taking behaviour in adolescence is due to the asymmetric maturation of two neurobiological systems: incentive processing and cognitive control. Incentive processing develops in early adolescence and encourages reward-driven behaviour in response to emotionally arousing and rewarding stimuli. Conversely, cognitive control processes which are required for self-regulation and decision-making do not develop until later adolescence (Maslowsky et al., 2019; Steinberg, 2010). As such, the dual systems model hypothesizes that the mismatch between reward-driven behaviour (i.e., incentive processing) and the ability to self-regulate (i.e., cognitive control) impacts frequency in risk behaviours (Maslowsky et al., 2019; Steinberg, 2010).

Steinberg (2010) posited that sensation seeking and impulsivity relate to the dual systems model. Sensation seeking results from significant increases in dopaminergic activity in the prefrontal cortex (e.g., dopamine is a key neurotransmitter in reward-driven behaviour), which rises rapidly in adolescence (Romer et al., 2017; Steinberg, 2010). Individuals high in sensation seeking will seek out novel experiences despite the risks involved (Romer et al., 2017). Comparatively, impulsivity is a lack of self-control and usually results in unplanned, spontaneous behaviour for an immediate reward. Adolescents do not appear to gain impulse control until late adolescence, which is problematic given that control of self-regulation permits

individuals to modulate their inclinations to seek rewards better. It is important to note the difference between sensation seeking and impulsivity as they are not mutually exclusive. Not all impulsivity leads to rewarding or stimulating experiences (e.g., hastily ending a friendship). Not all sensation seeking is done impulsively (e.g., anticipating a party with alcohol and planning to play drinking games; Romer et al., 2017). In an additional study, Dahl (2004) included sensation seeking as one of the domains that appear to be linked to puberty-specific maturational changes, including changes to romantic motivation, sexual interest, emotional intensity, sleep/arousal regulation, appetite, and sensation or reward seeking, highlighting the link to incentive processing described in Steinberg's (2010) dual systems model.

Fuzzy Trace Theory

Fuzzy trace theory is a comprehensive model of memory, reasoning, judgment, and decision-making and can be related to how individuals make decisions about risk (Reyna, 2012). According to this theory, individuals encode mental representations of their experiences in multiple ways (Reyna & Farley, 2006). When an individual is exposed to a meaningful stimulus, two types of representations are encoded into memory: verbatim (e.g., exact words, numbers, or pictures) and gist (e.g., essential information for meaning, the "substance," bottom-line information). These memory representations are considered to be independent experiences. In comparison to verbatim representation and precise analysis, the fuzzy gist representations summarize essential information. This information gathered in a fuzzy gist representation is acquired through the filter of culture, worldview, education, and developmental level specific to that individual (Reyna & Farley, 2006). As verbatim tends to fade rapidly, judgment and decision-making tend to be governed by fuzzy gist processing rather than verbatim. Reyna and Farley (2006) highlight that the tendency to base decisions on gist processes increases with age

and, therefore, experience and expertise. Thus, the more experiences an individual has, the more they begin to rely on gist representation rather than verbatim. Consequently, Reyna (2012) highlights that no single study tests the entire theory. They posit that because individuals rely on the intuitive gist representation from past experiences rather than conscious deliberation, they retrieve risk-avoidant values and, ultimately, are less likely to engage in risk-taking (Reyna & Farley, 2006).

Opportunity-Propensity Model

In a period when adolescents are confronted with various opportunities to engage in risky behaviours, as more independence is granted with age, it is crucial to consider the differences between individuals who ultimately decide to engage and those who do not (Boyer & Byrnes, 2009). Boyer and Byrnes (2009) discuss the opportunity-propensity model which is based on the premise that risk-taking can occur when three components are met: when individuals (a) are given the opportunity to take risks (e.g., the social component), (b) perceive the benefits of the risks (e.g., the cognitive component), and (c) are prone to engage in risky behaviours when given the opportunity (e.g., the personal trait component). In this model, opportunities are defined as a context perceived by the individual as facilitating or encouraging the exercise of risk behaviour that could help them attain their goal but may include some risk of negative consequences. On the other hand, propensities are defined as personal qualities that may explain why an individual may engage in risk behaviours when presented with the opportunity to do so. Boyer and Byrnes (2009) proposed three assumptions for why adolescents (15 to 18 years old) may engage in risk behaviours: (a) the individual believes that the positive consequences are greater or more likely to occur than the negative consequences, (b) the individual only thought of the positive

consequences, and (c) strong emotions or passions lead the individual to focus on the satisfaction of the goal while downplaying or disregarding the negative consequences.

Risk-taking behaviours develop through the interaction of the maturation cognitive functions and individual experiences. The process models discussed consider the intersection of impulsivity and self-control throughout development and the distinct impact that individual differences such as personality, opportunities, and experiences have on risk-taking engagement. The diversity of human experience influences the way individuals interacts with the world. These behavioural intentions of reactive, spontaneous engagement, or reasoned, deliberately planned engagement, is motivated by the interplay of these dual processes.

Reasoned and Reactive Risk-Taking

As mentioned previously in the introduction, two distinct subtypes of behaviour are discussed in the literature: reactive risk behaviours (e.g., impulsive behaviour) and reasoned risk behaviours (e.g., strategically planned behaviour; Maslowsky et al., 2010, 2019; Reyna & Farley, 2006; Romer et al., 2017). Risk-taking behaviours can be either reactive or reasoned and are differentiated by impulse or planning. For example, alcohol use can be reactive risk-taking (e.g., individuals impulsively engage when the opportunity arises but did not purposely seek out alcohol or plan in advance to drink) or reasoned risk-taking (e.g., individuals are aware that there will be alcohol at the party and intend to drink; Maslowsky et al., 2019). Intention and decision-making processes involved in risk-taking shift for individuals throughout development. Specifically, young people with minimal experience are less likely to deliberately engage in risk as the expectation for such opportunities increases with experience (Pomery et al., 2009). Pomery et al. (2009) found age and experience to moderate the intentional manner individuals engage in risk. As individuals gain experience, they also gain more awareness of the

circumstances and readily anticipate potential problems. Past experiences hold informational value for individuals to weigh the benefits and risks. Therefore, the shift from reactive to reasoned risk-taking begins as cognitive capacities, specifically working memory, start to advance (Maslowsky et al., 2019). Working memory supports retrieval and maintenance of goal-relevant information to execute complex cognitive tasks (Maslowsky et al., 2019).

Additionally, an individual's ability to weigh perceived benefits as greater than perceived risks has been found to be related to a greater propensity for reasoned risk behaviours (Maslowsky, 2011). Specifically, there is a positive association between reasoned risk behaviours and maturation of working memory capacities. Better working memory enables individuals to incorporate past experiences more effectively in decision-making, engaging in more purposeful risk-taking (Khurana et al., 2012). Khurana et al. (2012) have argued that poorer working memory in adolescence is related to a decreased ability to suppress momentary urges. Although most risk-taking behaviour research has focused on an adolescent population, researchers suggest cognitive processes are not fully developed until at least 25 years of age (Steinberg, 2008).

Perceptions of Risks and Benefits

The ways in which individuals interpret the potential benefits and risks of risky situations can impact their decision-making processes (Boyer, 2006). Figner and Weber (2011) suggested that observed differences in risk-taking engagement depend on individuals' perceptions of benefits and risks and willingness to engage deliberately. Whether in the presence of peers, in the heat of the moment or a novel situation, when considering the benefits and risks, or adverse long-term outcomes, adolescents reason more poorly than adults since those with less experience are less likely to anticipate potential outcomes (Pomery et al., 2009; Reyna & Farley, 2006).

Furthermore, adolescents acknowledge that risks may be high but the consequences (e.g., risks) are not weighted as heavily as the perceived benefits. Many of the risk behaviours discussed in the literature such as smoking, drug use, and unsafe sexual activity appear to offer immediate pleasures and adverse outcomes that would generally appear in the longer term (Reyna & Farley, 2006). Reyna and Farley propose that adolescents who engage in risk behaviours believe positive consequences are more likely or more important than negative consequences.

Individual Differences and Environmental Factors

Individuals differ in the risks they are willing to take. Figner and Weber (2011) integrated literature on risk-taking to highlight the impact of individual differences and contextual influences on risk-taking engagement. Individual differences including age, sex, past experiences, and environmental factors such as adverse childhood experiences (ACEs) can influence an individual's appraisal of risky events. ACEs are defined as potentially traumatic events experienced within the first 18 years of life that encompass various forms of emotional, physical, or sexual abuse, neglect, the stress associated with witnessing domestic violence, or exposure to substance abuse. Felitti et al.'s (1998) initial study analyzed the relationship between adverse childhood exposure and health risks such as alcoholism, drug abuse, smoking, and sexually transmitted disease. In particular, individuals who had experienced four or more categories of childhood exposure, compared to those individuals who had experienced none, had a four- to twelve-fold increase for various health risks (Felitti et al., 1998). Dube et al. (2002) specifically examined the association among ACEs and alcohol abuse as an adult and found a strong graded relationship between ACEs scores and alcohol misuse. Additionally, Hughes et al. (2017) provided evidence for strong associations between high ACEs scores and sexual risk-taking, problematic drug use, and interpersonal violence in a systematics review and meta-

analysis. This suggests that the more ACEs an individual experienced, the higher the association with risk-taking outcomes in sexual risk-taking, problematic drug use, and interpersonal violence. Therefore, the long-term impact of maltreatment or household dysfunction during childhood significantly impacts the quality of life (Felitti et al., 1998) and suggests that these individuals are at a significantly greater risk of engaging in risk-taking behaviours (Garrido et al., 2018).

In addition, exposure to childhood adversity negatively impacts mental health outcomes across a lifetime (Karatekin, 2017; Merrick et al., 2017; Schilling et al., 2007). The robust relationship between ACEs and mental health has been studied in both a prospective (Smout et al., 2020) and retrospective manner (Chapman et al., 2004; Merrick et al., 2017; Mersky et al., 2013; Karatekin, 2017). The cumulative impact of ACEs throughout development has been associated with mental health problems including anxiety (Kessler et al., 2010) and depression (Chapman et al., 2004; Karatekin, 2017) as well as more frequent alcohol and drug use (Merrick et al., 2017; Mersky et al., 2013).

Individual differences in past experiences influence the manner in which people interact with the world and shape their intentions. An accumulation of past experiences modifies outcome expectancies (Katz et al., 2000). For example, Katz et al. (2000) found that personality (e.g., sensation seeking and social conforming) and past experience contribute to expectation of future risk-taking behaviour. As individuals acquire more experience with risk-taking, the association with perceptions of benefits is stronger and perceptions of risks is weaker.

Risk-Taking Behaviour and Emerging Adulthood

Although there is ample research on adolescent risk behaviour, relatively little research considers the type of risk behaviours in the emerging adulthood population. Emerging adulthood

(i.e., 18 to 25 years old) is a unique developmental stage during which an individual transitions from adolescence to young adulthood (Arnett, 2000, 2005). Emerging adulthood is characterized by identity exploration, instability, self-focus, feelings of being in-between, and openness to possibilities (Arnett, 2000). This new transition experience for young adults in the industrialized society presents the delay of long-term commitments such as marriage and career goals, more gradually gaining independence and responsibility (Tanner & Arnett, 2017). Emerging adulthood is distinguished by a shift to relative independence, having not yet entered the responsibilities of adulthood in its entirety. This transitional period allows individuals the opportunity to explore possible life directions in this period (Arnett, 2000). Arnett (2000, 2005) suggests several risk-taking behaviours do not reach peak frequency until the emerging adulthood period (e.g., unprotected sex, substance abuse, and risky driving behaviours). Additional evidence from longitudinal research by Bachman et al. (1996) supported these claims, indicating that risk-taking behaviours such as substance use are shown to increase, rising to a peak in the early twenties. In an attempt to explain the increase in substance use during this age period, Arnett (2005) suggests that drug experimentation may be a part of identity exploration. As many individuals in emerging adulthood are looking to acquire a wide range of experiences before settling into adult life (e.g., marriage, children, careers), for some, substances may be a way to do so. Additionally, Arnett (2005) suggests that constructing an identity of self can be confusing. Thus, exploration of drugs may be a way to search or relieve the confusion.

It is proposed that many risk-taking behaviours emerge, increase, and eventually peak in adolescence (Boyer, 2006), although Statistics Canada (2021b) suggests that may not necessarily be true regarding alcohol and drug use in Canada in 2017. According to the Canadian Tobacco, Alcohol and Drugs Survey (CTADS), in 2017, the prevalence of alcohol use among the young

adult population (20 to 24 years old; 83.0%) was higher than among adolescents (15 to 19 years old; 57.0%) and adults aged 25 years and older (79.0%; Statistics Canada, 2021b). Additionally, the young adults had riskier alcohol consumption patterns than both groups as 29.0% (552,000) of young adults who drank exceeded the guideline for chronic risk. Prevalence of past-year drug use (e.g., cannabis, cocaine, ecstasy, speed or methamphetamines, hallucinogens, and heroin) increased to 15.0% (4.5 million) from 13.0% (3.7 million) in 2015. An increase in cannabis and cocaine use led to this overall increase. Cannabis use was most prevalent among young adults (33.0% or 780,000). The use of at least one of five illegal drugs was highest among young adults (10.0% or 241,000). Following the legalization of cannabis in Canada in 2018, Statistics Canada (2021a) collected survey data annually via the Canadian Cannabis Survey. The survey examined cannabis use in the past 12-month period for adolescents (16 to 19 years old, 44.0%) and young adults (51.0%), which displayed increases from the previous year (36.0%, 44.0%, respectively). Risk perceptions surrounding regular use of substances ranged from moderate to great risk for smoking tobacco (95.0%), followed by vaping with nicotine (90.0%), drinking alcohol (74.0%), vaping cannabis (75.0%), smoking cannabis (73.0%), and lastly, consuming edibles (68.0%).

In order to develop prevention and intervention initiatives that target the appropriate mechanisms underlying risk-taking behaviours, it is essential to understand how individuals are making appraisals about the benefits and risks of potential involvement. By understanding how individuals make sense of their past behaviours and consider the patterns of association involved with appraisals of benefits and risks, we may better understand what motivates their expected future risk-taking behaviour. The current study data explored the relationships among individual differences in past risk-taking experiences, appraisal of benefits and risks involved with

engagement, individuals' propensity to engage in reactive or reasoned risk-taking behaviours, and how this may impact future risk-taking behaviours.

Current Research Objectives

Objective 1

Objective 1 examined associations among age, sex, ACEs, mental health, antisocial behaviour (e.g., past involvement in a crime), and expected future involvement in each risk-taking behaviour domain (e.g., sexual activities, heavy drinking, drug use, drinking and driving behaviours).

Hypothesis 1a. Older individuals would be associated with lower expected future involvement in risk-taking behaviour across domains.

Hypothesis 1b. Higher childhood adversity exposure would be negatively associated with mental health ratings and positively associated with antisocial behaviour, sexual activities, and substance use.

Objective 2

Objective 2 examined if individuals' perceived benefits and risks of risk-taking influence their expected future involvement in risk-taking behaviours, after controlling for age. In each of the hypotheses below, the following risk-taking behaviour domains were tested: (a) sexual activities, (b) heavy drinking, (c) drug use, (d) drinking and driving behaviours.

Hypothesis 2a. Higher perceived benefits of risk-taking behaviour will be positively associated with expected future involvement in risk-taking behaviours.

Hypothesis 2b. Higher perceived risks of risk-taking behaviour will be negatively associated with expected future involvement in risk-taking behaviours.

Objective 3

Objective 3 tested if participants' reactive or reasoned past experiences contribute to explaining expected future involvement in risk-taking behaviour. In the hypothesis below, the following risk-taking behaviour domains are tested: (a) sexual activities, (b) heavy drinking, (c) drug use, (d) drinking and driving behaviours.

Hypothesis 3a. A higher number of reported reasoned past experiences of risk-taking behaviour (as indicated by the number of risk-taking behaviours endorsed on past experiences scale as reasoned) would be positively associated with higher expected future involvement in risk-taking behaviour.

Hypothesis 3b. A higher number of reported reactive past experiences of risk-taking behaviour (as indicated by the number of risk-taking behaviours endorsed on past experiences scale as reactive) would not be correlated with expected future involvement in risk-taking behaviour.

Methods

Study Participants

A total of 138 participants participated in the study. Twenty participants were excluded from the study sample due to lack of consent (i.e., selecting disagree or leaving blank) or incomplete data (under 30.0% of the survey completed). Inclusion criteria for the study consisted of individuals ages 18 to 24 years old, Canadian citizens, and that could read and write in English. Thus, 13 participants were excluded who did not meet the criteria.

Consequently, a total of 105 emerging adults were included in the following analyses. Of the 105 participants, 80.0% identified as female, 80.0% White, 15.0% Asian, 2.0% Indigenous, 1.0% Other, 2.0% Prefer not to say. Participants' highest level of education ranged from 1.0% less than a high school diploma, 45.7% high school diploma or equivalent, 20.0% college

diploma/degree/certificate, 26.7% bachelor's degree, 6.7% graduate-level degree. Additionally, participants were asked about current employment status from a list of options (e.g., employed full time (40+ hours per week), employed part-time (less than 40 hours per week), unemployed (currently looking for work), unemployed (not currently looking for work), student, self-employed, unable to work)) and could select all that applied. The majority of individuals (59.0%) indicated they were students. Twenty-three percent of individuals indicated they are employed full-time, one-third of individuals (30.5%) indicated they are employed part-time, and 22.9% individuals indicated they were unemployed.

Data Collection

All data was collected in an online questionnaire format via Qualtrics. Study recruitment took place from August 2020 to October 2020. For feasibility, a voluntary response, snowball sampling approach was used to recruit participants through by sharing the survey link on social media platforms and university email newsletters. This type of sampling may not guarantee representation or generalizability of the population (Creswell & Creswell, 2018); however, it was selected in an attempt to achieve the target sample size ($N = 385$). Ethical approval at the researcher's institution was granted prior to starting the study (Pro00097989). Participant consent was obtained at the beginning of the survey following the cover letter detailing the purpose of the study and explaining the benefits, risks, and commitments required in participation.

Measures

Demographic Variables

Demographic information was collected from each participant including age, sex, marital status, ethnicity, and education level. Further descriptive information is presented in Table 1 for these variables.

Table 1

Descriptive Information for Demographic Variables

Demographic Variables	Anchors	*M* or Frequency (%)	*SD*	Range
Age		21.9	1.9	18-24
Sex	1 = Female	84 (80.0%)	0.4	1-2
	2 = Male	21 (20.0%)		
Marital Status	1 = Single (never married)	88 (83.8%)	1.0	1-4
	2 = Relationship/dating	3 (2.9%)		
	3 = Common law	4 (3.8%)		
	4 = Married	10 (9.5%)		
Ethnicity	1 = White	84 (80.0%)	0.7	1-5
	2 = Asian	16 (15.2%)		
	3 = Indigenous	2 (1.9%)		
	4 = Other	1 (1.0%)		
	5 = Prefer not to say	2 (1.9%)		
Education	1 = Less than a high school diploma	1 (1.0%)	1.0	1-5
	2 = High school diploma or equivalent	48 (45.7%)		
	3 = College diploma/degree/certificate	21 (20.0%)		
	4 = Bachelor's degree	28 (26.7%)		
	5 = Graduate level degree	7 (6.7%)		

ACEs

The *Adverse Childhood Experiences Survey* (Dube et al., 2002) measured participants'

(a) emotional, physical, or sexual abuse; (b) emotional and physical neglect; (c) stress associated

with witnessing domestic violence; (d) exposure to substance abuse; and (e) whether participants

have a member of the household who is incarcerated or mentally ill. All questions pertained to

the participants' first 18 years of life. Cumulative ACEs total scores range from 0 (*no ACEs*) to

10 (*highest total ACEs*) and measured the total number of ACEs experienced ($M = 2.12$, $SD =$

2.2, range = 10.0). The ACEs survey had adequate internal consistency, $\alpha = 0.76$.

Mental Health

The study participants were asked to provide a rating of their overall mental health that

ranged on a scale from 1 (*poor*) to 5 (*excellent; M = 3.1, SD = 1.1,* range = 4.0).

Antisocial Behaviour

Participants' past antisocial behaviour was measured with the following question, "have

you ever been involved in a crime?" Involvement was indicated as 1 (*yes*; 13.3%) or 0 (*no;*

86.7%).

Risk-Taking Behaviours

Risk-taking behaviour measures were adapted involving four domains: sexual activities[1],

heavy drinking[2], drug use[3], and drinking and driving behaviours[4]. Each measure described below

captures a distinct perception of the following domains: (a) perceived benefits, (b) perceived

risks, and (c) expected future involvement of risk-taking. The adapted scales are conceptually

based on the Cognitive Appraisal of Risky Events – Revised (CARE-R) questionnaire (Katz et

al., 2000). Based on the factor loadings provided from Katz et al.'s questionnaire, we created

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[1] Sexual activities included the questions involving a new partner, defined as "someone I just met or do not know well." Items involving sexual activities with a regular partner were not included in the following analyses. An additional two questions were not included within the sexual activities domain because they did not capture risk-taking behaviour the way the other items did (e.g., using a condom and abstaining from sexual activity). Also, items regarding sexual coercion were not relevant to our research objectives and therefore were not included within the adapted measure for the current analyses.

[2] Heavy drinking included drinking alcohol in excess, drinking too quickly, or playing drinking games. Additionally, an item was included regarding mixing drugs and alcohol.

[3] Drug use included trying and/or using drugs other than alcohol. Of note, the CARE-R factor loadings referred to this domain as "illicit drug use". Given the current laws within Canada and the inclusion of the item 'marijuana,' the adapted measure is labelled "drug use". It includes several illicit substances such as cocaine, hallucinogens, amphetamines, and inhalants.

[4] Drinking and driving behaviours included driving after drinking specific ranges of alcoholic beverages (e.g., 3-4 alcoholic beverages) and riding in a car with someone who has consumed alcohol.

similar item groupings to create specific risk-taking behaviour domains. Fromme et al. (1997) conducted a factor-analysis that provides evidence for the utility of separating into these risk-taking behaviours domains and allows for the opportunity to evaluate the factors that contribute to different risk-taking events. See Table 3 for summary of the risk-taking behaviours measures.

Perceived Benefits of Risk-Taking. The adapted scales for each risk-taking behaviour domain (i.e., sexual activities, heavy drinking, drug use, and drinking and driving behaviours) measured participants' perceived positive consequences (i.e., benefits) if they were to engage in the specific risk-taking behaviour. The items were rated on a 7-point Likert-scale ranging from 1 (*Not Likely at All*) to 7 (*Extremely Likely*), with higher scores indicating greater perceived benefits involved with engagement in the risk-taking behaviour. Each domain revealed good internal reliability: α = .85 (sexual activities), α = .79 (heavy drinking), α = .77 (drug use), α = .79 (drinking and driving behaviours).

Perceived Risks of Risk-taking. The adapted scales for each risk-taking behaviour domain (i.e., sexual activities, heavy drinking, drug use, and drinking and driving behaviours) measured participants' perceived negative consequences (i.e., risks) involved in the specific risk-taking behaviour. The items were rated on a 7-point Likert-scale ranging from 1 (*Not Likely at All*) to 7 (*Extremely Likely*), with higher scores indicating greater perceived risks involved with engagement in the risk-taking behaviour. Each domain revealed good internal reliability: α = .89 (sexual activities), α = .80 (heavy drinking), α = .77 (drug use), α = .69 (drinking and driving behaviours).

Past Experiences (Reactive and Reasoned). Two measures of participants' past experience of risk-taking behaviours were assessed: (a) past experiences of reactive risk-taking behaviour, (b) past experiences of reasoned risk-taking behaviour. Past frequency of risk-taking

behaviour was measured by reported frequency of involvement in the risk-taking behaviours

from the CARE-R measure. For the participants who endorsed past engagement in the activity

(*yes*), they additionally were required to indicate if the past engagement reactive or reasoned.

This item was administered as follow-up, similar to Maslowsky et al. (2011, 2019), to assess the

frequency of reactive and reasoned past experiences. To calculate overall past experiences of

reactive and reasoned risk-taking behaviours, the items were dummy coded and summed (0 = *no,*

1 = *yes*); therefore, higher scores reflected higher frequency of engagement. See Table 2 for

response frequency by item.

Table 2

Descriptive Information for Past Experiences (Reactive and Reasoned) Variables for Each Risk-

Taking Behaviour Domain

Measures	Frequency (Valid Percent)		Frequency (Valid Percent)	
Risky Sexual Activities	Yes	No	Reactive	Reasoned
Had sex with someone I just met or do not know well	42 (40.4%)	62 (59.6%)	37 (36.3%)	4 (3.9%)
Had sex without protection against pregnancy	14 (13.6%)	89 (86.4%)	12 (11.8%)	1 (1.0%)
Had sex without protection against sexually transmitted diseases	22 (21.4%)	81 (78.6%)	19 (18.8%)	1 (1.0%)
Had sexual intercourse while under the influence of alcohol	37 (36.3%)	65 (63.7%)	33 (33.0%)	1 (1.0%)
Had sexual intercourse while under the influence of drugs other than alcohol	17 (16.7%)	85 (83.3%)	13 (12.7%)	3 (2.9%)
Had sex without a condom	23 (22.5%)	79 (77.5%)	20 (19.8%)	1 (1.0%)
Heavy Drinking				

Drank more than 5 alcoholic beverages	75 (72.8%)	28 (27.2%)	23 (23.2%)	47 (47.5%)
Drank alcohol too quickly	81 (78.6%)	22 (21.4%)	58 (60.4%)	15 (15.6%)
Mixed drugs and alcohol	45 (43.7%)	58 (56.3%)	27 (26.7%)	15 (14.9%)
Played drinking games	82 (79.6%)	21 (20.4%)	18 (18.8%)	56 (58.3%)
Drug Use				
Marijuana	62 (60.2%)	41 (39.8%)	21 (21.2%)	36 (36.4%)
Cocaine	16 (16.2%)	83 (83.8%)	12 (11.7%)	4 (3.9%)
Hallucinogens	24 (23.8%)	77 (76.2%)	6 (5.8%)	18 (17.5%)
Amphetamines	7 (7.1%)	91 (92.9%)	5 (4.9%)	2 (1.9%)
Inhalants	8 (8.2%)	89 (91.8%)	7 (6.8%)	1 (1.0%)
Drinking and Driving Behaviours				
Drove after drinking 1-2 alcoholic beverages	60 (58.3%)	43 (41.7%)	18 (17.8%)	39 (38.6%)
Drove after 3-4 alcoholic beverages	16 (15.7%)	86 (84.3%)	12 (11.7%)	3 (2.9%)
Drove after 5 or more alcoholic beverages	7 (6.9%)	95 (93.1%)	6 (5.8%)	1 (1.0%)
Rode in a car with someone who had consumed alcohol	59 (57.3%)	44 (42.7%)	37 (37.4%)	16 (16.2%)

Expected Future Involvement in Risk-Taking. The adapted scales for each risk-taking behaviour domain evaluated the participants' expected future involvement in each activity in the future (i.e., in the next six months). The items were rated on a 7-point Likert-scale ranging from 1 (*Not Likely at All*) to 7 (*Extremely Likely*), with higher scores indicating a greater likelihood of engagement in the risk-taking behaviour. Each domain had good internal reliability: $\alpha = .87$ (sexual activities), $\alpha = .83$ (heavy drinking), $\alpha = .57$ (drug use), $\alpha = .72$ (drinking and driving behaviours).

Table 3

Descriptive information for Perceived Benefits, Perceived Risks and Expected Future

Involvement in Risk-Taking Behaviours

Measures	Number of Items	α	*n*	*M*	*SD*	Range
Perceived Benefits of Risk-taking Behaviour						
Sexual Activities	9	.86	90	21.3	10.1	9-46
Heavy Drinking	4	.79	90	10.3	5.7	4-23
Drug Use	5	.77	90	11.0	5.6	5-28
Drinking and Driving	4	.79	90	8.0	4.9	4-26
Perceived Risks of Risk-taking Behaviour						
Sexual Activities	9	.90	78	49.7	11.0	15-63
Heavy Drinking	4	.80	84	21.8	5.4	4-28
Drug Use	5	.77	82	27.9	5.8	5-35
Drinking and Driving	4	.69	83	21.6	4.6	9-28
Expected Future Involvement in Risk-taking Behaviour						
Sexual Activities	9	.89	74	12.4	5.9	9-30
Heavy Drinking	4	.83	80	8.5	5.5	4-23
Drug Use	5	.57	81	8.7	3.8	5-20
Drinking and Driving	4	.72	76	6.3	2.6	4-15

Plan of Analyses

      All statistical analyses were executed using SPSS 27 (IBM, 2020). Preliminary analyses

consisted of basic descriptive statistics to demonstrate the characteristics of the participants and

the adapted measures (i.e., mean, standard deviation, range, Cronbach's alpha).

Objective 1

Zero-order correlations were employed to examine the associations among participants'
demographic and psychosocial variables such as age, sex, ACEs, mental health, antisocial
behaviour, and expected future involvement in risk-taking behaviours. Expected future
involvement in risk-taking behaviours included the four domains: (a) sexual activities, (b) drug
use, (c) heavy drinking, and (d) drinking and driving behaviours.

Objectives 2 and 3

Four separate two-step hierarchical multiple regression analyses were conducted for each
of the four domains (i.e., sexual activities, drug use, heavy drinking, and drinking and driving
behaviours) to assess Objectives 2 and 3. In Step 1 of the first hierarchical multiple regression
assessing risky sexual activities, participants' age, perceived benefits and perceived risks in
sexual activities were entered to assess their relationship with expected future involvement in
sexual activities (Objective 2). At Step 2, the reactive and reasoned past experiences variables for
sexual activities were entered to assess additional variance explained by these new factors
(Objective 3).

For the remaining hierarchical regression analyses (2-4), the same steps and variables
were used to assess these relationships in the other risk-taking domains (i.e., drug use, heavy
drinking, and drinking and driving behaviours).

Assumptions

Prior to conducting regression analyses, skewness and kurtosis values and stem-and-leaf
plots were obtained to examine the distributions for the outcome variable from each risk
behaviour domain. After outliers were removed from expected future involvement in sexual
activities, drug use, heavy drinking, drinking and driving behaviours the assumption of normality
was satisfied since the values for skewness and kurtosis fell between -2 and +2 (skewness and

kurtosis .80-1.75, -.13-1.91, respectively; George & Mallery, 2010; Gravetter & Wallnau, 2014).

Furthermore, the assumption of linearity was found among the predictor variables (e.g., residual

statistics range between -3 and +3), cook's test (.12-.20), and there was no multicollinearity in the

data (all correlations did not exceed .80).

Results

Statistical Analysis

Zero-Order Correlations (Objective 1)

The zero-order correlations between age, sex, ACEs, mental health, antisocial behaviour,

and expected future involvement for risky sexual activities, heavy drinking, drug use, and

drinking and driving behaviours are presented in Table 4. ACEs was positively correlated with

antisocial behaviour ($r = .30, p < .01$) and negatively correlated with mental health ($r = -.39, p <$

.01). Sex and mental health were positively correlated ($r = .21, p < .05$) meaning that males

indicated higher mental health. Past antisocial behaviour (e.g., involved in a crime) and expected

future involvement in drug use were positively correlated ($r = .35, p < .01$). Expected future

involvement in all four risk-taking behaviour domains were positively correlated with one

another ranging from ($r = .28-.55, p < .05$) with the exception of expected future sexual activities

and drinking and driving behaviours ($r = .11, p = 0.11$).

Table 4

Zero-Order Correlations Between Demographic and Psychosocial Variables and Expected

Future Involvement in Four Risk-Taking Behaviour Domains

Variable	1	2	3	4	5	6	7	8	9
1. Age	1	.04	.01	.05	.13	.10	.13	.05	.13
2. Sex	-	1	-.14	.21*	.15	.07	.13	-.02	.12
3. ACEs	-	-	1	-.39**	.30**	.15	.18	.18	-.11

4. Mental Health	-	-	-	1	-.13	.09	-.14	-.18	-.06
5. Antisocial Behaviour	-	-	-	-	1	.02	.18	.35**	.14
6. EFI-Sexual Activities	-	-	-	-	-	1	.34**	.34**	.11
7. EFI-Heavy Drinking	-	-	-	-	-	-	1	.50**	.37**
8. EFI-Drug Use	-	-	-	-	-	-	-	1	.28*
9. EFI-Drinking & Driving	-	-	-	-	-	-	-	-	1

Note. Sex was dummy-coded where 1 = female and 2 = male. EFI-sexual activities = Expected future involvement in sexual activities, EFI-heavy drinking = Expected future involvement in heavy drinking, EFI-drug use = Expected future involvement in drug use, EFI drinking & driving = Expected future involvement in drinking and driving behaviours.

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

Hierarchical Multiple Regression Analyses (Objectives 2 and 3)

A hierarchical multiple regression analysis was carried out to investigate whether age and perceived benefits and risks of risk-taking behaviour significantly predict participants' expected future involvement in each risk-taking behaviour domain (Step 1). At Step 2, the reactive and reasoned past experiences variables were entered to assess additional variance explained by these new factors. Results are presented for each domain.

Sexual Activities. For Objective 2, the results of the hierarchical regression indicated at Step 1, age, perceived benefits and risks in sexual activities explained 22.1% of the variance in expected future sexual activities, $F(3,63) = 5.97$, $p = .001$. In this model, perceived benefits of sexual activities contributed to the model ($\beta = .52$, $p = .001$), however, perceived risks ($\beta = .07$, $p = .656$), and age did not ($\beta = -.01$, $p = .954$).

For Objective 3, the reactive and reasoned past experiences of sexual activities were added as predictor variables in Step 2. Adding these two variables explained an additional 3.9% of the variance in expected future sexual activities; however, this change in R^2 was not

significant (p = .206). Thus, Model 1 (Objective 2) has better predictive power of expected

future sexual activities than Model 2 where reactive and reasoned past experiences of sexual

activities were added (Table 5).

Table 5

Summary of Hierarchical Multiple Regression Analyses for Variables Predicting Expected

Future Involvement in Sexual Activities

Variable	β (b)	t	p	R^2	R^2 change	95% CI	
						LL	UL
Step 1				.22	.22**		
Age	-.01(-.02)	-.06	.954			-.85	.80
Perceived Benefits	.52(.29)**	3.41	.001			.12	.46
Perceived Risks	.07(.04)	.45	.656			-.13	.20
Step 2				.26	.04		
Age	-.07(-.26)	-.59	.556			-1.12	.61
Perceived Benefits	.44(.25)**	2.80	.007			.07	.43
Perceived Risks	.09(.05)	.58	.562			-.12	.22
Reactive Past Experiences	.16(.48)	1.25	.215			-.18	1.53
Reasoned Past Experiences	.12(1.33)	.95	.345			-1.47	4.13

Note. Standardized regression coefficients (*β*) are provided. Unstandardized regression

coefficients (*b*) are reported in brackets.

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

Heavy Drinking. For Objective 2, the results of the hierarchical regression indicated at

Step 1, age, perceived benefits and risks in heavy drinking explained 54.5% of the variance in

expected future heavy drinking, $F(3,75) = 29.93$, $p < .001$. In this model, perceived benefits of

heavy drinking contributed to the model (*β* = .79, *p* <.001), however, perceived risks (*β* = .07, *p*

= .544), and age did not (*β* = -.02, *p* = .814).

For Objective 3, the reactive and reasoned past experiences of heavy drinking were added as predictor variables in Step 2. Adding these two variables explained an additional 5.8% of the variance in expected future heavy drinking. This change in R^2 was significant ($p = .007$). Thus, Model 2 has greater predictive power of expected heavy drinking than Model 1, $F(5,73) = 22.15$, $p < .001$. In Model 2, perceived benefits of heavy drinking contributed to the model ($\beta = .72$, $p < .001$), as well as reasoned past experiences of heavy drinking ($\beta = .27$, $p = .002$); however, perceived risks ($\beta = .10$, $p = .361$), age ($\beta = -.11$, $p = .171$), and reactive past experiences of heavy drinking did not ($\beta = .14$, $p = .099$). See Table 6 for a summary.

Table 6

Summary of Hierarchical Multiple Regression Analyses for Variables Predicting Expected Future Involvement in Heavy Drinking

Variable	β (b)	t	p	R^2	R^2 change	95% CI LL	UL
Step 1				.55	.55**		
Age	-.02(-.06)	-.24	.814			-.54	.43
Perceived Benefits	.79(.79)**	7.14	<.001			.57	1.01
Perceived Risks	.07(.07)	.61	.544			-.16	.31
Step 2				.60	.06**		
Age	-.11(-.34)	-1.38	.171			-.83	.15
Perceived Benefits	.72(.72)**	6.79	<.001			.51	.93
Perceived Risks	.10(.11)	.92	.361			-.12	.33
Reactive Past Experiences	.14(.59)	1.67	.099			-.11	1.30
Reasoned Past Experiences	.27(1.20)**	3.19	.002			.45	1.95

Note. Standardized regression coefficients (β) are provided. Unstandardized regression coefficients (b) are reported in brackets. *LL* = lower limit; *UL* = upper limit.

* $p < .05$, ** $p < .01$.

Drug Use. For Objective 2, the results of the hierarchical regression indicated at Step 1, age, perceived benefits and risks in drug use explained 57.0% of the variance in expected future drug use, $F(3,75) = 29.93$, $p < .001$. In this model, perceived benefits ($\beta = .45$, $p < .001$) and perceived risks ($\beta = -.38$, $p < .001$) of drug use contributed to the model; however, age did not ($\beta = -.08$, $p = .302$). For Objective 3, the reactive and reasoned past experiences of drug use were added as predictor variables in Step 2. Although Step 1 helps to explain much of the variance, Step 2 explained an additional 10.7% of variance in expected future drug use. This change in R^2 was significant ($p < .001$).

Thus, Model 2, when reactive and reasoned past experiences of drug use were added, has greater predictive power of drug use than the Model 1, $F(5,71) = 29.80$, $p < .001$. At Step 2, perceived benefits ($\beta = .37$, $p < .001$) and perceived risks ($\beta = -.25$, $p = .012$) of drug use, as well as reactive ($\beta = .19$, $p = .009$) and reasoned ($\beta = .29$, $p < .001$) past experiences of drug use better explain expected future drug use; but not age ($\beta = -.13$, $p = .068$). See Table 7 for a summary.

Table 7

Summary of Hierarchical Multiple Regression Analyses for Variables Predicting Expectations of Future Involvement in Drug Use

Variable	β (b)	t	p	R^2	R^2 change	95% CI LL	UL
Step 1				.57	.57**		
Age	-.08(-.17)	-1.04	.302			-.50	.16
Perceived Benefits	.45(.30)**	4.38	<.001			.16	.43
Perceived Risks	-.38(-.25)**	-3.62	<.001			-.39	-.11
Step 2				.68	.11**		
Age	-.13(-.27)	-1.85	.068			-.56	.02
Perceived Benefits	.37(.25)**	4.00	<.001			.12	.37

Perceived Risks	-.25(-.17)*	-2.57	.012			-.29	-.04
Reactive Past Experiences	.19(.97)**	2.67	.009			.25	1.69
Reasoned Past Experiences	.29(1.34)**	3.77	<.001			.63	2.05

Note. Standardized regression coefficients (β) are provided. Unstandardized regression coefficients (*b*) are reported in brackets. *LL* = lower limit; *UL* = upper limit.

* $p < .05$, ** $p < .01$.

Drinking and driving behaviours. For Objective 2, the results of the hierarchical regression indicated at Step 1, age, perceived benefits and risks in drinking and driving explained 32.9% of the variance in expected future drinking and driving, $F(3,70) = 11.46$, p < .001. In this model, perceived benefits of drinking and driving contributed to the model (β = .47, *p* <.001), however, perceived risks (β = -.18, *p* = .178), and age did not (β = -.11, *p* = .309).

For Objective 3, the reactive and reasoned past experiences of drinking and driving were added as predictor variables in Step 2. Adding these two variables explained an additional 2.4% of the variance in expected future drinking and driving; however, this change in R^2 was not significant (*p* = .284). Thus, Model 1 has better predictive power of expected future drinking and driving than the Model 2 when reactive and reasoned past experiences were added (Table 8).

Table 8

Summary of Hierarchical Multiple Regression Analyses for Variables Predicting Expected Future Involvement in Drinking and Driving Behaviours

Variable	β (*b*)	*t*	*p*	R^2	R^2 change	95% CI LL	95% CI UL
Step 1				.33	.33**		
Age	-.11(-.16)	-1.02	.309			-.47	.15
Perceived Benefits	.47(.31)**	3.57	<.001			.14	.48
Perceived Risks	-.18(-.10)	-1.36	.178			-.25	.05

	β(b)	t	p			LL	UL
Step 2				.35	.02		
Age	-.13(-.19)	-1.02	.283			-.51	.12
Perceived Benefits	.45(.30)**	3.37	.001			.12	.47
Perceived Risks	-.15(-.09)	-1.08	.283			-.25	.07
Reactive Past Experiences	.01(.02)	.05	.962			-.66	.69
Reasoned Past Experiences	.17(.67)	1.57	.122			-.18	1.53

Note. Standardized regression coefficients (β) are provided. Unstandardized regression coefficients (*b*) are reported in brackets. *LL* = lower limit; *UL* = upper limit.

* $p < .05$, ** $p < .01$.

Discussion

Emerging adulthood is a distinct transitional period of development between adolescence and adult life (Arnett, 2000). Individuals in emerging adulthood typically experience instability and changes in living arrangements (e.g., moving out of their parent's home) and an increased sense of independence, allowing for experimentation and exploration in many areas in life. Arnett (2006) proposed that identity exploration may occur more in emerging adulthood than in adolescence. Data presented by Statistics Canada (2021a, 2021b) suggests that emerging adulthood is a period of experimentation in many ways, including predominant substance use compared to adolescence or adulthood. This data suggests that risk-taking behaviours may not peak in adolescence.

Furthermore, as cognitive development continues until the age of 25 (Steinberg, 2006), the cognitive processes involved with risk-taking, including mechanisms that support the perceived benefits and risks of engagement, may still be developing. Thus, the current study's purpose was to gain a deeper understanding of the impacts of individuals' risk appraisals on future risky behaviour. Specifically, this study extended the literature to consider the inter-

relationships among factors involved in risk-taking behaviour; and how age, perceived benefits and risks and past experiences explained expectations for future involvement.

Objective 1

Age

Surprisingly, age was not a strong predictor in the present study. Despite factors that should help explain why age is important during emerging adulthood, such as one's continued cognitive development (Steinberg, 2008), increased independence, and exposure to more opportunities for exploration (Arnett, 2006), age was not found to be a strong predictor in our current study. The study results posit that the sample is a fairly unified group in the manner in which they appraise and engage in risk-taking behaviours. Perhaps the emerging adulthood period of cognitive development may be subtle in comparison to adolescence. Arnett (2006) believed that its heterogeneity defines emerging adulthood. This is a period in which the variance is the greatest in many aspects of development in terms of school, employment, and romantic commitments. According to Boyer and Byrnes (2009), the opportunity-propensity model suggests that risk-taking will occur when individuals are given the opportunity and perceive the benefits involved. Additionally, Boyer and Byrnes (2009) suggest there are components from personality in which individuals are more prone to engage when given the opportunity than others, such as sensation seeking. Our findings aligned with this theory in that despite possible variations in lifestyles during this developmental period, the current sample appears to consider the benefits, risks, and future engagement similarly. However, our study did not test for personality traits as it is well documented in research, and, therefore, the current study is unable to further interpret the role of specific traits such as sensation seeking. Nevertheless, this study

extends the literature by examining cognitive appraisals of risk-taking behaviours in an older age category than the vast majority of the risk-taking literature.

ACEs

In keeping with the research in this area, the current study extends the research that suggests a higher number of ACEs were associated with lower self-report ratings of mental health (Chapman et al., 2004; Karatekin, 2017; Kessler et al., 2010). However, contrary to previous research findings, ACEs did not significantly correlate with sexual activities (Hughes et al., 2017) or drug use (Merrick et al., 2017; Mersky et al., 2013) in the present study. We did find a higher frequency of ACEs were associated with higher levels of antisocial behaviour. Thus, the current study provides further evidence illustrating the impact of ACEs, mental health, and antisocial behaviour. A greater understanding of the impact of distinct experiences from ACEs exposure may provide clarity in the associations with specific risk-taking behaviours such as sexual activities. Since the ACEs measure includes several categories of abuse, neglect, and domestic violence, the impact of any single experience is different for each individual at different stages in their lives (Merrick et al., 2017). Specifically, the age and type of adversity may influence the impact and association on future risk-taking behaviours. The current analysis examined the overall number of ACEs rather than the timing or type of adversity; therefore, further evaluation of the specific associations was not examined.

Sex

As 80.0% of the study participants identified as female, the sample was not representative of the general population in terms of sex. This under-representation of male participants is not commonly depicted in research, as much of the literature cited ranges in male representation from 38.0% (Babad et al., 2019) to 52.0% (Maslowsky et al., 2011). Therefore, the current study

provides a unique perspective due to a sample that was largely female. Although some researchers suggested in some cases that sex does not matter, others posited that it may depend on the type of risk-taking behaviour. When opportunities for risk are equal for males and females, sex no longer informs who will engage in risk-taking behaviour, as appetite for risk-taking does not differ (Boyer & Byrnes, 2009; Figner and Weber, 2011). However, Figner and Weber (2011) suggest that subjective perceptions of risks and benefits may differ, specifically in the domains of financial, recreational, and ethical risks. Compared to males, females tend to perceive risks to be higher in these domains; however, females perceive risks to be lower in the social domain (Figner & Weber, 2011). Considering the current findings, it does not appear that there is a significant difference in expected future involvement between females and males, regardless of the domain of risk-taking behaviour. In terms of sex differences, the present study results suggested an association among sex and mental health ratings. Specifically, males indicated better ratings of mental health than females; however, although this correlation was significant, it was not substantial ($r = .21$). These findings aligned with data collected by Statistics Canada (2020) which indicated that females are more likely than males to report worse mental health since the outset of physical distancing due to COVID-19 (Moyser, 2020).

Antisocial Behaviour

Increased engagement in antisocial behaviour was associated with higher levels of expected future drug use. Although this association was not among my hypothesis, there may be external factors that were not measured within the current study such as predisposition for sensation seeking (Romer et al., 2017) or peer influences (Walters, 2019) that may impact the relationship with antisocial behaviours (Farrell et al., 2017) and drug use (Branstetter et al., 2011). Most drug use in Canada is considered illegal with the exception of cannabis. Thus, the

positive association among antisocial behaviour and expected future drug use may not surprising. Additionally, sensation seeking is a need for novel sensations and experiences and accounts for significant variance in behavioural intentions for risk-taking behaviours such as use of illegal drugs which may be classified as antisocial behaviour (Reyna & Farley, 2006). The impact of involvement with certain peer groups has been discussed in the literature. For example, Walters (2019) suggests that prosocial peers may have as much impact on future antisocial behaviour and drug use as antisocial peers.

Altogether, the pattern of results from Objective 1 suggests there is little individual diversity in the manner in which individuals 18 to 24 years old perceive and engage in risk-taking behaviours. Additionally, the current results highlight that childhood experiences matter and can have lasting impacts over a lifetime, in keeping with much of the existing research (Merrick et al., 2017; Mersky et al., 2013); however, the specific nature of those impacts may be highly nuanced. This is not surprising given the complexity and transactional nature of development and upholds the importance of protective factors such as stable home environments and prosocial peers that may further inform prevention and intervention initiatives.

Objectives 2 and 3

In examining each domain of risk-taking behaviours separately, the current study provides further insight into distinct differences in motivations for future involvement in risk-taking behaviour. Consistent with previous studies, we found perceived benefits to be better predictors of future risk-taking behaviours (Katz et al., 2000; Maslowsky et al., 2010). Specifically, the current study results indicate that expected future involvement in sexual activities and drinking and driving behaviours were predicted only by the perceived benefits of engagement. This is particularly relevant as we consider communicating information in

prevention campaigns for risky sexual activity and drinking and driving behaviours. Prevention programs that focus solely on the harms of these risk-taking behaviours appear to be missing a crucial motivational element for the emerging adulthood population (Katz et al., 2000).

Researchers suggest that future involvement in reasoned risk behaviour is driven by the ability to seek out benefits and choose the beneficial option within a risky situation (Malsowsky et al., 2010). In addition to perceived benefits, there are risk-taking domains examined within the current study in which past experiences of reasoned risk-taking behaviour significantly predicted future involvement. The present study provides further evidence of perceived benefits and extends the literature by including past experiences of reasoned risk-taking behaviour as significant predictors of future expectations for heavy drinking. Furthermore, given that the current study investigated risk perceptions in emerging adulthood, these findings suggest that the prioritization of perceived benefits persists through the transitional years. The dual systems model posits that incentive processing is motivated by the benefits of risk-taking; however, the cognitive processes involved in deliberate decision-making are thought to continue to develop until age 25 (Steinberg, 2008, 2010), which aligns with the findings of the current study.

Lastly, when examining factors associated with expected future drug use, perceived risks and past experiences were also key in predicting future involvement. Specifically, perceived risks, past experiences of both reactive and reasoned risk-taking behaviour in addition to perceived benefits significantly predicted expected future drug use. These results suggest that individuals consider their past experiences, whether reactive or reasoned, to inform their future drug use, which aligns with the fuzzy trace theory (Reyna, 2012). As individuals gain experience and become more advanced decision makers, they can readily retrieve and smoothly apply those generic gist appraisals of risky situations to the present or future circumstances (Reyna & Farley,

2006). Furthermore, past experiences of reactive drug use suggests that individuals may be engaging in this type of behaviour impulsively at times. Additionally, perceived benefits and risks are significant predictors suggesting that individuals weigh the risks involved when considering future engagement. As most substance use is illegal in Canada, aside from cannabis use, this is likely reflected in the perceptions of risks by individuals. However, Arnett (2007) highlights that emerging adulthood tends to be the peak age period for many risk-taking behaviours that most societies try to discourage. The current sample can be understood to consider the risks involved, but perhaps positive past experiences, peer involvement, or the perceived benefits ultimately motivate future involvement.

Strengths of the Current Study

Overall, the current study contributes to the literature on appraisals and engagement in risk-taking behaviours in several ways. First, by examining these relationships in an older sample than most risk behaviour studies, the current study provides further information regarding the nature of risk-taking in emerging adulthood (Boyer, 2006; Boyer & Byrnes, 2009; Maslowsky et al., 2019). Another strength of the present study is the incorporation of several domain-specific risk-taking behaviours in order to understand the unique predictors and impacts involved with the distinct areas of risk-taking behaviours (Katz et al., 2000). These domain-specific measures also have good psychometric reliability. Furthermore, each domain was explored in greater depth with the consideration of important aspects that may predict future behaviour in each of the domains. Lastly, the data collection for this study took place during the COVID-19 pandemic; therefore, it provides further insight into risk-taking within the emerging adulthood population and delivers a snapshot of individuals' current experiences and perceptions during this time.

Limitations and Areas for Future Research

The following limitations should be considered in the study interpretation. First, this was a cross-sectional study, and therefore cannot be used to infer causation or developmental trajectories. Although this study provided important findings that build upon the research literature concerning the development of risk-taking in emerging adulthood, employing a longitudinal approach would be useful for considering the direction of these relationships over time. Additionally, utilizing a broader age range in future research would facilitate more extensive delineation of the developmental trajectories of risk-taking behaviours.

Second, it may be challenging to fully interpret the findings of this study alongside the extant research literature because of the timing of when the data collection took place. For example, the data for the current study was collected during a global pandemic. The COVID-19 pandemic has changed many Canadians' lives in unimaginable ways and has significantly impacted various areas of life, including mental health and increased substance use (Rotermann, 2020). Notably, however, this study still provides critical insights into the manner in which individuals have responded to significant change and stress and engage in risk-taking during unprecedented times. Future studies that employ a similar approach to the current study would allow for comparison and follow-up of characteristics and trends as we navigate subsequent changes following the COVID-19 pandemic. Additionally, the current sample is unique due to the high involvement of females, which may impact analysis. Therefore, our ability to discuss perceived benefits and risks and expectations of future involvement in risk-taking is limited for male participants. Future studies may collect an equally divided sample to further discuss the role of sex in individuals' perceived benefits and risks in risk-taking behaviour.

Third, response styles from participants resulted in incomplete data for the past experiences of reactive versus reasoned risk-taking behaviour. Participants endorsed past

engagement in risk-taking behaviour but did not select whether the experience was reactive or reasoned in nature, which may reflect problems interpreting the format of the question. In these cases, no response was considered as an absence of behaviour. This limitation can be addressed in future research by including further clarity within the survey platform itself and including additional options beyond reactive or reasoned (e.g., both, neither, unsure) to allow participants to identify with their chosen response clearly. This limitation is a part of the shortcomings in self-report research; however, it was essential to consider during the initial cleaning and analysis of data and when interpreting the results of this study. Lastly, future research can expand upon the current findings by examining the influence of both pathways to expected future involvement (i.e., expected future reactive and reasoned risk-taking involvement). Separating the subtypes of future risk-taking behaviour into reactive or reasoned will allow further investigation of the impacts among past experiences and future involvement of reactive and reasoned risk-taking.

Implications

The current study extends the research literature by examining each domain separately and identifying the unique motivations involved for expected future sexual activities, heavy drinking, drug use, and drinking and driving behaviours. Therefore, the present results enable a better understanding of the emerging adulthood demographic and facilitate more effective communication for non-profit organizations such as MADD Canada or Drug Free Kids Canada to implement prevention and intervention initiatives. Additionally, the data may be interpreted for recommendations aimed at policy and practice, such as health education approaches and public policy to reduce burdens of injury, distress, addictions, and associated economic costs.

The current findings suggest that future involvement in risk-taking behaviours across all domains is less about the risks involved but more associated with the benefits. An example of

perceived benefits predicting involvement more than risks can be found in Alberta. At this time, Alberta Health Services is raising concern over the syphilis outbreak reported in Edmonton, with infection numbers at the highest they have been in approximately 70 years (Harrap, 2021). The rapid increase in sexually transmitted infections suggests that finding an effective strategy to improve safe sexual activities is crucial. The current study suggests that in the sexual activity domain of risk-taking behaviour, it may be beneficial to recognize the appeal of engagement in these activities while incorporating harm reduction principles (Alberta Health Services, 2019) as a means to minimize risks. By acknowledging that sexual activity is a normal, healthy part of life and providing education around safe sex engagement, there is the opportunity to present risk reduction information such as regular sexually transmitted infection screenings, wearing a condom, and the use of oral contraceptives.

Similarly, the results from the present study suggest that the perceived benefits predict individuals' future involvement in drinking and driving. It is commonly known that consuming alcohol and driving is illegal, and that alcohol affects judgement, reaction time, and perception. Many campaigns target risks such as the illegal nature of the activity and the risk of injuring oneself or others (MADD Canada, 2021a). Nevertheless, drinking and driving behaviour persists (MADD Canada, 2021b). Although people seem to understand the risks involved, the benefit (e.g., having a ride home) seems to be the greater predictor of future involvement in drinking and driving behaviours. However, research also suggests that drivers poorly predict their driving impairment (Beirness, 1986; Verster, 2011). Therefore, prevention initiatives may benefit from emphasizing the poor self-assessment abilities of an individual who is intoxicated and highlighting the benefits and importance of a safe ride home with a designated driver or taxi.

Notably, the frequency of past experiences of drug use in the current sample is high compared to the data collected from Statistics Canada (Statistics Canada, 2021a). Specifically, cannabis use consumption for the emerging adulthood population in 2019 was reported at 51.0%, whereas the current sample reported past experiences of cannabis use at 60.2%. This difference may be partly attributed to the impact of COVID-19 on substance use in Canada. In 2020, reasons for the increase in cannabis use included as a means of relaxation, as a result of boredom, and a way to reduce stress and anxiety (Statistics Canada, 2021a). In general, statistics reported by Statistics Canada suggest that the pandemic is amplifying alcohol and drug use (Statistics Canada, 2020). However, the impacts of the pandemic on mental health and substance use are shown to be greater for people at risk of mental health disorders or living with mental health disorders and with substance use issues (Leger, 2021). Specifically, people living alone are more likely to experience moderate-to-severe depressive symptoms and problematic alcohol use. The pandemic restrictions have also impacted the availability of certain substances and access to drug treatment services (United Nations Office on Drugs and Crime, 2020). As a result of limited availability, there are shifts in the pricing of many drugs, which may cause drug users to seek substitutes, which are often more harmful.

Conclusion

In order for prevention and intervention methods to be successful, it is important to understand what influences decisions made by emerging adults. The current study examined the extent to which past experiences and perceptions shape the motivation to engage in future risk-taking. Specifically, this study sought to achieve a deeper understanding of risk-taking behaviour by extending the literature to examine the emerging adult population. The zero-order correlation analysis revealed the importance of protective factors throughout development. Additionally, a

series of two-step multiple hierarchical regression analyses were utilized to examine the distinct predictors in four domains of risk-taking. This analysis revealed individuals' perceived benefits are the greatest predictors of future involvement in sexual activities and drinking and driving behaviours. That said, the results indicated that future involvement of heavy drinking was predicted by perceived benefits and past experiences of reasoned risk-taking. Lastly, future drug use was best explained by considering individuals' perceived benefits and risks and past experiences of reactive and reasoned risk-taking behaviour. In extending our understanding of risk-taking and the motivations that underlie individuals' propensity for engagement, we can better support the prioritization of health and well-being, fostering the development of self-sufficiency and independence while reducing harm.

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Appendix

Thank you for agreeing to participate in the following survey.

From this research we wish to learn about individual's perceptions of risks and benefits in various situations. The survey should take you approximately 15-30 minutes to complete. You do not have to answers any questions you do not want to answer. Your name will not be attached to the survey at any time, you will remain anonymous and will not be identifiable.

There are five sections in this survey: 1) About you 2) Your past experiences 3-5) Your thoughts on risky behaviours. You may notice that questions may sound similar in different sections, please do not be concerned, as the survey was intended that way. At the end of this survey, please choose the "submit" button to save your responses. You will also find a link and document at the end of the survey with a list of resources for further information or assistance.

Please answer all of the following questions as they currently describe you.

1. What is your age in years? _____
2. How do you currently describe your gender identity?
    a. Female
    b. Male
    c. Other _____
    d. Prefer not to say
3. Please indicate your biological sex:
    a. Female
    b. Male
    c. Other _____
    d. Prefer not to say
4. Marital status:
    a. Single (never married)
    b. Married
    c. Divorced
    d. Other _____
5. Which of the following ethic identities best describes you?
    a. White
    b. Hispanic or Latino
    c. Black
    d. Aboriginal or Indigenous
    e. Asian
    f. Other _____
    g. Prefer not to say
6. What is the highest level of education that you have completed?
    a. Less than a high school diploma
    b. High school degree or equivalent
    c. College diploma/degree/certificate
    d. Bachelor's degree
    e. Graduate level degree
    f. Other _____

7. Have you ever been suspended or expelled?
8. If yes:
   a. 1 time
   b. 2-5 times
   c. 5 or more times
9. What is your current employment status?
   a. Employed full time (40+ hours per week)
   b. Employed part-time (less than 40 hours per week)
   c. Unemployed (currently looking for work)
   d. Unemployed (not currently looking for work)
   e. Student
   f. Self-employed
   g. Unable to work
10. Overall, how would you rate your mental health?
    a. Excellent
    b. Somewhat good
    c. Average
    d. Somewhat poor
    e. Poor
    f. Not sure
11. Please note any of the following diagnoses that may apply for you:
    a. Depressive disorder
    b. Anxiety disorder
    c. Developmental disorder
    d. Substance use disorder
    e. Attention deficit disorder
    f. Other _____
12. Have you ever been involved in a crime?
13. If yes, please indicate
    a. Number of times before age of 18 _____
    b. Number of times 18 years or older _____

Past Experiences – PART A

Please complete the following sentence:
A. A regular partner is someone that I have dated for at least _____ **(specify number)**
weeks. When asked about a regular partner below, **use this definition.**

In your past experience, have you ever…

1. Had sex with:
    ... a regular partner (as defined in A)   YES / NO
    If yes, was it: A: planned in advance / B: unplanned, decided in the moment
    ... someone I just met or do not know well   YES / NO
    If yes, was it: A: planned in advance / B: unplanned, decided in the moment

2. Had sex without protection against pregnancy with:
    ... a regular partner (as defined in A)   YES / NO
    If yes, was it: A: planned in advance / B: unplanned, decided in the moment
    ... someone I just met or do not know well   YES / NO
    If yes, was it: A: planned in advance / B: unplanned, decided in the moment

3. Had sex without protection against sexually transmitted diseases with:
    ... a regular partner (as defined in A)   YES / NO
    If yes, was it: A: planned in advance / B: unplanned, decided in the moment
    ... someone I just met or do not know well   YES / NO
    If yes, was it: A: planned in advance / B: unplanned, decided in the moment

4. Used condoms for sexual intercourse with:
    ... a regular partner (as defined in A)   YES / NO
    If yes, was it: A: planned in advance / B: unplanned, decided in the moment
    ... someone I just met or do not know well   YES / NO
    If yes, was it: A: planned in advance / B: unplanned, decided in the moment

5. Had sexual intercourse while under the influence of alcohol with:
    ... a regular partner (as defined in A)   YES / NO
    If yes, was it: A: planned in advance / B: unplanned, decided in the moment
    ... someone I just met or do not know well   YES / NO
    If yes, was it: A: planned in advance / B: unplanned, decided in the moment

6. Had sexual intercourse while under the influence of drugs other than alcohol with:
    ... a regular partner (as defined in A)   YES / NO
    If yes, was it: A: planned in advance / B: unplanned, decided in the moment
    ... someone I just met or do not know well   YES / NO
    If yes, was it: A: planned in advance / B: unplanned, decided in the moment

7. Had sex without a condom with:
    ... a regular partner (as defined in A)   YES / NO

If yes, was it: A: planned in advance / B: unplanned, decided in the moment
... someone I just met or do not know well   YES / NO
If yes, was it: A: planned in advance / B: unplanned, decided in the moment

8. Tried/used drugs other than alcohol:
   a) Marijuana   YES / NO
      If yes, was it: A: planned in advance / B: unplanned, decided in the moment
   b) Cocaine   YES / NO
      If yes, was it: A: planned in advance / B: unplanned, decided in the moment
   c) Hallucinogens   YES / NO
      If yes, was it: A: planned in advance / B: unplanned, decided in the moment
   d) Amphetamines (speed)   YES / NO
      If yes, was it: A: planned in advance / B: unplanned, decided in the moment
   e) Inhalants   YES / NO
      If yes, was it: A: planned in advance / B: unplanned, decided in the moment
   f) Other (specify_____)   YES / NO
      If yes, was it: A: planned in advance / B: unplanned, decided in the moment

9. Drove after drinking:
   … 1-2 alcoholic beverages   YES / NO
      If yes, was it: A: planned in advance / B: unplanned, decided in the moment
   … 3-4 alcoholic beverages   YES / NO
      If yes, was it: A: planned in advance / B: unplanned, decided in the moment
   … 5 or more alcoholic beverages   YES / NO
      If yes, was it: A: planned in advance / B: unplanned, decided in the moment

10. Drank more than 5 alcoholic beverages   YES / NO
       If yes, was it: A: planned in advance / B: unplanned, decided in the moment

11. Drank alcohol too quickly   YES / NO
       If yes, was it: A: planned in advance / B: unplanned, decided in the moment

12. Mixed drugs and alcohol   YES / NO
       If yes, was it: A: planned in advance / B: unplanned, decided in the moment

13. Played drinking games   YES / NO
       If yes, was it: A: planned in advance / B: unplanned, decided in the moment

14. Rode in a car with someone who had consumed alcohol   YES / NO
       If yes, was it: A: planned in advance / B: unplanned, decided in the moment

Past Experiences – PART B

While you were growing up, during the first 18 years of life:

1. Did a parent or other adult in the household **often…**
   Swear at you, insult you, put you down, or humiliate you?
            Or
   Act in a way that made you afraid that you might be physically hurt?   **YES/NO**

2. Did a parent or other adult in the household **often…**
   Push, grab, slap, or throw something at you?
            Or
   Ever hit you so hard that you had marks or were injured?   **YES/NO**

3. Did an adult or person at least 5 years older than you **ever…**
   Touch or fondle you or have you touch their body in a sexual way?
            Or
   Try to or actually have oral, anal, or vaginal sex with you?   **YES/NO**

4. Did you **often** feel that…
   No on in your family loved you or thought you were important or special?
            Or
   Your family didn't look out for each other, feel close to each other, or support each
   other?   **YES/NO**

5. Did you **often** feel that…
   You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you?
            Or
   Your parents were too drunk or high to take care of your or take you to the doctor if you
   needed it?   **YES/NO**

6. Where your parents **ever** separated or divorced?   **YES/NO**

7. Was your mother or stepmother"
   Often pushed, grabbed, slapped, or had something thrown at her?
            Or
   Sometimes or often kicked, bitten, hit with a fist, or hit with something hard?
            Or
   Ever repeatedly hit over at least a few minutes or threatened with a gun or knife?
        YES/NO

8. Did you live with anyone who was a problem drinker or alcoholic or who used street
   drugs?   **YES/NO**

9. Was a household member depressed or mentally ill or did a household member attempt
   suicide?   **YES/NO**

10. Did a household member go to prison?   **YES/NO**

EXPECTED BENEFITS

Please complete the following sentence:
A. A regular partner is someone that I have dated for at least _____ **(specify number)** weeks. When asked about a regular partner below, **use this definition.**

B. Using a scale of 1 **(not at all likely)** to 7 **(extremely likely)**, please rate how likely it is that you would experience **some positive consequence** (e.g., experience pleasure, feel good about yourself, spend time with friends) if you engaged in the following activities.

LIKELIHOOD OF POSITIVE CONSEQUENCES

	Not at all Likely		Moderately Likely		Extremely Likely		
1. Sex with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
2. Sex without protection against pregnancy with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
3. Sex without protection against sexually transmitted diseases with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
4. Using condoms for sexual intercourse with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
5. Sexual intercourse while under the influence of alcohol with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
6. Sexual intercourse while under the influence of drugs other than alcohol with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
7. Sex without a condom with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7

CARE-R: Expected Benefits 1

CARE-R

Using a scale of 1 **(not at all likely)** to 7 **(extremely likely)**, please rate how likely it is that you would experience **some positive consequence** (e.g., experience pleasure, feel good about yourself, spend time with friends) if you engaged in the following activities.

LIKELIHOOD OF POSITIVE CONSEQUENCES

		Not at all Likely			Moderately Likely			Extremely Likely
8.	Sex with someone other than my regular partner (as defined in A)	1	2	3	4	5	6	7
9.	Sex with a NEW partner	1	2	3	4	5	6	7
10.	Leaving a social event with someone I have just met or do not know well	1	2	3	4	5	6	7
11.	Choosing to abstain from sexual activity due to concerns about pregnancy or sexually transmitted diseases	1	2	3	4	5	6	7

IF FEMALE, GO TO QUESTION 12. IF MALE, GO TO QUESTION 17.

LIKELIHOOD OF POSITIVE CONSEQUENCES

		Not at all Likely			Moderately Likely			Extremely Likely
12.	Sexual intercourse because partner uses verbal pressure or threats	1	2	3	4	5	6	7
13.	Sexual intercourse because partner uses physical force	1	2	3	4	5	6	7
14.	Being drunk with someone I do not know well	1	2	3	4	5	6	7
15.	Sexual intercourse because partner is too aroused to stop	1	2	3	4	5	6	7
16.	Sexual intercourse because of partner's continual pressure (e.g., threats to end the relationship)	1	2	3	4	5	6	7

IF FEMALE, GO TO QUESTION 22.

LIKELIHOOD OF POSITIVE CONSEQUENCES

		Not at all Likely			Moderately Likely			Extremely Likely
17.	Convincing partner to have sexual intercourse through use of verbal pressure or threats	1	2	3	4	5	6	7
18.	Convincing partner to have sexual intercourse through use of physical force	1	2	3	4	5	6	7
19.	Making sexual advances toward a drunk date	1	2	3	4	5	6	7
20.	Convincing partner to have sexual intercourse because I am too aroused to stop	1	2	3	4	5	6	7
21.	Convincing partner to have sexual intercourse through continual pressure (e.g., threats to end the relationship)	1	2	3	4	5	6	7

CARE-R: Expected Benefits 2

Using a scale of 1 **(not at all likely)** to 7 **(extremely likely)**, please rate how likely it is that you would experience **some positive consequence** (e.g., experience pleasure, feel good about yourself, spend time with friends) if you engaged in the following activities.

	LIKELIHOOD OF POSITIVE CONSEQUENCES						
	Not at all Likely			Moderately Likely		Extremely Likely	
22. Trying/using drugs other than alcohol							
a) Marijuana	1	2	3	4	5	6	7
b) Cocaine	1	2	3	4	5	6	7
c) Hallucinogens	1	2	3	4	5	6	7
d) Amphetamines (speed)	1	2	3	4	5	6	7
e) Inhalants	1	2	3	4	5	6	7
f) Other (specify _____)	1	2	3	4	5	6	7
23. Driving after drinking							
… 1-2 alcoholic beverages	1	2	3	4	5	6	7
… 3-4 alcoholic beverages	1	2	3	4	5	6	7
… 5 or more alcoholic beverages	1	2	3	4	5	6	7
24. Drinking more than 5 alcoholic beverages	1	2	3	4	5	6	7
25. Drinking alcohol too quickly	1	2	3	4	5	6	7
26. Mixing drugs and alcohol	1	2	3	4	5	6	7
27. Playing drinking games	1	2	3	4	5	6	7
28. Riding in a car with someone who has consumed alcohol	1	2	3	4	5	6	7

CARE-R

EXPECTED RISKS

Please complete the following sentence:
A. A regular partner is someone that I have dated for at least _____ **(specify number)** weeks.
When asked about a regular partner below, **use this definition.**

B. Using a scale of 1 **(not at all likely)** to 7 **(extremely likely)**, please rate how likely it is that you would experience **some NEGATIVE consequence** (e.g., become sick, be injured, be embarrassed, lose money, suffer legal consequences, fail a class, or feel bad about yourself) if you engaged in the following activities.

	LIKELIHOOD OF NEGATIVE CONSEQUENCES						
	Not at all Likely			**Moderately Likely**			**Extremely Likely**
1. Sex with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
2. Sex without protection against pregnancy with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
3. Sex without protection against sexually transmitted diseases with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
4. Using condoms for sexual intercourse with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
5. Sexual intercourse while under the influence of alcohol with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
6. Sexual intercourse while under the influence of drugs other than alcohol with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
7. Sex without a condom with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7

CARE-R: Expected Risks 1

CARE-R

Using a scale of 1 **(not at all likely)** to 7 **(extremely likely)**, please rate how likely it is that you would experience **some NEGATIVE consequence** (e.g., become sick, be injured, be embarrassed, lose money, suffer legal consequences, fail a class, or feel bad about yourself) if you engaged in the following activities.

LIKELIHOOD OF NEGATIVE CONSEQUENCES

	Not at all Likely		Moderately Likely			Extremely Likely	
8. Sex with someone other than my regular partner (as defined in A)	1	2	3	4	5	6	7
9. Sex with a NEW partner	1	2	3	4	5	6	7
10. Leaving a social event with someone I have just met or do not know well	1	2	3	4	5	6	7
11. Choosing to abstain from sexual activity due to concerns about pregnancy or sexually transmitted diseases	1	2	3	4	5	6	7

IF FEMALE, GO TO QUESTION 12. IF MALE, GO TO QUESTION 17.

LIKELIHOOD OF NEGATIVE CONSEQUENCES

	Not at all Likely		Moderately Likely			Extremely Likely	
12. Sexual intercourse because partner uses verbal pressure or threats	1	2	3	4	5	6	7
13. Sexual intercourse because partner uses physical force	1	2	3	4	5	6	7
14. Being drunk with someone I do not know well	1	2	3	4	5	6	7
15. Sexual intercourse because partner is too aroused to stop	1	2	3	4	5	6	7
16. Sexual intercourse because of partner's continual pressure (e.g., threats to end the relationship)	1	2	3	4	5	6	7

IF FEMALE, GO TO QUESTION 22.

LIKELIHOOD OF NEGATIVE CONSEQUENCES

	Not at all Likely		Moderately Likely			Extremely Likely	
17. Convincing partner to have sexual intercourse through use of verbal pressure or threats	1	2	3	4	5	6	7
18. Convincing partner to have sexual intercourse through use of physical force	1	2	3	4	5	6	7
19. Making sexual advances toward a drunk date	1	2	3	4	5	6	7
20. Convincing partner to have sexual intercourse because I am too aroused to stop	1	2	3	4	5	6	7
21. Convincing partner to have sexual intercourse through continual pressure (e.g., threats to end the relationship)	1	2	3	4	5	6	7

CARE-R: Expected Risks 2

CARE-R

Using a scale of 1 **(not at all likely)** to 7 **(extremely likely)**, please rate how likely it is that you would experience **some NEGATIVE consequence** (e.g., become sick, be injured, be embarrassed, lose money, suffer legal consequences, fail a class, or feel bad about yourself) if you engaged in the following activities.

LIKELIHOOD OF NEGATIVE CONSEQUENCES

	Not at all Likely			**Moderately Likely**			**Extremely Likely**
22. Trying/using drugs other than alcohol							
a) Marijuana	1	2	3	4	5	6	7
b) Cocaine	1	2	3	4	5	6	7
c) Hallucinogens	1	2	3	4	5	6	7
d) Amphetamines (speed)	1	2	3	4	5	6	7
e) Inhalants	1	2	3	4	5	6	7
f) Other (specify _____)	1	2	3	4	5	6	7
23. Driving after drinking							
… 1-2 alcoholic beverages	1	2	3	4	5	6	7
… 3-4 alcoholic beverages	1	2	3	4	5	6	7
… 5 or more alcoholic beverages	1	2	3	4	5	6	7
24. Drinking more than 5 alcoholic beverages	1	2	3	4	5	6	7
25. Drinking alcohol too quickly	1	2	3	4	5	6	7
26. Mixing drugs and alcohol	1	2	3	4	5	6	7
27. Playing drinking games	1	2	3	4	5	6	7
28. Riding in a car with someone who has consumed alcohol	1	2	3	4	5	6	7

CARE-R: Expected Risks 3

EXPECTED INVOLVEMENT

Please complete the following sentence:
A. A regular partner is someone that I have dated for at least _____ **(specify number)** weeks.
When asked about a regular partner below, **use this definition.**

B. Using a scale of 1 **(not at all likely)** to 7 **(extremely likely)**, please rate how likely it is that you would engage in each activity **in the next 6 months?**

<u>EXPECTED INVOLVEMENT</u>

	Not at all Likely			**Moderately Likely**			**Extremely Likely**
1. Sex with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
2. Sex without protection against pregnancy with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
3. Sex without protection against sexually transmitted diseases with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
4. Using condoms for sexual intercourse with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
5. Sexual intercourse while under the influence of alcohol with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
6. Sexual intercourse while under the influence of drugs other than alcohol with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7
7. Sex without a condom with:							
… a regular partner (as defined in A)	1	2	3	4	5	6	7
… someone I just met or do not know well	1	2	3	4	5	6	7

CARE-R: Expected Involvement 1

CARE-R

Using a scale of 1 **(not at all likely)** to 7 **(extremely likely)**, please rate how likely it is that you would engage in each activity **in the next 6 months?**

EXPECTED INVOLVEMENT

		Not at all Likely			Moderately Likely			Extremely Likely	
8.	Sex with someone other than my regular partner (as defined in A)	1	2	3	4	5	6	7
9.	Sex with a NEW partner	1	2	3	4	5	6	7
10.	Leaving a social event with someone I have just met or do not know well	1	2	3	4	5	6	7
11.	Choosing to abstain from sexual activity due to concerns about pregnancy or sexually transmitted diseases	1	2	3	4	5	6	7

IF FEMALE, GO TO QUESTION 12. IF MALE, GO TO QUESTION 17.

EXPECTED INVOLVEMENT

		Not at all Likely			Moderately Likely			Extremely Likely	
12.	Sexual intercourse because partner uses verbal pressure or threats	1	2	3	4	5	6	7
13.	Sexual intercourse because partner uses physical force	1	2	3	4	5	6	7
14.	Being drunk with someone I do not know well	1	2	3	4	5	6	7
15.	Sexual intercourse because partner is too aroused to stop	1	2	3	4	5	6	7
16.	Sexual intercourse because of partner's continual pressure (e.g., threats to end the relationship)	1	2	3	4	5	6	7

IF FEMALE, GO TO QUESTION 22.

EXPECTED INVOLVEMENT

		Not at all Likely			Moderately Likely			Extremely Likely	
17.	Convincing partner to have sexual intercourse through use of verbal pressure or threats	1	2	3	4	5	6	7
18.	Convincing partner to have sexual intercourse through use of physical force	1	2	3	4	5	6	7
19.	Making sexual advances toward a drunk date	1	2	3	4	5	6	7
20.	Convincing partner to have sexual intercourse because I am too aroused to stop	1	2	3	4	5	6	7
21.	Convincing partner to have sexual intercourse through continual pressure (e.g., threats to end the relationship)	1	2	3	4	5	6	7

CARE-R: Expected Involvement 2

CARE-R

Using a scale of 1 **(not at all likely)** to 7 **(extremely likely)**, please rate how likely it is that you would engage in each activity **in the next 6 months?**

EXPECTED INVOLVEMENT

	Not at all Likely			Moderately Likely			Extremely Likely
22. Trying/using drugs other than alcohol							
a) Marijuana	1	2	3	4	5	6	7
b) Cocaine	1	2	3	4	5	6	7
c) Hallucinogens	1	2	3	4	5	6	7
d) Amphetamines (speed)	1	2	3	4	5	6	7
e) Inhalants	1	2	3	4	5	6	7
f) Other (specify _____)	1	2	3	4	5	6	7
23. Driving after drinking							
… 1-2 alcoholic beverages	1	2	3	4	5	6	7
… 3-4 alcoholic beverages	1	2	3	4	5	6	7
… 5 or more alcoholic beverages	1	2	3	4	5	6	7
24. Drinking more than 5 alcoholic beverages	1	2	3	4	5	6	7
25. Drinking alcohol too quickly	1	2	3	4	5	6	7
26. Mixing drugs and alcohol	1	2	3	4	5	6	7
27. Playing drinking games	1	2	3	4	5	6	7
28. Riding in a car with someone who has consumed alcohol	1	2	3	4	5	6	7

CARE-R: Expected Involvement 3