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Psychosocial Risks and Decision-Making Processes in Emerging Adults

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PSYCHOSOCIAL RISKS AND DECISION-MAKING PROCESSES IN EMERGING ADULTS

by
Tatiana Nedecheva Carreira

A Dissertation
Submitted to the Faculty of Graduate Studies
through the Department of Psychology
in Partial Fulfillment of the Requirements for
the Degree of Doctor of Philosophy at the
University of Windsor

Windsor, Ontario, Canada

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DECLARATION OF ORIGINALITY

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ABSTRACT

The study examined whether the pattern of relations between rational and intuition-based decision-making processes, psychosocial background variables, and risky behaviours in emerging adults supports the analytical-experiential theory (Klaczynski, 2001a, 2001b), which highlights the role of the rational process, or the fuzzy-trace theory (Reyna & Brainerd, 1992), which highlights the role of the intuition-based process in optimal decision-making. Additionally, the study compared the think-aloud and self-report methods of measuring decision-making processes. One-hundred and twenty five undergraduate students between the ages of 18 and 21 years completed online questionnaires reporting on their demographic characteristics, communication with their parents, risk and protective factors, risky behaviours, and self-reported use of rational and intuition-based decision-making. Using a think-aloud protocol, participants also listened to three vignettes and audio-recorded themselves giving advice to the person in the vignette. Their responses were coded by different combinations of two independent coders along categories of intuition-based and rational decision-making processing. The rational and intuition-based decision-making as measured through self-report and think aloud were predicted from risk and protective factors, communication with parents, and gender. In addition, recent and lifetime risky behaviours were predicted from rational and intuition-based decision-making processes as measured through self-report and the think-aloud protocol. The results within this sample provided support for the analytical-experiential theory, with rational decision-making processing being associated with higher protective factor scores and intuition-based processing being associated with lower protective factor scores and higher recent and lifetime risky behaviours. Women scored higher on intuition-based processing as measured through think-aloud, and men scored higher on the self-report of rationality. The think-aloud and self-report measures did not show consistent associations. The results are interpreted in the context of the low psychosocial risk of the sample, restricted age range, and

contextual characteristics of the measurement methods. Future studies should examine decision-making processes in more diverse samples and in a variety of situations.

DEDICATION

This dissertation is dedicated to my great-great-grandfather, N. A. Nedechev, a truly exceptional man whose belief in the importance of education echoed through many generations of my family and was a great source of inspiration to me.

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CHAPTER I

INTRODUCTION

It is consistently documented that the periods of adolescence and emerging adulthood are characterized by increased engagement in risky behaviours, such as alcohol and drug consumption (Canadian Alcohol and Drug Use Monitoring Survey, 2011), risky sexual behaviours (Benotsch, Snipes, Martin, & Bull, 2012; Rotermann, 2012; Scott & Steinberg, 2003), and reckless driving (Road Safety in Canada, 2011). In an effort to understand why individuals at these developmental stages display a propensity to take risks, an examination of the decision-making processes appears to be crucial. Contemporary theories state that decision-making is characterized by rational processes, which rely on logic and probability, as well as intuition-based processes, which rely on gut feelings, heuristic judgments, and emotions (Kahneman & Klein, 2009). However, there is disagreement as to which type of processing is associated with optimal decisions when individuals are faced with risky situations. According to the analytical-experiential theory developed by Klaczynski (2001a, 2001b), the rational process, defined as analytical processing within the theory, leads to optimal decisions, especially in situations involving risk. In contrast, the fuzzy-trace theory developed by Reyna and colleagues (Reyna & Brainerd, 1992; Reyna & Brainerd, 2011) states that the intuition-based process, defined as gist processing within the theory, leads to decisions that promote adjustment.

While researchers have studied the development of specific decision-making processes across the lifespan, there is little information regarding the role of background factors in the development of these processes. However, the literature on psychosocial factors states that individuals who experience more risk than protective factors tend to engage in risky behaviours to a higher extent than those who experience more protective than risk factors (Danielson et al, 2006; Saewyc, Homma, & Ogilvie, 2008; Scott-Parker, Watson, King, 2009; Serbin & Karp, 2004). Thus, it is likely that background characteristics are associated with decision-making processes that determine individuals' decisions.

Therefore, the purpose of this study was to examine the nature of decision-making processes in youth, as well as the associations between background characteristics and decision-making processes. Specifically, the study aimed at investigating whether decision-making processes would be characterized by a preference for rationality or intuition. Additionally, the patterns of relations between rational and intuition-based decision-making processes, background characteristics such as psychosocial risk and protective factors, as well as communication between youth and their parents were investigated. Another aim of the study was to analyze how rational and intuition-based decision-making processes relate to risky behaviours (e.g., delinquent behaviours, drug and alcohol consumption). Finally, since decision-making has been assessed using self-report (e.g., Mills, Reyna, & Estrada, 2008; Marks et al., 2008), as well as think-aloud procedures (e.g., Lewis, 1982), these two approaches were also investigated. Specifically, the patterns of association between the two decision-making processes measured through the think-aloud method and self-report method, as well as background psychosocial variables and risky behaviours were compared.

It was hypothesized that the results would support either the analytical-experiential theory or the fuzzy-trace theory depending on the pattern and direction of associations between decision-making processes, psychosocial risk and protective factors, and parent-youth communication. Similarly, the specific pattern of associations between decision-making processes and risky behaviours was expected to lend support for one of the two theories.

This chapter will begin with an overview of the developmental period spanning adolescence to emerging adulthood, as well as the psychosocial risk and protective factors and risky behaviours that characterize the lives of many individuals. Given its importance, the contribution of relationships with parents to emerging adults' decision-making will also be examined. Next, cognitive development in emerging adults will be discussed, and the conceptual and theoretical issues, as well as the theories of development of decision-making, will be described. Specifically, an overview of decision-making

models focusing on rational as well as dual processes involving both rational and intuition-based processes will be presented. Then, gender differences in decision-making will be reviewed. Finally, the rationale for the proposed research, along with the specific research questions and hypotheses will be presented.

Psychosocial Characteristics of Emerging Adulthood

The developmental period of youth spanning from adolescence to emerging adulthood is considered a time in which individuals prepare for the demands and responsibilities of adulthood. The process of identity formation previously associated with adolescence (Erikson, 1968) is now believed to extend into emerging adulthood and into the mid to late 20s (Arnett, 2007). According to Erikson's theory of psychosocial development (1968), individuals go through a process to establish basic social and occupational identities as they transition into adulthood. Specifically, individuals between the ages of 18 and 29 experience considerable instability, as well as feelings of being in-between adolescence and adulthood, while considering many possible life pathways (Arnett, 2006; Cote, 2006). Thus, the transitions into family and occupational roles that Erikson (1968) identified as occurring at the end of adolescence have now been postponed until the late 20s and even the early 30s (Tanner & Arnett, 2011). Emerging adults focus on self-development and self-exploration while trying on many different adult roles and choices in their romantic relationships, occupational choices, and commitment to values. This is reflected in their decision-making processes and the nature of their decisions. Arnett and his colleagues (Tanner & Arnett, 2011; Tanner, 2006) proposed the concept of re-centering as describing the transitions from adolescence, through emerging adulthood, and into adulthood. Re-centering is a three-stage process that starts with the legal emancipation of adolescents from their parents, continues with the exploration of adult identities, eliminating those that do not fit individuals' plans and goals, and finally ends in a commitment to careers, families, and community (Tanner & Arnett, 2011).

In emerging adulthood, individuals are no longer dependent on formal structures (e.g., school,

parents, families) and they have an unprecedented amount of freedom (Cote, 2000). Specifically, with an increasing number of emerging adults pursuing post-secondary education, as well as delaying marriage and family, individuals also have the possibility to delay commitments to specific adult roles (Arnett, 2006). Some of the challenges experienced by emerging adults include anxiety over commitments and choices as individuals are in the process of formulating goals and regulating their actions in order to achieve them (Arnett, 2007). Some emerging adults are also likely to experience their increased freedom by engaging in behaviours that were previously restricted by parental or school monitoring, such as drug and alcohol use and general risk taking (Schulenberg & Zarett, 2006).

Thus, the span of adolescence and emerging adulthood appears to be a time when young people are susceptible to making decisions to engage in risky behaviours that can have negative outcomes for individuals and society alike. The high prevalence of adolescents who abuse alcohol, drugs, and cigarettes (Plant & Miller, 2001), engage in risky sexual behaviour (Bachanas et al., 2002; Scott & Steinberg, 2003) and get involved in motor-vehicle accidents (Turner & McClure, 2003) has been extensively documented. This tendency is carried on into the emerging adult years, with significant number of individuals engaging in risky behaviours such as risky sexual behaviours (Benotsch et al., 2012) and reckless driving (Bradley & Wildman, 2002).

The reality of Canadian youth appears to follow this general trend. Thus, Canadian adolescents are reported to engage in heavy drinking, substance use (Canadian Addiction Survey, 2004), drinking and driving (Leadbeater, Foran, & Grove-White, 2008), risky sexual behaviours (Rotermann, 2007), and to present with a high prevalence of sexually transmitted diseases (Maticka-Tyndale, 2008). Adolescents also constitute a significant proportion of those convicted of crime (Brennan & Dauvergne, 2011). These trends continue into emerging adulthood, with substantial rates of drug and alcohol use (Canadian Alcohol and Drug Use Monitoring Survey, 2011), increasing rates of criminal offenses

(Brennan, 2012), motor-vehicle accidents (Road Safety in Canada, 2011), and risky sexual behaviour (Rotermann, 2012).

In sum, the time frame spanning adolescence and emerging adulthood is characterised by decisions that can have a significant impact on the rest of individuals' lives. Environmental factors have been documented to have a significant impact on individuals' development and adjustment. Thus, in order to understand why and how decisions are made, it is important to examine environmental and individual risk and protective factors.

Theoretical Conceptualizations of Psychosocial Risks, Protective Factors, and Decision-Making

As individuals develop, dynamic transactions with their environments determine adverse or positive outcomes. For instance, Bronfenbrenner developed an ecological framework, which postulates that there are progressive and mutual accommodations between the growing individual and the immediate environments in which they live (Bronfenbrenner, 1977; Bronfenbrenner & Morris, 1998). The relations between these environments and the developing person are reciprocal, with both having the ability to influence the other. According to this approach, an understanding of individuals' decision-making process can only be achieved after examining the individual and environmental characteristics, as well as their transactions.

According to the developmental psychopathology approach, the environmental and individual factors that influence an individual's development can be divided into two categories. The first category contains the risk factors, which represent individual or environmental circumstances that increase the likelihood of a negative or undesirable outcome (Cummings et al., 2000). The risk factors can operate in a synergistic fashion, whereby two or more risk factors together produce a more negative impact than each factor in isolation (Arthur, Hawkins, Pollard, Catalano, & Baglioni, 2002; Masten, 2011; O'Dougherty Wright, Masten, & Narayan, 2013; Rutter, 1983). Thus, the decision-making processes of

individuals who present with a high number of risk factors are likely to lead them to make choices that promote maladjustment.

While most individuals that are faced with numerous risk factors experience life-long difficulties in many aspects of their lives, others display successful adaptations despite challenging circumstances (Masten, Best, & Garmezy, 1990). This phenomenon is conceptualized as resilience and is defined as individuals' flexibility or the ability to rebound in the face of adversity and successfully meet their developmental challenges (Garmezy, 1993). These favourable developmental outcomes are explained by the second group of dynamic forces affecting human development, the protective and compensatory factors, which reduce the impact of risk factors on development. As such, protective factors increase the probability that individuals' decision-making processes will promote their adjustment.

The complex and intricate ways in which the accumulation of risk and protective factors affects individuals' developmental pathways have been well-documented (Serbin & Karp, 2004). Recently, these dynamic interactions between people and environments have been described as developmental cascades (Dodge, Greenberg, & Malone, 2008; Masten et al., 2005, Masten, 2003). Developmental cascades refer to the consequences of the accumulation of dynamic interactions between individuals and their environments across time, developmental periods, and domains on adjustment (Masten & Cicchetti, 2010). It appears that maladjustment results from the additive negative effects of risk factors that seem to trigger each other thus producing a cascading effect (Masten & Cicchetti, 2010).

Many specific environmental and individual risk and protective factors affecting development have been described in the literature. Some of the factors include dispositional attributes, such as temperament at birth (difficult vs. easy), intelligence (average or below average), family characteristics (positive and cohesive vs. negative and conflictual marital and parent-child relationships), as well as extra-familial contexts (e.g., lack of achievement at school and social difficulties, or bonding with a supportive adult outside of the family when the situation in the family is difficult) (Anderson, Sabatelli,

& Kosutic, 2007; Garmezy, 1985; Pedersen et al., 2005; Seidman et al., 1999). Based on a review of the empirical literature on risk and protective factors and research conducted with students in Grades 6 to 12 (12-18 years), Arthur and colleagues (2002) pinpointed 23 risk and 10 protective factors that predict the initiation and maintenance of problem behaviours such as substance use, delinquency, violence, and school drop-out. The risk and protective factors were related to the community (e.g., low neighbourhood attachment, rewards for prosocial community involvement), school (e.g., academic failure, opportunities for prosocial school involvement), family (e.g., high family conflict), peer, and individual domains (e.g., rewards for antisocial behaviour, impulsiveness). A summary description of each category of risk and protective factors from Arthur et al. (2002) that are of interest in the present study is presented in Table 1.

It appears that some forms of externalizing problems are continuous across the lifespan. For instance, antisocial behaviours (e.g., physical aggression, delinquent behaviour) in childhood and adolescence are especially predictive of adjustment difficulties in adulthood (Patterson, DeBaryshe, & Ramsey, 1989; Serbin & Karp, 2004). The course and etiology of antisocial behaviours has been conceptualized as belonging to one of two categories. The adolescent-limited antisocial behaviours that originate from social processes and maturity gaps and lead adolescents to imitate antisocial peers are relatively transient and normative, and usually decrease in emerging adulthood (Moffitt, 2006). The life-course persistent antisocial behaviours are related to neurodevelopmental and family adversity factors that are present early in an individuals' life and continue later into adulthood; these are resistant to change and are considered pathological (Moffitt, 1993; Moffitt & Caspi, 2001; Moffitt, 2006). Thus, individuals' neurobiological predispositions, such as a difficult temperament, interact with chaotic family environments that are often characterized by involvement in crime, to foster life-course persistent antisocial behaviours (Moffitt, 1993; Moffitt & Caspi, 2001). As such, violent adults often come from family backgrounds characterised by socio-economic disadvantage, as well as harsh and

Table 1

Risk and Protective Factors Relevant for the Present Study (Arthur et al., 2002)

Risk and Protective Factors	Description
Community Risk Factors	Individuals' perception of safety of their neighborhood and the extent to which they moved between different neighborhoods in the past.
Family Risk Factors	Family members' involvement with drugs and antisocial behaviours, family expectations and attitudes with respect to drug and alcohol use.
School Risk Factors	Level of academic achievement, motivation with respect to school work.
Peer-Individual Risk Factors	General attitudes and perceptions related to antisocial behaviour and drug use, involvement with peers who use drugs and engage in antisocial behaviour.
Community Protective Factors	Opportunities and encouragement for prosocial behaviours.
Family Protective Factors	Parental supportiveness.
School Protective Factors	Positive school climate and safety.
Peer-Individual Protective Factors	Involvement with prosocial peers, positive view of the world.

inconsistent parenting, which encourages aggressive and coercive behaviour on the part of the children while discouraging prosocial behaviour (Patterson et al., 1989). Individuals who engage in antisocial behaviours have been documented to have insecure attachment to their caregivers, specifically disorganized attachment (Psalich, Dadds, Hawes, & Brennan, 2012). Therefore, as children, these individuals have not established a positive bond with their parents, which leads to cognitive schemas characterized by an external locus of control and major difficulties in behavioural self-regulation (Patterson et al., 1989). These individuals are likely to perpetuate the cycle of violence and social disadvantage with their own children because of limited job and social opportunities, as well as harsh and inconsistent parenting which encourages violence (Patterson et al., 1989; Serbin & Karp, 2004).

According to the developmental psychopathology approach (Cicchetti, 1984; Luthar, Cicchetti, & Becker, 2000), individuals' decision-making processes are the result of the dynamic interaction of individual and environmental risk and protective factors. Thus, in order to understand why a particular decision was made, one should consider individual characteristics (e.g., gender, age, education), as well as environmental characteristics (e.g., neighbourhood, school, family) (Cicchetti & Lynch, 1993). Specifically, decisions that put an individual at risk of maladaptive outcomes (e.g., engaging in risky behaviours such as unprotected sex) may be explained by a higher number of risk factors, as compared to protective factors. The extent to which individuals are successful in the transitions from adolescence through emerging adulthood and into adulthood depends on the lack of or presence of social, emotional, and intellectual resources in the form of the risk and protective factors that they accumulated throughout their childhood and adolescence (Cote, 2006; Masten, Best, & Garmezy, 1990; Schulenberg & Zarett, 2006). The quality of the relationship with parents is one such important protective factor and it is discussed in the following section.

Decision-Making and Relationship with Parents

The relationship with parents constitutes an important factor in individuals' decision-making.

Traditional theories of human development have advanced that a major task of adolescence and emerging adulthood is to separate from parents and form bonds with peers (Arnett, 2007, 2006; Erikson, 1968; A. Freud, 1960). Moreover, peer relationships also contribute to identity development (Berzonsky, Branje, & Meeus, 2007; Flum & Lavi-Yudelevitch, 2002) and influence decision-making and behaviour (Allen, Porter, & McFarland, 2006; Brown, 2004; Crockett, Raffaelli, & Shen, 2006; Potard, Courtois, & Rusch, 2008; Harris, 1998; Kinney, 1993; Prinstein & La Greca, 2002).

While it has been documented that peers' contributions to decision-making persist throughout the span of emerging adulthood (Aquilino, 2006; Gardner & Steinberg, 2005), the impact of individuals' relationships with their parents and their experiences in their family environment is more far-reaching than previously believed. The intimacy between late adolescents and emerging adults and their parents is re-established (Buhrmester, 1996; Frank, Pirsch, & Wright, 1990), and a positive relationship between emerging adults and their parents is associated with adjustment in emerging adulthood (DeVet, 1997). Several characteristics of relationships with parents have been documented to contribute to adjustment in emerging adulthood. It appears that positive relationships between adolescents and their parents promote parents' perception of having influence in their teenager's lives (Freedman-Doan, Arbretton, Harold, & Eccles, 1993). In a longitudinal study, Hair, Moore, Garrett, Ling, and Cleveland (2008) reported that adolescents who reported having a positive relationship with their parents characterized by parental support and monitoring also reported higher levels of mental well-being and engaged in less delinquent behaviours in emerging adulthood. In addition, the opportunity to participate in family decisions during adolescence has been found to contribute to better adjustment in emerging adulthood through greater similarity in attitudes between individuals and their parents (Brody, Moore, & Glei, 1994).

Moreover, it appears that communication is an important aspect of a positive relationship with parents, especially in relation to values and decision-making (Aquilino, 1997). In a study of late

adolescents, emerging adults, and their parents, positive communication with parents was associated with adopting the parents' moral principles and values (White & Matawie, 2004). The quality of communication in the relationship with parents has also been found to predict lower rates of delinquent behaviour amongst emerging adults (Leas & Mellor, 2000) and contribute to their adjustment (Perosa, Perosa, & Tam, 2002; Tubman & Lerner, 1994). For both adolescents and emerging adults, parents tend to influence the decisions that can have long-term and potentially negative consequences (Bregman & Killen, 1999; Wang et al., 2007). Important decisions regarding commitments are facilitated by parents' ability to act as a secure base while emerging adults engage in explorations (Bartle-Haring, Brucker, & Hock, 2002).

Summary

Current theory and empirical evidence indicates that throughout the lifespan, individuals are the producers of their own development, whereby they influence and are influenced by the environments in which they live (Bronfenbrenner, 1977; Bronfenbrenner & Morris, 2005; Lerner & Castellino, 2002). These active transactions between individuals and the environments in which they evolve are influenced by the synergistic interaction between risk and protective factors, which act together to promote specific adjustment outcomes. Recent empirical conceptualizations have presented risk as a continuous variable, whereby an individual at high risk possesses many risk factors and few protective factors (Arthur et al., 2002). As such, emerging adults have a set of resources that will enable them to engage in self-exploration in a productive manner and make decisions that will promote their adjustment into adulthood. One such important resource appears to be the relationship with parents as experienced throughout adolescence and in emerging adulthood (Masten & Tellegen, 2012). In terms of specific characteristics, the extent to which individuals feel close to their parents and the quality of the communication between individuals and their parents appear to be especially important (Leas & Mellor, 2000; Overbeek, Vollebergh, Engels, & Meeus, 2005).

The interaction of individuals' experiences in their environments and their biological predisposition culminates in the changes in brain structure and physiology, which in turn foster the changes in cognition (Asato et al., 2010; Giedd et al., 1999; Kuhn, 2006). These changes are briefly reviewed in the next section. Following this review, theories of decision-making and how they apply to adolescents and emerging adults will be described.

Cognitive Development and Decision-Making in Emerging Adults

The period spanning adolescence and emerging adulthood is characterized by a re-organization of the brain circuits that support an increase in cognitive sophistication. The area of the prefrontal cortex undergoes extensive re-organization (Bava et al., 2010; Crews et al., 2007), and the efficiency of information processing increases (Asato et al., 2010). The neural connections between emotions and cognition are being formed (Toga et al., 2006). The difficulty in integrating emotions and reasoning partly explains adolescents' and emerging adults' tendency to focus on rewards rather than potential risks when making decisions (Overman, 2004; Southgate, Tchanturia, & Treasure, 2005). Specifically, hypothetical, deductive, and inductive thinking abilities (Inhelder & Piaget, 1958; Shaffer, Wood, & Willoughby, 2000), as well as post-formal thought characterised by the recognition of the relativity of points of view and the commitment to ones' own definition of truth across situations (Perry, 1970; Riegel, 1978), characterize the decision-making of emerging adults. Moreover, post-formal thought involves an integration of emotions and cognition in problem-solving and decision-making (Labouvie-Vief, 2006; Labouvie-Vief & Diehl, 2000), which reflects the current theory and empirical evidence in the areas of cognitive neuroscience and behavioural risk-taking in emerging adults. However, it is likely that the overall maturational changes associated with brain development, as well as the increased sophistication of basic cognitive processes during the period of adolescence and emerging adulthood, interact with life experience to promote more meaningful and integrated decision-making.

Because of the increase in the ability to think rationally, which has been typically considered as

the hallmark of cognitive development, traditional theories of decision making have emphasized the role of rationality in optimal decision-making. However, with the importance of emotions and intuition in decision making coming to light, recent theories have posited that there are two processes involved in decision-making. Specifically, it is believed that individuals make decisions using both rational process and intuition-based processes. The following section describes the traditional decision-making models based on rationality, as well as the recent dual-processes models.

Theories of Emerging Adult Decision-Making

Models predominantly based on rationality. The importance of rationality and logic has long been emphasized in cognitive development and decision-making. Early studies on rational decision-making and heuristic biases emphasized the importance of rationality and formal logic in optimal decision-making (Kanheman & Tversky, 1983; Tversky & Kanhneman, 1973). Decisions were considered rational if they demonstrated coherence by consistently following the rules of logic and probability (Gilovich, Griffin, & Kahneman, 2002), as well as achieving good outcomes (Reyna & Farley, 2006). Examples of decision-making models emphasizing the preponderance of rationality in decision-making include the health belief model (Becker, 1990), the theory of reasoned action (Fishbein & Ajzen, 1975), the theory of planned behaviour (Shure, 2003), as well as the self-regulation model of decision-making (Byrnes, 1998, 2005).

The health-belief model articulates the factors that are involved in making decisions to engage in health-promoting or destructive behaviours (Becker, 1990). The model posits that decisions are motivated by a person's goal of achieving health, perceived vulnerability of health threats, perceived severity of health threats, and beliefs that specific behaviours will promote health or cure illness (Janz & Becker, 1984). Additional factors such as perceived vulnerability, perceived self-efficacy, and the motivation to protect oneself from a health threat have also been included as part of this model (Rosenstock, Strecher, & Becker, 1988; Sutton, 2001). Similarly, the theory of reasoned action

(Fishbein & Ajzen, 1975) and the theory of planned behaviour (Ajzen, 1991; Ajzen & Fishbein, 1980) hypothesize that beliefs, norms, and intentions play an important role in decision-making. Thus, according to these theories, quantifying the threats of various behaviours to one's health and analyzing the costs and benefits of engaging in them predict individuals' decisions.

The Self-Regulation Model of Decision-Making (SRMDM) developed by Byrnes (1998, 2005) further emphasized the specific rational processes involved in decision-making. Specifically, according to the theory, successful decision-making involves modifying the mental representations by creating strategies or shortcuts to make their reasoning more efficient. Most of these strategies are rational, including setting goals, considering the possible ways to accomplish these goals, evaluating options, and implementing the option that appears to be the most advantageous. In the course of acquiring and applying these strategies, individuals rely on cognitive abilities such as working memory capacity, as well as the declarative, procedural, and conceptual knowledge represented in long-term memory (Byrnes, 2005). Thus, people's maladaptive decisions can be explained by failure of these cognitive processes, such as faulty knowledge, beliefs, or maladaptive values, failure to activate this stored knowledge in a particular situation, and inability to coordinate multiple goals in that particular situation. In contrast, good decision-makers are able to exercise self-regulation by applying their cognitive skills to overcome the obstacles and distractions resulting from limited resources, lack of knowledge, certain personality traits, and salient emotional experiences (Byrnes, 2005).

Empirical evidence for models predominantly based on rationality. Overall, rational decision-making has been empirically supported. Constructs that were investigated in the context of decision-making in adolescents and emerging adults include estimation of risk, perception of benefits, consideration of advantageous choices, sensitivity to rewards and punishment, and behavioural intentions (Haase & Silbereisen, 2011; Halpern-Felsher & Cauffman, 2001; Halpern-Felsher, Millstein, Elin, Adler, Tschann, & Biehl, 2001; Reyna & Farley, 2006; Sun, Buys, Stewart, & Chum, 2011;

Wright, Randall, & Hayes, 2012; Umeh & Patel, 2004). In general, as they transition from adolescence into emerging adulthood, individuals exhibit lower perception of risk (Boyer, 2006; Haase & Silbereisen, 2011; Halpern-Felsher et al., 2001; Steinberg, 2004). For instance, Halpern-Felsher and her colleagues (2001) report that emerging adults' perceptions of risk relative to risky sexual behaviours, drinking and driving, and binge drinking are lower in those who have engaged in these behaviours compared to those who have not. These results are consistent with studies on risk perception related to drug use (e.g., Umeh & Patel, 2004). There is also evidence for beliefs as guiding individuals' decisions to engage in specific behaviours. For instance, pro-smoking beliefs were found to predict individuals' smoking behaviour in emerging adults (Sun et al., 2011). Similarly, beliefs about the benefits and self-efficacy related to condom use predicted safe sexual practices (Wright et al., 2012).

Several studies documented differences between adolescents' and emerging adults' ability to set goals, estimate performance, learn from feedback, consider multiple goals at the same time, and consider probabilities in decision-making tasks (Byrnes, Miller, & Reynolds, 1999; Byrnes & McClenny, 1994). Specifically, emerging adults have been found to be more proficient in these tasks than adolescents.

Summary. Overall, models predominantly based on rationality propose that decision-making is a process characterized by logical and coherent reasoning, as well as the achievement of one's goals (Byrnes, 2005; Kahneman & Klein, 2009). These ideas are reflected in the common conceptualizations of decision-making, in which individuals choose between competing courses of action while pursuing one's goals (Byrnes, 1998; Van Leijenhorst, Westenberg, & Crone, 2008). According to this perspective, the adequacy of a decision is judged by the extent to which the decision-making process focuses on logical deliberations (e.g., weighing probabilities), and the extent to which the outcomes correspond to the goals of the decision-maker. Individuals make bad decisions because of faulty knowledge, beliefs, and maladaptive values, failure to activate stored knowledge in a particular

situation, and inability to coordinate multiple goals in a particular situation (Byrnes, 2005). Conditions that have been found to be related to lack of competent decision-making include cognitive overload, maladaptive expectations of what constitutes effective decision-making, and the absence of good models of careful and reflective thought (Galotti, 2001).

Expansion on rationality. Models of decision-making that promote rationality often downplay the role of intuition, emotions, and emotional states (Reyna & Farley, 2006). Recently, theorists have concluded that the relationship between emotions and decision-making is bi-directional (Schwarz, 2000), with affect being tied to the complexity of the cognitive schemas of which it forms a part (Labouvie-Vief, 2005). For instance, the emotional valence experienced as one is engaging in decision-making has been found to influence risk perception. Specifically, both adolescents and emerging adults perceive risk as lower when they experience positive affect (Haase & Silbereisen, 2011).

According to the somatic marker hypothesis, the anticipation of emotional responses to positive and negative consequences guides decision-making in uncertain situations (Bechara et al., 1994, 2000; Crone, Vendel, & van der Molen, 2003). In the literature, a distinction between anticipated and anticipatory emotions is made (Loewenstein, Weber, Hsee, & Welch, 2001). Specifically, the anticipated emotions relate to how one would feel as a result of a decision, whereas anticipatory emotions encompass immediate reactions, such as fear, anxiety, and dread, when one is required to make a decision in a context that involves risk and uncertainty (Loewenstein et al., 2001). Regret, conceptualized as a comparison of reality to the mentally generated alternatives, is another anticipatory emotion that has been studied (Amsel, Bowden, Cottrell, & Sullivan, 2005). Regret can be either adaptive in that it enables an individual to learn from a bad decision and to avoid the same decision in the same context in the future, or it can also be maladaptive in that it could result in rumination and depression (Stewart & Vandewater, 1999).

Laboratory studies in which participants were asked to assess the emotional outcomes associated

with various decisions demonstrate that early adolescents are more inconsistent than adults in predicting the emotional outcomes of their decisions, such as regret, an ability that appears to improve throughout adolescence (Amsel et al., 2005). In a study of anticipatory emotions in relation to risky sexual behaviour amongst emerging adults, participants were asked to think of how they would feel if they engaged in unsafe sex (Richard, Van Der Pligt, & De Vries, 1996). The results demonstrated that anticipated regret decreased participants' intention to engage in unsafe sexual practices. Therefore, the inability to anticipate the emotional outcomes of a decision to engage in a risky behaviour is likely to increase maladaptive decision-making characterised by risk-taking (Damasio, 1994). The quest for the pleasant states associated with positive emotions can also act as a motivator for risky behaviour. Specifically, youth could engage in risky behaviours as a way to enhance pleasant affective states and reduce negative affective states such as those associated with tension and depression (Caffray & Schneider, 2000; Cooper, Agocha, & Sheldon, 2000).

Dual processing theories. Dual processing models build upon the rational models by advancing that in addition to the rational process, decision-making is also characterised by the intuition-based process. Within the dual-processing models, the rational process is characterised by conscious deliberation and weighing of pros and cons guided by logic and rationality, whereas the intuition-based process is associative, automatic, and relies on gut feelings (Kahneman & Klein, 2009; Klaczynski, 2001a, 2001b; Reyna & Farley, 2006). It is hypothesised that the intuition-based process is the result of our evolutionary past, whereby the organism is able to protect itself by quickly responding to danger. However, because it is automatic and based on heuristics, it is vulnerable to biases in judgment, which are avoided by the analytical system that evolved much later (Reyna & Farley, 2006). The analytical-experiential theory and fuzzy-trace theory are two dual-process theories that posit the co-existence of the rational and intuition-based processes in decision making. Both have received empirical support and will be reviewed in the following sections.

Analytical-experiential theory of decision-making. Consistent with the general assumptions of the dual-system theories, the analytical-experiential theory of decision-making proposes that there are two processes that guide decision-making (Klaczynski, 2005). The first is experiential processing, the intuition-based process involving the automatic activation of procedural memories that can be used to make decisions (Chen & Chaiken, 1999; Epstein, 1994). Specifically, this type of processing allows individuals to make judgements by matching the information coming from the environment to the contextualized representations that are heavily dependent on problem content and are developed based on previous experience in similar situations. This system is considered to be the default system used to make decisions (Brainerd & Reyna, 2001; Epstein, 1994). The second process is defined as analytical processing and it is a rational-based approach that is presumed to be more effortful, deliberate, and detail-oriented, than the experiential processing (Klaczynski, 2005). It is also less context-dependent and more reliant on general logical principles and probabilities, such as calculation of probability ratios, propositional logic, and logically consistent reasoning in problems that are only superficially different (Klaczynski, 2001a, 2001b). Within the theory, the analytical and experiential processes are conceptualized as categorically different.

The two processes co-exist, and may function independently or together (Klaczynski, 2001a). For instance, experiential processing, which is activated by stereotypes and salient memories, has been found to be predominant in social situations, whereas analytical processing has been found to be applied in situations devoid of social context (Jacobs & Potenza, 1991). While authors have highlighted that both types of processing are necessary and adaptive in a variety of situations (Klaczynski, 2001a, 2001b), it has also been stated that the experiential processing often leads to biases and suboptimal decisions (Amsel, Close, Sadler, & Klaczynski, 2009; Amsel, Klaczynski, Johnston, Bench, Close, Sadler, & Walker, 2008). This is especially likely to occur when the experiential processing overwhelms the analytical processing, and individuals are not able to judge whether their heuristic

judgments and gut feelings are valid and reasonable in a particular situation (Jacobs & Klaczynski, 2002; Klaczynski, 2001a).

Metacognitive skills have been found to play an important role in mediating between the experiential and analytical processes in decision-making (Amsel et al., 2008; Jacobs & Klaczynski, 2002). Through a process termed metacognitive intercession, individuals are able to override the automatic heuristics produced by the experiential processing, distinguish the responses generated by the analytical and experiential processing (i.e., logic vs. gut feelings), and determine whether one of the responses, or a compromise, would produce the best decision (Klaczynski, 2004). This process involves accessing knowledge about the situation, monitoring one's reasoning, assessing the process by which the decision is made, and evaluating the inferences and decisions produced (Klaczynski, 2005).

Empirical support and methodological considerations. The analytical-experiential theory has received empirical support. It has primarily been investigated using framing paradigms, which include descriptions of situations emphasizing loss or gain (e.g., Amsel et al., 2008; Klaczynski, 2001a, 2001b), statements rated on rationality and conviction (e.g., Klaczynski & Gordon, 1996; Klaczynski & Lavalley, 2005; Klaczynski & Robinson, 2000), as well as self-report questionnaires containing statements reflecting the two decision-making processes (e.g., Marks et al., 2008; Pacini & Epstein, 1994).

In a study by Klaczynski (2001a), emerging adult participants were presented with scenarios, in which they were asked to select from different options associated with specific probabilities. They were instructed to answer “as they normally would” or “as a perfectly logical person”. Participants’ responses tended to reflect heuristics and biases (i.e., evidencing experiential processing) when asked to answer “as they normally would” and the rules of logic when answering “as a perfectly logical person” (i.e., evidencing analytical processing). Thus, it appears that explicit prompting to use logic promotes the use of analytical processing. This was later replicated in other studies (e.g., Amsel et al., 2008).

Being faced with threats to one's beliefs and assumptions also appears to trigger analytical processing. In a study by Klaczynski and Lavalley (2005), emerging adult participants were presented with arguments that were goal-threatening, goal-enhancing, and goal-neutral with respect to their chosen occupation (e.g., architect), and asked to judge the argument's persuasiveness, as well as justify their ratings. Participants' justifications evidenced analytical processing significantly more when presented with goal-threatening arguments. Similar findings were documented in other studies using a similar methodology (e.g., Klaczynski & Gordon, 1996; Klaczynski & Robinson, 2000).

Sometimes, individuals are faced with tasks in which they can make decisions by relying on either the analytical process based on logic and rationality or the experiential process based on heuristics and gut feelings. The process of metacognitive intercession involves comparing the responses generated by analytical and experiential processes to determine the most appropriate course of action given a particular situation (Klaczynski, 2004). This process has been documented in emerging adults in a study by Amsel and his colleagues (2008). In this study, participants were presented with a ratio bias task, in which participants were instructed to choose between two gambling choices of equivalent probabilities, but with a different number of winners (i.e., 1 out of 10 vs. 10 out of 100). Participants were also asked to rate how sure they were that "no preference" was a logical and rational response. The authors characterized participants' metacognitive status into competent (very and mostly sure), conflicted (a little sure), and poor (not sure at all). Participants had the tendency to prefer a higher number of absolute winners (i.e., 10 out of 100). Those who were sure that "no preference" was a rational response (i.e., metacognitively competent) were also more likely to recognize the two options in the scenario as equivalent, thus evidencing analytical processing.

Self-report measures have also been developed to assess the experiential and analytical processing in adults (Rational-Experiential Inventory; Pacini & Epstein, 1999), as well as adolescents (Rational-Experiential Inventory for Adolescents; Marks et al., 2008). The reliability and validity of the

adult version has been documented (Epstein, Pacini, Denes-Raj, & Heier, 1996). The adolescent version was modified from the adult version, with the experiential and rational subscales being correlated in predicted ways with personality factors, emotional expressivity, and reasoning (Marks et al., 2008). The adolescent version also has been used with emerging adults (Genovese & Little, 2004).

Analytical-experiential theory and risky behaviours. Only one study investigating analytical and experiential processing in relation to real-life risky behaviours was found at the time of the current review. In a study of gambling behaviours, Amsel and colleagues (2009) hypothesized that those who engage in gambling on a regular basis have difficulties regulating between experiential and analytical processing, such that decision-making is mainly guided by experiential processing. Emerging adult participants completed a questionnaire asking about their formal and informal gambling behaviours. Their decision-making processes and metacognitive status were assessed using the ratio-bias task described above. The results confirmed that gambling was associated with poor metacognitive status, and that individuals who gamble believe that experiential processing (i.e., gut feeling) is rational. Individuals who gamble believe that experiential processing (i.e., gut feeling) is rational. Additionally, individuals who exhibited analytical processing (i.e., stated that they did not prefer one ratio over the other) gambled less.

Developmental considerations. Overall, individuals become more sophisticated in both the experiential and analytical processing as they transition from adolescence to emerging adulthood (Klaczynski, 2001b). This progression is likely due to exposure to a variety of experiences and situations, as well as the development of metacognitive skills (Jacobs & Klaczynski, 2002; Klaczynski, 2000a). Compared to adolescents, emerging adults make more use of analytical processing, and are better able to control the influence of automatic heuristics on their decisions (Klaczynski, 2001a). Emerging adults also evidence analytical processing to a higher extent than adolescents in response to goal-threatening scenarios (Klaczynski & Gordon, 1996; Klaczynski & Lavalley, 2005). Emerging

adults (age range = 19-28 years) also make more use of analytical processing than middle-age (age range= 38-55 years) and older adults (age range = 64-81 years) when considering evidence that was favourable to their point of view, which indicates that individuals' reliance on heuristics and experiential processing become more pronounced with age (Klaczynski & Robinson, 2000).

Fuzzy-trace theory. The fuzzy-trace theory also endorses a two-process approach to explaining decision-making, with gist processing corresponding to intuition-based processing and verbatim processing corresponding to rational processing (FTT; Reyna & Brainerd, 1992). The verbatim and gist representations are conceptualized as existing on a continuum, with one end representing specific probabilities of an outcome (i.e., verbatim) and the other representing heuristics and gut feelings (i.e., gist). The fuzzy-trace theory originated from memory research, whereby it was documented that individuals encode and retrieve their memories by using the “bottom line” information termed “fuzzy trace” rather than the memory for specific details and facts, defined as “verbatim” (Brainerd & Knigam, 1984). The notion that individuals use mental short-cuts and general, rather than specific, representations was further applied to reasoning and decision-making. This theory proposes that it is gist processing, which is based on heuristics and summary judgments, as opposed to verbatim processing, based on specific facts and probabilities, that ensures optimal decision-making (Reyna, 1992).

It appears that the representations involved in gist processing are extracted, learned, and applied as individuals gain experience with a variety of situations. Specifically, while individuals encode both the verbatim (i.e., specific details) and gist (i.e., general principles and ‘big picture’) of a situation (Reyna & Farley, 2006), a higher use of gist as compared to verbatim representations is noted with increased exposure to a variety of situations over time (Reyna, Lloyd, & Brainerd, 2003). The preference for gist representations can be explained by the rapid fading of the verbatim representations and the economical nature of mental representation, which essentially involves summaries of personally

meaningful and relevant content that applies to a situation (Reyna & Farley, 2006). Mental representations within gist processing reflect highly idiosyncratic aspects such as values, preferences, and emotionally salient attitudes that are represented in long-term memory which interact with task requirements, problem representations, and retrieval of principles in determining decisions (Reyna & Brainerd, 1992). Therefore, acquiring gist representations in a given situation involves understanding and integrating its emotional and cognitive components, which in turn are contingent upon individuals' education, culture, worldview, and developmental level (Adam & Reyna, 2005).

Emotions are also encoded in gist representations, with emotional valence being the most pervasive and fundamental representation that promotes retrieval of values (Reyna & Farley, 2006) and guides decisions (Rivers, Reyna, & Mills, 2008). Specifically, stimuli marked with a positive valence are perceived as more beneficial and less risky, whereas those that are associated with a negative valence are perceived to be harmful (Alhakami & Slovic, 1994). Overall, individuals are more likely to be negatively affected by emotions when they have difficulty grasping the gist of events (Rivers et al., 2008).

Empirical support and methodological considerations. The fuzzy-trace theory has been empirically supported through studies using the framing paradigm (e.g., Corbin, McElroy, & Black, 2010; Estrada, 2011; Kuhberger & Tanner, 2010), questionnaires assessing endorsement of items reflecting gist and verbatim representations in relation to specific situations (e.g., Brown & Gould, 2012; Mills et al., 2008; Mills, 2010; Reyna, Estrada, DeMarinis, Myers, Stanis, & Mills, 2011; Svenson, Salo, & de Loo, 2007), and verbal output coded for gist representations (Wolfe, 1995).

The framing paradigm involves presenting participants with a description of a situation reflecting a dilemma and asking them to select from solutions that are phrased to emphasize loss or gain (e.g., monetary gains or losses; Kuhberger, Shulte-Mecklenbeck, & Perner, 1999; prizes; Reyna & Ellis, 1994; Asian disease problem; Tversky & Kahneman, 1981). Framing effects occur when individuals'

choices change in response to the wording of options as gains or losses, which is expected to influence the decision-maker's frame of mind and weighing of the facts presented in the description (Tversky & Kahneman, 1981). Specifically, individuals are more risk averse (i.e., prefer the sure option) when the options are framed in terms of gains, but more risk seeking (i.e., prefer the gamble) when the options are framed in terms of losses, and this occurs despite the fact that the absolute numerical outcomes of options worded in either way are the same (Edwards, Elwyn, Covey Matthews, & Pill, 2001; Tversky & Kahneman, 1986). In a study employing this paradigm with adolescent, emerging adult, and adult participants grouped together, gains and losses were phrased in terms of degree (i.e., comparing between two different probabilities of living and between two different probabilities of dying) as opposed to absolute differences (i.e., a probability of living vs. a probability of dying) (Kuhlberger & Tanner, 2010). The authors found that when faced with differences in degree, participants did not express any preference for either of the two choices. In contrast, when presented with absolute differences, participants preferred the choice that presented a higher probability of gain (i.e., some will live). This was interpreted as supporting the fuzzy-trace theory, since individuals transformed the specific numerical probabilities into rough categories of risk and gain. In another study utilizing descriptions of problems and solutions framed to represent loss or gain, Estrada (2011) found that adding qualitative descriptions of risk into the general description of the problem significantly influenced participants' decisions.

Questionnaires have been developed by validating items that were written by the authors to reflect gist and verbatim representations as they apply to specific decisions or behaviours. They include risky sexual behaviour (Mills et al., 2008; Mills, 2010; Reyna et al., 2011), risky driving behaviour (Brown & Gould, 2012), and the retrospective reports of the process one engaged in when making a real-life decision (Svenson et al., 2007). These questionnaires have been reported to support the predictions formulated by the fuzzy-trace theory. For instance, Svenson and colleagues (2007) asked

undergraduate participants to describe the most important decision of their lives, as well as a less important decision that they made recently. Participants were subsequently asked to rate how each category of gist statements (e.g., consequences, affect/feeling, values, probability of events happening, causes leading to the decision problem) was relevant to their decision-making on a scale from 0 to 100. The results indicated that a variety of representations related to gist processing were judged as very relevant to the decision-making process.

Only one study in which participants' verbalizations were coded for accuracy of understanding of probabilities and their relevance in decision-making was found for this review. In a study of undergraduate students, Wolfe (1995) asked participants to describe the meaning and relevance of various pieces of information in vignettes presenting a situation that contained base-rate (i.e., percentage of cases in which an event has occurred in the past) and hit-rate (i.e., accuracy of the estimation of the probability of the occurrence of an event) information. Two independent coders rated whether the descriptions supplied by the participants were accurate in defining the base-rate and whether participants judged this information to be relevant to decision-making. Participants who described base-rate information accurately and judged it as relevant were more likely to consider it in making their decisions.

Fuzzy-trace theory and risky behaviours. Gist and verbatim processing have been found to be predictive of engagement in specific risky behaviours. In a study of speeding behaviour, Brown and Gould (2012) assessed risk perceptions associated with speeding among individuals between the ages of 17 and 75 years. The authors used six items formulated to reflect representations about speeding related to gist processing. Specifically, three items were unfavourable to speeding (e.g., 'Exceeding speed limits is always dangerous. '), and three were favourable to speeding (e.g., 'I can drive safely at high speeds. '), and participants were asked to either agree or disagree with each statement. The results indicated that gist representations reflecting a negative perception of the risk of speeding were

predictive of speeding behaviours above and beyond enjoyment, excitement, and perceived likelihood of being caught. Specifically, gist representations unfavourable to speeding behaviours were associated with less speeding.

According to Reyna and Farley (2006), getting individuals to use verbatim representations in their decision-making will increase the likelihood that they will engage in risky behaviour since this reasoning does not reflect the previous experience or personal values contained in gist processing that could discourage risk-taking. Specifically, while relying on specific numerical estimates that characterize verbatim representations, individuals are likely to underestimate the risk of negative consequences for themselves, thus exhibiting optimistic bias (Reyna & Farley, 2006). Moreover, when individuals rely on verbatim representations in considering the likelihood of negative outcomes, they tend to consider a single probability associated with a single instance of engaging in risky behaviours as opposed to the additive probability of negative outcomes associated with engaging in a risky behaviour multiple times (Mills et al., 2008; Reyna et al., 2011). For instance, individuals may believe that engaging in unprotected sexual relations once will only be associated with a 50% chance of getting an STD, but ignore the fact that engaging in unprotected sex multiple times will increase that probability.

In studies of risky sexual behaviours and behavioural intentions related to sexual activity in adolescents (Mills et al., 2008) and emerging adults (Reyna et al., 2011), participants were asked to rate verbatim items ('I am likely to get pregnant (or get someone pregnant) in the next 6 months'; 'I am likely to have an STD by age 25.'; 'I am likely to have an STD in the next 6 months.'), which represent specific probabilities, and gist items (e.g., 'When in doubt about having sex, delay or avoid it.'; 'I have a responsibility to my parents/family to not have sex'; 'Better to not have sex than risk getting HIV-AIDS'), which are based on a categorical assessment of risk and values, on a 5-point rating scale indicating their agreement. Scores on the verbatim items correlated positively with risk-taking behaviour and behavioural intentions. On the other hand, scores on the items reflecting gist correlated

negatively with the same behavioural measures. It was concluded by Reyna and her colleagues (Mills et al., 2008; Reyna et al., 2011) that endorsement of simple values protected against risk taking, whereas specific questions that promoted verbatim processing (asking about specific and quantitative risk) produced a higher endorsement of risky behaviour. However, the use of gist and verbatim processing were not found to be significantly associated with age. The authors explained this pattern by highlighting the transitional nature of adolescence and emerging adulthood and the lack of systematic preference for gist or verbatim processing during this developmental period. The relevance of gist and verbatim processing to decision-making and engagement in risky behaviours has also been evidenced in the context of interventions targeting prevention of specific risky behaviours (e.g., Mills, 2010; Kirby, Barth, Leland, & Fetro, 1991). Specifically, teaching adolescents statements that reflect risk aversive gist representations decreased risky behaviours.

Developmental considerations. According to the fuzzy-trace theory, the development of decision-making progresses from verbatim processing, which involves consciously balancing the risks and rewards of a situation and focusing on detailed quantitative information, to intuitively applying previously acquired representations that are part of gist processing (Reyna, 1996; Reyna et al., 2003; Reyna & Brainerd, 2011; Reyna, 2012). Studies conducted with children, adolescents, and adults indicate that the characteristics considered and the outcomes of decisions differ across the age groups. In a study by Jansen, Duivenvoorde, and Huizenga (2012), children and adolescents between the ages of 8 and 17 completed a paper-and-pencil Gambling Machine Task, where they were asked to decide whether two machines were equally profitable, or whether one was more profitable than the other. In this framing paradigm, each machine was characterized by the dimensions of certain gain, frequency of loss, and amount of loss. The amount of gain was printed on the machine, and the frequency and amount of loss had to be deduced from the number of balls pictured on each machine. Depending on the colour of balls drawn, the machine would generate a loss or a gain. The items reflected different

situations of loss and gain on two machines. The results indicated that older participants tended to use fast and quick rules that do not require extensive computation and that are similar to gist representations.

Experimental studies employing the framing paradigm indicate that there are age-related differences in how individuals make decisions. From later childhood to early adolescence, individuals evidence a shift in the way they make decisions. Specifically, instead of considering multiple dimensions of the problem, such as risk and rewards, they focus on rewards (Reyna et al., 2011). In adolescence and emerging adulthood, individuals are able to consider risks and rewards at the same time, and there is evidence of higher use of gist representations (Reyna et al., 2011). Additionally, research on framing and working memory among undergraduate students documented that individuals who exhibit large working memory capacity may be more skilled at summarizing large quantities of information and encoding gist than those with lower working memory capacity, which makes emerging adults less vulnerable to framing effects (Corbin et al., 2010). In adolescence, individuals display preference for rewards by choosing the risky gamble option as the potential of gain increases, whereas emerging adults choose the safe option more often, which is similar to the type of framing effect found in adults, although it is less extensive (Reyna et al., 2011). This suggests that although emerging adults display patterns of decision-making that are progressively more adult-like, they still use some of the adolescent decision-making approaches.

Thus, the developmental period spanning adolescence and emerging adulthood represents a period during which individuals' use of gist processing increases (Reyna, Adam, Poirier, LeCroy, & Brainerd, 2005). Moreover, the proponents of the fuzzy-trace theory posit that young people's decision-making competence depends on contexts (Reyna & Adam, 2003). Thus, there are several context-specific components that have to be present for optimal decision-making (Reyna et al., 2005). First, individuals should have general background knowledge about the problem. Second, there needs to be an

accurate representation of links between the causes and consequences of behaviour in a particular situation, as well as values attached to them, which is typically represented in a gist of the specific situation which guides the individual's decisions. Third, these gist representations need to be consistently retrieved and implemented. As individuals gain experience in multiple domains and develop more representations that are based on gist processing, their tendency to rely primarily on verbatim processing when making decisions decreases and their decision-making outcomes improve as a result (Reyna et al., 2005).

Summary. Overall, while the rational models of decision-making have focused on specific logical processes involved in decision-making, they have not clearly addressed the role of intuition, gut feelings, and emotions in the decision-making process (Rivers et al., 2008). The importance of the emotions that one anticipates as a result of making a specific decision has been acknowledged by a number of theorists (Bechara et al., 1994, 2000; Schwarz, 2000).

The dual-process models of decision-making have been developed to include these constructs. Specifically, both the analytic-experiential theory of decision-making (Klaczynski, 2005) and the fuzzy-trace theory of decision-making (Reyna & Brainerd, 1992) stipulate that the decision-making process is guided by two processes. The first process is intuition-based, and is utilized when individuals' pre-existing heuristics and experiences with a situation encoded in values, emotions, and principles guide the decision-making. The second process is rational, and involves use of deliberation, detailed quantitative information, and rational principles in the decision-making process. The analytical-experiential theory proposes that the analytical processing, which ensures that the decision-making process is guided by rationality, fosters optimal decisions when individuals are faced with risk. On the other hand, the fuzzy-trace theory posits that the gist processing, which encompasses intuition and simple heuristics, leads to optimal decisions in risky situations. Moreover, the analytical-experiential theory conceptualizes the two processes as categorically distinct, whereas the fuzzy-trace

conceptualizes them as representing the opposing ends of a continuum. Thus, the differences between the two theories are the difference in emphasis on which of the two processes is of primary importance to optimal decision-making, as well as how the two processes relate to each other.

Gender Differences in Decision-Making

Gender differences in decision-making processes and associated behaviours have often been reported, with males engaging in risky behaviours to a higher extent than females (Byrnes et al., 1999). In a laboratory study utilizing a simplified version of the Iowa Gambling task, males were found to take more risks than females throughout childhood, adolescence, and emerging adulthood (Van Leijenhorst et al., 2008). Studies consistently demonstrate that emerging adult males engage in risky behaviours such as reckless driving (Constantinou, Panayiotou, Konstantinou, Loutsiou-Ladd, & Kapardis, 2011), binge drinking (O'Malley & Johnson, 2002), pathological gambling (Engwall, Hunter, & Steinberg, 2004), chronic use of marijuana (Preston, 2006), and reckless sexual behaviours (Bradley & Wildman, 2002) significantly more than females.

It appears that the differences in risk-taking may be due to the interactions between internal characteristics, such as personality, and external factors such as culture and environment. Thus, men have been found to display higher sensation seeking (Zuckerman, 1994) and impulsivity (Soltenberg, Batién, & Birgenheir, 2008) than women, which may encourage higher risk taking in males. Additionally, researchers identified socio-cultural influences in gender differences in risk taking (Arnett, 1992). It appears that expectations regarding risk taking are communicated to individuals by parents through socialization. In research on toddlers' risk-taking behaviours in the playground, parents have been found to tolerate and encourage boys' risky behaviours to a higher extent than girls' (Morrongiello & Dawber, 2000). Such parental reactions likely lead to girls perceiving themselves as more vulnerable than boys to the negative outcomes of risky behaviours, which then discourages risk taking amongst girls (Hillier & Morrongiello, 1998). This gender difference in perception of

vulnerability to risk has also been documented amongst emerging adults (e.g., Gonzales, Glik, Prelip, Bourque, Yuen, Ang, & Jones, 2006). The higher risk taking tendency amongst males has also been demonstrated in cross-cultural research, whereby researchers have found a higher discrepancy in risk taking favouring males in male-dominated cultures as opposed to female-dominated cultures or equalitarian cultures (Gong & Yang, 2012).

Methodological and Theoretical Gaps

Overall, the current understanding of adolescent decision-making involves the consideration of both rational and intuition-based processes, which consider the importance of summary judgments, heuristics, intuition, and emotions in the decision-making process. However, there are disagreements about what type of approach characterizes optimal decision-making in situations involving risk and the associated behavioural outcomes in risky situations.

The fuzzy-trace theory, positing that gist representations, which include quick and coarse judgments about a situation that have been formulated in the context of one's subjective characteristics (e.g., emotions, values, intuition) and experience promote optimal decision-making in risky situations. On the other hand, the analytical-experiential theory proposes that the analytical, rational process leads to more optimal decisions in risky situations. However, the association between important background characteristics as well as rational and intuition-based decision-making processes has not yet been investigated. One such factor is the communication between youth and their parents, which has been documented as important for youth's decision-making, mainly through parents imparting values to their children (White & Matawie, 2004). Additionally, a positive relationship between emerging adults and their parents contributed to adjustment (Leas & Mellor, 2000; Perosa, Perosa, & Tam, 2002).

Psychosocial risk and protective factors represent another important set of variables that appear to be rarely investigated in decision-making research. However, given that the period of adolescence and emerging adulthood represents a period of transition during which both rational and intuition-based

decision-making processes can be used depending on situations, and that experience plays a role in decision-making, individuals' life circumstances and background risk and protective factors could explain the varying patterns of use of decision-making processes.

Finally, the methodological approaches used to investigate decision-making mostly rely on experimental laboratory tasks, such as ones using the framing paradigm. Specifically, participants are presented with descriptions of situations and asked to choose among several options worded in different ways (e.g., Estrada, 2011; Corbin, McElroy, & Black, 2010) or rate the scenarios on persuasiveness and explain their ratings (Klaczynski, 2001a; Klaczynski & Gordon, 1996). Their decision-making is assessed through the particular option that they select and their explanations of their ratings. Additionally, researchers have also used rating scales in which individuals' decision-making is assessed through endorsement of items that typify specific decision-making processes (e.g., Marks et al., 2008; Mills et al., 2008; Pacini & Epstein, 1999; Reyna et al., 2011; Svenson, Salo, & Loo, 2007). Think-aloud protocols have also been used in studies in which individuals audio-recorded themselves as they were making decisions and the output was coded (e.g., Lewis, 1982). However, the think-aloud and self-report measures of the use of rational and intuition-based decision-making processes have not yet been compared. Retrospective reports of decision-making processes used and measurement of the processes as individuals make decisions may differ due to biases related to memory and self-presentation. Therefore, this comparison will shed light on the extent to which different ways of measuring decision-making process are associated with the predictors and outcomes of decision-making.

The Purpose of the Present Study

Since decision-making in adolescence and emerging adulthood is characterized by choices that can have far reaching consequences on individuals' lives, it is important to investigate the variables that are associated with decision-making processes. The overall purpose of the present study was to

investigate the rational and intuition-based decision-making processes of youth in relation to the degree of psychosocial risk and protective factors they endorse, and their report of their communication with their parents. Additionally, the present study aimed at examining the relation between the two decision-making processes and risky behaviours.

Another purpose of the present study was to determine whether the pattern of associations between background psychosocial variables and decision-making processes characterized by rationality and intuition would provide support for the analytical-experiential theory or the fuzzy-trace theory. Additionally, the study aimed at assessing the decision-making processes using the think-aloud protocol method, as well using self-report questionnaires, in order to compare the patterns of associations between the background variables and the two kinds of measurements of decision-making processes. The relations between decision-making processes measured through think-aloud and self-report were also examined in association with background psychosocial variables and risky behaviours.

Research Questions and Hypotheses

According to the psychosocial factors literature, individuals' experiences of risk and protective factors are associated with adjustment outcomes. Specifically, a high number of protective factors and a low number of risk factors are associated with better adjustment (Masten, 2011; O'Daugherty et al., 2013; Schulenberg & Zarett, 2006). Similarly, fewer risk than protective factors are associated with less engagement in risky behaviours (Danielson et al., 2006; Saewyc et al., 2008). Communication with parents was one of the protective factors found to be related to decision-making outcomes. Specifically, the quality of the communication with parents was associated with more adaptive decisions (Bregman & Killen, 1999; Hair et al., 2008) and less engagement in risky behaviours (Leas & Mellor, 2000; Overbeeck et al., 2005). Thus, according to the psychosocial literature, it was hypothesized that fewer risk and more protective factors, as well as adaptive communication between parents and their children,

would predict better adjustment outcomes, including optimal decision-making and less engagement in risky behaviours.

Two competing dual-process theories conceptualize the processes involved in decision-making. Specifically, while both theories propose that decision-making is characterised by rational and intuition-based processes, they disagree as to which process leads to optimal decision-making. According to the analytical-experiential theory (Klaczynski, 2001a, 2001b), analytical processing, which is the rational process of decision-making, predicts optimal decision-making and less engagement in risky behaviours (Amsel et al., 2009; Amsel et al., 2008). In contrast, within the fuzzy-trace theory, gist processing, which is the intuition-based process of decision-making, predicts optimal decision-making and less engagement in risky behaviours (Mills et al., 2008; Reyna et al., 2011). Since the rational and intuition-based processes have not yet been investigated in relation to background psychosocial factors, the overall goal of the present study was to clarify this association. Specifically, the study aimed to determine whether the background psychosocial factors are associated with the two decision-making processes. Additionally, the association of the two decision-making processes to individuals' report of engagement in risky behaviours was tested. The lifetime and recent (i.e., within the past month) risky behaviours were considered separately in the present study to account for individuals' experiences with risk, which can be related to changes in decision-making processes (Reyna et al., 2011). Another goal of the study was to specify whether the pattern of associations between the background psychosocial factors, the two decision-making processes, and risky behaviours, would support the analytical-experiential or the fuzzy-trace theory. A third goal concerned the measurement of decision-making processes. Specifically, the patterns of relations between background variables and rational and intuition-based decision-making processes as assessed by self-report and think-aloud approaches were compared. The research questions are listed below and the patterns of relations between study variables expected based on the two theories are presented in Table 2.

Table 2

Patterns of Relations Between Variables Expected to Support Each Theory

	Analytical-Experiential Theory	Fuzzy-Trace Theory
Hypothesis 1	1a) Self-reported use of analytical processing will demonstrate positive associations with protective factors and communication with parents, and a negative association with risk factors.	1b) Self-reported use of analytical processing will demonstrate negative associations with protective factors and communication with parents, and a positive association with risk factors.
Hypothesis 2	2a) Self-reported use of experiential processing will demonstrate positive associations with risk factors and negative associations with protective factors and communication with parents.	2b) Self-reported use of experiential processing will demonstrate a negative association with risk factors and positive associations with protective factors and communication with parents.
Hypothesis 3	3a) Gist processing as assessed through the think-aloud protocol will demonstrate negative associations with protective factors and communication with parents, and a positive association with risk factors.	3b) Gist processing as assessed through the think-aloud protocol will demonstrate positive associations with protective factors and communication with parents, and a negative association with risk factors.
Hypothesis 4	4a) Verbatim processing as assessed through the think-aloud protocol will demonstrate a negative association with risk factors and positive associations with protective factors and communication with parents.	4b) Verbatim processing as assessed through the think-aloud protocol will demonstrate a positive association with risk factors and negative associations with protective factors and communication with parents.
Hypothesis 5	5a) Lifetime risky behaviours will demonstrate negative associations with self-reported use of analytical processing and verbatim processing as measured through think-aloud, and positive associations with self-reported use of experiential processing and gist processing as measured through think-aloud.	5b) Lifetime risky behaviours will demonstrate positive associations with self-reported use of analytical processing and verbatim processing as measured through think-aloud, and negative associations with self-reported use of experiential processing and gist processing as measured through think-aloud.
Hypothesis 6	6a) Recent risky behaviours will demonstrate negative associations with self-reported use of analytical processing and verbatim processing as measured through think-aloud, and positive associations with self-reported use of experiential processing and gist processing as measured through think-aloud.	6b) Recent risky behaviours will demonstrate positive associations with self-reported use of analytical processing and verbatim processing as measured through think-aloud, and negative associations with self-reported use of experiential processing and gist processing as measured through think-aloud.

Research question 1: Self-report analytical. Do psychosocial factors and communication with parents predict the self-reported use of analytical (rational-based) processing?

Hypothesis 1. Background risk and protective psychosocial factors, and the quality of communication with parents will predict the self-report of analytical (rational-based) processing. As shown in Table 2, the findings will support the analytical-experiential theory if analytical processing is positively associated with a favourable psychosocial background. In contrast, the fuzzy-trace theory will be considered to be supported if the analytical processing is positively associated with an unfavourable psychosocial profile.

Research question 2: Self-report experiential. Do psychosocial factors and communication with parents predict the self-reported use of experiential (intuition-based) processing?

Hypothesis 2. Background risk and protective psychosocial factors, and the quality of communication with parents will predict the self-report of experiential (intuition-based) processing. As can be seen in Table 2, the findings will support the analytical-experiential theory if experiential processing is positively associated with an unfavourable psychosocial background. The findings will be considered as supportive of the fuzzy-trace theory if the experiential processing is positively associated with a favourable psychosocial profile.

Research question 3: Gist processing. Do psychosocial factors and communication with parents predict the gist processing as measured through think-aloud (intuition-based) procedure?

Hypothesis 3. Background risk and protective psychosocial factors, and the quality of communication with parents will predict gist processing as assessed through the think-aloud protocol (intuition-based). As displayed in Table 2 on page 36, the findings will support the analytical-experiential theory if gist processing is positively associated with an unfavourable psychosocial background. In contrast, the findings will be considered as supportive of the fuzzy-trace theory if gist processing is positively associated with a favourable psychosocial profile.

Research question 4: Verbatim processing. Do psychosocial factors and communication with parents predict the verbatim processing as measured through think-aloud (rational) procedure?

Hypothesis 4. Background risk and protective psychosocial factors, and the quality of communication with parents will predict verbatim processing as assessed through the think-aloud protocol (rational). As shown in Table 2 on page 36, the findings will support the analytical-experiential theory if verbatim processing is positively associated with a favourable psychosocial background. The findings will be considered as supporting the fuzzy-trace theory if verbatim processing is positively associated with an unfavourable psychosocial profile.

Research question 5: Lifetime risky behaviours. Do rational and intuition-based decision-making processes predict lifetime risky behaviours?

Hypothesis 5. The rational and intuition-based decision-making processes, as assessed through self-report and think aloud, will predict lifetime risky behaviours. As can be seen in Table 2 on page 36, the findings will support the analytical-experiential theory if lifetime risky behaviours were to be positively associated with intuition-based processing and negatively associated with rational processing, as assessed through think-aloud and self-report. In contrast, the findings will be considered as supporting the fuzzy-trace theory if lifetime risky behaviours were to be negatively associated with intuition-based processing and positively associated with rational processing.

Research question 6: Recent risky behaviours. Do rational and intuition-based decision-making processes predict recent risky behaviours?

Hypothesis 6. The rational and intuition-based decision-making processes as assessed through self-report and think-aloud will predict recent risky behaviours. As displayed in Table 2 on page 36, the findings will support the analytical-experiential theory if recent risky behaviours are positively associated with intuition-based processing and negatively associated with rational processing, as assessed through think-aloud and self-report. In contrast, the findings will be considered as supporting

the fuzzy-trace theory if recent risky behaviours are negatively associated with intuition-based processing and positively associated with rational processing.

CHAPTER II

METHOD

Participants

Participants were 140 youths between the ages of 14 and 21 years, and twenty of their parents. They were recruited from the University of Windsor participant pool and the surrounding community. Ten participants and two parents had to be excluded from the analyses, because of missing data due to problems with the internet connection while they were completing the online survey, or due to failure to complete one of the measures. To maintain homogeneity in the sample and facilitate the generalizability of the findings, participants between the ages of 14 and 18 years of age ($n = 5$) who were recruited from the community were excluded from the main analyses. Overall, 19 parents (14 mothers and 5 fathers, M age = 47.75 years) participated. Due to the small sample size of parents, they were also excluded from the main analyses. The data for these participants, along with the consent forms and the letters of information are available from the researcher upon request.

In total, the data were analyzed for 125 participants (23 males and 102 females, M age = 19.44 years, $SD = 1.01$). Please see Table 3 for emerging adult participants' demographic characteristics. Of these, 101 participants (19 males and 82 females, M age = 19.35 years, $SD = 1.02$) completed the think-aloud portion of the study. The unequal representation of males and females in the present study mirrors the composition of psychology classes, from which the participants were recruited. As can be seen in Table 3, most of the participants were Caucasian and reported being born in Canada. While about a quarter of all participants declined to report on the income level of their families, among those who provided this information, participants were distributed across income levels. Most participants came from intact, two-parent families and identified their mothers as the parent/caregiver/guardian who knows them best.

Table 3

Summary of Demographic Characteristics of Emerging Adult Participants (N = 125)

Variables	Male <i>n</i> = 23	Female <i>n</i> = 102
Age		
18	4 (17.4%)	24 (23.5%)
19	8 (34.8%)	26 (25.5%)
20	9 (39.1%)	34 (33.3%)
21	2 (8.7%)	18 (17.6%)
Ethnicity		
Caucasian	11 (47.8%)	66 (64.7%)
Black (e.g., African, Haitian, Jamaican, Somalian)	5 (21.7%)	8 (7.8%)
South Asian (e.g., East Indian, Pakistani, Punjabi, Sri Lankan)	2 (8.7%)	6 (5.9%)
Chinese	1 (4.3%)	3 (2.9%)
Arab/West Asian (e.g., Armenian, Egyptian, Iranian, Lebanese)	4 (17.4%)	10 (9.8%)
Morocan	0 (0%)	2 (1.9%)
Filipino	0 (0%)	2 (1.9%)
Indian	0 (0%)	1 (.98%)
Mixed	0 (0%)	3 (2.9%)
Born in Canada ^{a,b}		
Yes	16 (72.7%)	75 (75.8%)
No	6 (27.2%)	24 (24.2%)
Family of Origin Income ^{c,d}		
less than \$10,000	0 (0%)	5 (5.3%)
\$11,000 to \$20,000	1 (5%)	4 (4.2%)
\$21,000 to \$30,000	0 (0%)	3 (3.1%)
\$31,000 to \$40,000	1 (5%)	4 (4.2%)
\$41,000 to \$50,000	0 (0%)	5 (5.3%)
\$51,000 to \$60,000	1 (5%)	8 (8.4%)
\$61,000 to \$70,000	2 (10%)	6 (6.3%)
\$71,000 to \$80,000	1 (5%)	6 (6.3%)
\$81,000 to \$90,000	3 (15%)	4 (4.2%)
\$91,000 to \$100,000	3 (15%)	2 (2.1%)
\$101,000 to \$110,000	1 (5%)	3 (3.1%)
\$111,000 to \$119,000	0 (0%)	3 (3.1%)
\$120,000 or more	2 (10%)	14 (14.7%)
Prefer Not to Answer	8 (40%)	28 (29.5%)

(table continues)

Table 3 (continued)

Variables	Male <i>n</i> = 23	Female <i>n</i> = 102
Family of Origin Composition		
Two Parent Family Led by Both Parents	17 (73.9%)	88 (86.3%)
Single Parent Family Led by Father	2 (8.7%)	1 (.98%)
Single Parent Family Led by Mother	3 (13.0%)	13 (12.7%)
Single Parent Family Led by Grandmother	1 (4.3%)	0 (0%)
Parent/Guardian/Caregiver Who Knows You Best ^{a,c}		
Mother	13 (59.1%)	76 (75.2%)
Father	4 (18.2%)	10 (9.8%)
Mother and Father	3 (9.1%)	13 (12.9%)
Grandmother	1 (4.5%)	0 (0%)
Neither	1 (4.5%)	2 (2.0%)

^a*n* = 22^b*n* = 99^c*n* = 20^d*n* = 95^e*n* = 101

Procedure

Recruitment. Ethics approval from the Research Ethics Board at the University of Windsor was obtained prior to starting this study. Adolescents, emerging adults, and their parents were invited to participate in this study. Efforts were also made to recruit adolescents between the ages of 14 and 18 years from local high schools, a youth community organization, and through parents who are undergraduate students and registered within the participant pool. The parents were asked to complete online questionnaires assessing demographic characteristics and their communication with their children (Parent-Adolescent Communication; Barnes & Olson, 1985). The adolescent participants were asked to complete online the same questionnaires as those that were administered to the emerging adult participants, but were not asked to participate in the think-aloud portion of the study. Adolescents and parents recruited from the community were each offered the opportunity to be entered in a draw to win one of the three thirty-dollar gift certificates to the Devonshire Mall.

However, the school board authorities raised concerns that it might not be possible to conceal the identity of schools and thus the prevalence of specific risk factors in participating schools. Despite the researcher's best efforts to address these concerns, the school boards and school staff declined to allow the recruitment of their students. The researcher was also not able to recruit a sufficient number of adolescents from the youth community organization and the Participant Pool. A timeline of steps taken in recruiting participants is presented in Appendix A.

The emerging adult participants were recruited from the University of Windsor Psychology Participant Pool and from a local youth centre located in the greater Windsor-Essex County region. The participants recruited from the University of Windsor Psychology participant pool were given extra course credit. Specifically, they received 1.5 bonus points for 60 minutes of participation if registered in the pool and enrolled in one or more eligible courses. The participants completed the study in two sessions. The first session consisted in completing the online questionnaires, and the second session

involved the audio-recording of the think-aloud procedure. Before the start of the first session, participants were provided with a letter of information and consent form (please see Appendix B). They were asked to read and sign the consent form to document their agreement to participate in the present study. Participants were also asked to invite their parents to participate in the study. However, they were allowed to participate in the second session of the study even when their parents declined to participate.

The online questionnaires were administered through a confidential online website set up by the university's IT services and attached to the university's server, which participants were able to access using a password. Answers to the questionnaires were stored in an Excel file, in which participants were identified by a number. The data file with the responses to the questionnaires and the audio-recording are stored in a locked file cabinet. Participants completed the online questionnaires at a computer laboratory at the University of Windsor. This location was chosen in order to control for the conditions in which participants completed the questionnaire, therefore eliminating potential confounding factors related to varying environmental circumstances and making the responses more reliable. Once they completed the questionnaires, participants were distributed a list of community resources. The think-aloud procedure was completed individually by each participant in a private room at the University of Windsor. At the beginning of the session, participants read and signed the consent form documenting their agreement to being audio-recorded. Following this, the participants were provided with the instructions for the vignettes, and explanations on how to record themselves on the digital audio-recorder. Since each vignette was placed in a separate folder on the recorder, the researcher asked the participants to let her know once they were done with the recording for each individual vignette, and personally switch the recorder to the next vignette. This was done in order to ensure smooth recording of the participants' think-aloud.

Measures

Demographic characteristics. Emerging adult participants completed a demographic questionnaire in which they were asked to indicate their age, gender, ethnicity, and income level. Participants were also asked to indicate the composition of their family, as well as which parent/guardian/caregiver they feel the closest to. Please see Appendix C for the Demographic Questionnaires.

Risk and protective factors and risky behaviours. The risk and protective factors, as well as risky behaviours, were assessed using The Communities that Care Survey (Arthur et al., 2002). This instrument is comprised of 198 items that assess the presence of 23 risk factors and 10 protective factors. The risky behaviours assessed include drug and alcohol consumption, as well as antisocial behaviour (e.g., delinquency, property destruction, stealing) over their lifetime, as well as more recently (i.e., within the last month). Participants provide responses by using rating scales. Categories of risk and protective factors include the community, school, family, peer, and individual domains, all of which have been identified as predictors of adolescent health and behavioural outcomes (Hawkins, Catalano, & Brewer, 1995; Herrenkohl et al., 2000). Some of the risk factors include neighbourhood disorganisation, family conflict, parental attitudes towards drugs, and sensation seeking. The protective factors include community rewards for prosocial involvement, family attachment, social skills, and belief in the moral order.

Arthur and his colleagues (2002) conducted an extensive reliability and validation study of the instrument with large samples of students in grades 6 to 12 from Oregon schools. The authors present the reliabilities for each scale comprising the various categories of risk and protective factors by gender and grade (Arthur et al., 2002). The average alpha reliabilities were .78 for the total number of risk factors and .71 for the total number of protective factors. The authors also measured youth engagement in risky behaviours, and found that the correlations between endorsement of risk factors and risky

behaviours were as expected. Subsequent studies demonstrated the reliability and validity of the instrument across grades, gender, and ethnic groups (Glaser, Van Horn, Arthur, Hawkins, & Catalano, 2005). School boards routinely use this measure across many American states in order to screen youth and identify those who need to be in prevention programs (Arthur et al., 2007).

The participants in the present study are slightly older than those in the original sample in Arthur and colleague's (2007) study. Therefore, it was not possible to use a grade-based procedure to determine whether the scores on each risk and protective factor are above a specific cut-off, and calculate a frequency count of all risk and protective factors that are above the cut-off. As such, the risk and protective factor scores in the present study represent the continuous scores before the application of the cut-off and were calculated by using the procedure developed by the authors (J. Briney, personal communication, November 10, 2009). In order to determine how the scores of the participants in the present study compare to those included in the authors' sample, the means and standard deviations obtained for each risk and protective factors in the present study were compared to those obtained by the authors of the measure in a sample of Grade 12 students, which were the oldest participants for whom data was available (J. Briney, personal communication, January 14, 2013). As can be seen in Table D1 in Appendix D the means are very similar. The reliability coefficients, the range of scores obtained in the present study, as well as the means and standard deviations are presented in Table 4. As can be seen, the reliability coefficients range between .61 and .82, and are therefore adequate.

Self-report intuition-based and rational decision-making processes. The Rational-Experiential Inventory for Adolescents (REI-A) (Marks et al., 2008) was used to assess the intuition-based and rational decision-making processes. The measure is an adaptation of the Rational-Emotional Inventory originally developed and used with adults (Epstein et al., 1996). This measure assesses individuals' approach to decision-making. Specifically, the measure contains 20 items equally divided into two scales. The analytical scale reflects the rational decision-making process, which is conscious,

Table 4

Psychometric Information for Questionnaire-Based Variables (N = 125)

Variable	Measure	Subscales/ Coding Categories	Range of Scores		M (SD)	α
			Possible	Obtained		
Risk and Protective Factors	Communities that Care Youth Survey	Risk Factors	20-115	37.4-68.4	48.8 (6.38)	.82
		Protective Factors	12-55	36.3-47.6	36.3 (4.57)	.61
Risky Behaviours	Communities that Care Youth Survey	Lifetime Risky Behaviours	1-80	11-46	17.51 (6.19)	.72
		Recent Risky Behaviours	21-169	21.1-47	26.75 (5.04)	.74
Self-Report Intuition-Based and Rational Decision-Making	Rational-Experiential Inventory for Adolescents	Rational Scale	1-5	1.5-4.9	3.58 (.70)	.85
		Experiential Scale	1-5	1.7-5	3.59 (.66)	.84
Communication with Mother as Rated by Emerging Adults	Parent-Adolescent Communication Scale	Openness in Family Communication	10-50	10-50	36.42 (10.21)	.94
		Problems in Family Communication	10-50	12-47	30.32 (7.89)	.82
		Total Score	20-100	26-95	66.57 (16.80)	.92
Communication with Father as Rated by Emerging Adults	Parent-Adolescent Communication Scale	Openness in Family Communication	10-50	10-50	36.42 (10.21)	.92
		Problems in Family Communication	10-50	10-49	30.15 (7.89)	.80
		Total Score	20-100	24-98	63.87 (16.22)	.92

controlled, logic-based, and largely affect free. On the other hand, the experiential scale reflects the intuition-based decision-making process, which is unconscious, automatic, and based on gut feelings and affect (Epstein, 1994; Marks et al., 2008). Each item is rated on a 5-point Likert Scale, where 1 = disagree strongly, 2 = disagree a little, 3 = neither agree nor disagree, 4 = agree a little, and 5 = agree strongly. The scale scores are calculated by computing the means of the scores on items comprising each scale. A higher score on a scale indicates a preference for the particular style of reasoning and decision-making. Following the pilot testing, the authors conducted a study of reliability and validity with 306 students (184 females and 122 males) aged between 13 and 18 years of age from five Australian high schools. The scales showed good internal consistency ($\alpha = .89$ for the rational subscale and $\alpha = .81$ for the experiential subscale). The 5-week test-retest reliability was $r = .98$ for rationality subscale and $r = .95$ for the experiential subscale, thus demonstrating that the measure is fairly stable. The validity analyses showed that higher scores on the rationality subscale were associated with higher performance on deductive reasoning and inductive reasoning tasks, whereas high scores on the experiential subscale were associated with higher emotional expressivity. The measure has also been used with emerging adults, and the reliability coefficients were $.77$ for the experiential scale and $.85$ for the rational scale (Genovese & Little, 2011). The reliability coefficients and the range of scores obtained in the present study are presented in Table 4 on page 46. The reliability for the scales in the present study is good.

Communication with parents- emerging adult report. Communication with parents was assessed using the Parent-Adolescent Communication Scale (Barnes & Olson, 1985). Adolescents and emerging adults completed separate, but parallel forms regarding their communication with their mothers and their fathers. The combined reliability coefficients across the mother and father forms in the original sample of young people aged between 16 and 20 years was $.87$ for open family communication, $.78$ for problems in communication, and $.88$ for the total measure (Barnes & Olson,

2003; Barnes & Olson, 1985). The measure has been extensively used with adolescents and emerging adults (Barnes, Hoffman, Welte, Farrell, & Dintcheff, 2006; Fisher, 1987; Landman-Peeters, Hartman, van der Pompe, den Boer, Masselam, Marcus, & Stunkard, 1990; Rosanti & Marta, 1997). In a study of emerging adults aged between 16 and 19 years, Barnes and colleagues (2006) report a reliability of .91 for the form reporting on communication with mother. In a study of adolescents and emerging adults between the ages of 13 and 26, the reliability for the combined mother and father forms was reported to be .93 (Landman-Peeters et al., 2005). In a study of parent-emerging adult dyads (mean age = 20.3 years), the reliability for the entire measure was .91 (Segrin et al., 2012). Table 4 on page 46 presents the range of possible scores, as well as the reliabilities calculated for the present sample for each questionnaire. The reliability for mother and father forms completed by the adolescent and emerging adult participants is good to excellent.

Think-Aloud Protocol

Vignettes. Consistent with the tradition of Lewis' (1982) methodology, the think-aloud procedure used in the present study involved audio-recorded vignettes in which same-gender peers describe problems that they are experiencing and then ask for the participants' advice on what to do. Vignettes were selected from the Vignettes for the Peer Conformity Scale developed by Santor, Messervey, and Kussumakar (1999). The vignettes describe situations in which adolescents could decide to engage in a risky behaviour (e.g., sexual activity, driving home drunk, smoking). The vignettes appeared to be representative of situations encountered by adolescents, as the percentage of participants reporting experiencing the various vignettes ranged between 21% and 80% (Santor et al., 1999). The authors also documented the convergent validity of Vignettes for the Peer Conformity Scale. Specifically, higher scores were associated with participants' report of risky behaviours such as skipping classes, substance use, alcohol use, theft, and increased number of sexual partners (Santor et al., 1999).

Three vignettes were selected for the current study because they clearly represent a situation in

which the young person is pressured to make a choice, and the outcomes of which could lead him or her to engage in risky behaviour. One of the vignettes described a situation in which peers pressure a young person to engage in sexual activity with a popular peer towards whom he/she feels a romantic attraction, another depicts a situation in which a young person has had too much to drink and is pressured to drive, and the last one involves being pressured to smoke cigarettes. As previous research indicates that both youth and emerging adults are more likely to engage in risky behaviour with peer encouragement (Gardner & Steinberg, 2005), the selected vignettes are likely to represent situations in which individuals are especially vulnerable to risk-taking.

The vignettes were modified for the present study. Specifically, the vignette depicting the sexual situation was modified in order to reflect a gender neutral representation of the popular peer in order to increase the relevance of the vignette for gay, lesbian, bisexual, and transgendered individuals. Additionally, the personal pronouns were changed from second person to first person, with a female voice recording used with female participants and a male voice recording used with male participants in order to enable participants' identification with the individuals reading the vignettes, therefore increasing their comfort to think-aloud and give advice. Two students, a male and a female, were recruited from the Dramatic Arts Program at the University of Windsor on a first-come basis to record themselves using a digital recorder as they were acting the vignette out. They were asked to sign a consent form allowing the researcher to use the recordings for the study (please see Appendix E for the consent form), and were given a 25 dollar gift certificate to the University of Windsor Bookstore in exchange for their assistance. The permission to use and modify the vignettes was obtained from the first author (D. Santor, personal communication, November 18, 2009). Please see Appendix F for the vignettes and the permission to reproduce.

The instructions for the vignettes were elaborated specifically for the present study. Following the guidelines put forth by Ericsson and Simon (1993) for think-aloud protocols, the instructions were brief

and open-ended in order to ensure that the experimental task was as ecologically valid as possible. Consistent with other researchers who used the think-aloud procedure to study adolescents' reasoning (e.g., Blanchard-Fields & Coats, 2008; Blanchard-Fields, Jahnke, & Camp, 1995; Lewis, 1982), participants were asked to listen to the audio-recordings, and help the peer in the vignette with advice about what to do. In order to help participants to provide the most representative responses possible, they were asked to think of friends with similar problems or imagine that they were in the situation. Counterbalancing was used in order to control for the order of presentation of the vignettes.

Transcribing and segmenting procedures. All of the audio-recorded think-aloud protocols were transcribed and separated into vignettes by the researcher. The current guidelines for segmentation of think-aloud protocols stipulate that segments should represent meaningful units big enough to include each coding category of the coding scheme developed for a given study, which often consist of sentences and clauses (Ericsson & Simon, 1993; Van Someren, Barnard, & Sandberg, 1994; Yang, 2003). However, it is also recommended that when the coding process involves tracking of the meaning that is only discernable by combining several clauses and sentences together, it is more useful to group these isolated parts into episodes (Van Someren et al., 1994). The preliminary testing of the coding scheme by the researcher showed that the coding categories are best captured in episodes which contain several sentences and clauses and require tracking of meaning. Therefore, the think-aloud data were grouped into episodes. Specifically, the total response to each vignette was considered to be an episode instead of being segmented into clauses and sentences. The think-aloud data on each vignette from each participant was assigned a random alpha-numerical code (e.g., 101y), and presented in random order to ensure that the coders could not identify the three vignettes that were produced by the same participant. Thus each vignette for each participant was coded independently from the other two vignettes.

Coding categories and variables derived from the think-aloud protocols. The coding categories reflect the conceptualizations of the fuzzy-trace theory. Specifically, the gist and verbatim processing

categories developed by Mills and colleagues (2008) in the context of a self-report measure assessing the use of gist and verbatim processing were adapted to be used as coding categories to code the transcripts for the current study. These categories were theoretically derived from past research, which tested the effect of experimental manipulations such as framing a problem in a certain way on individuals' propensity to take risks (e.g., Reyna & Adam, 2003). Mills and colleagues (2008) used the categories as measures to assess the perception of risk associated with sexual behaviour, where they were demonstrated to be internally consistent and orthogonal. Additionally, endorsement of verbatim processing was positively associated with intentions to engage in risky behaviour, as well as reports of actual risky behaviour (Mills et al., 2008). In contrast, endorsement of gist processing was negatively associated with risky behaviour (Mills et al., 2008). Similar results were replicated by Reyna and colleagues (2011).

Following the work of Mills and colleagues (2008) and Reyna and colleagues (2011), the gist processing category in the present study was divided into three subcategories: categorical risk, which involves focusing on the costs of risky behaviours while ignoring benefits, gist principles, which refers to expression of values and beliefs that inhibit risky behaviour, and global risk, which involves a qualitative conceptualization of risk (Mills et al., 2008; Reyna et al., 2011). The coding scheme with examples of each code is presented in Table 5. Additionally, a test-run of the coding scheme on two pilot protocols indicated that in addition to gist processes that discourage risky behaviours, participants' think-aloud protocols also evidenced gist representations that encourage risky behaviours. Thus, the coding scheme was expanded to include the gist principles that are favourable to risky behaviour.

The verbatim processing category was divided into the subcategories of specific risk, which involves mentioning a specific outcome of risky behaviour on a temporal scale, and quantitative risk, which involves specific probabilities of a potential negative outcome (Mills et al., 2008; Reyna et al., 2011). A final code was included to identify segments that are not codable (i.e., do not reflect verbatim

Table 5

Coding Scheme for Gist and Verbatim Processing in a Think-Aloud Task (Adapted from Mills et al., 2008)

Coding procedure:

1. Read through the entire vignette a least twice.
2. Rate the vignette independently (that is, without discussing it with other coders) on each of the coding categories, according to the following scale:
 - (1) absent (no statements reflecting the coding category)
 - (2) implicitly present (one statement reflecting the coding category)
 - (3) explicitly present-twice (at least two statements reflecting the coding category)
 - (4) explicitly present and dominant (more than two statements reflecting the coding category)

As you do your coding and rating, please underline the statements that go with each rating, and identify the codes on top of the corresponding statements.

Code	Explanation	Examples
Gist Processing Codes		
CR	Gist Processing-Categorical risk	<ul style="list-style-type: none"> • <i>Don't drive while drunk. Take a cab instead. Your life is worth more than money.</i> • <i>You should never drive while drunk.</i> • <i>Even if you use condoms, you'll eventually get an STD if you have sex often enough.</i>
MVF	Gist Processing-Morals and Values Favourable to the Risk	<ul style="list-style-type: none"> • <i>If you feel that smoking is the right choice for you, then you should do it.</i> • <i>If you really feel that this person is the one, even after only two dates, then you should have sex with him/her.</i>

Table 5 (continued)

Table 5 (continues)

Code	Explanation	Examples	Code
MVU	Gist Processing-Morals and Values Unfavourable to Risk	Mentioning values and/or morals in general, or naming specific morals or/and values that discourage risky behaviour.	<ul style="list-style-type: none"> • <i>You have to behave according to your morals and values.</i> • <i>I am responsible to God to wait to have sex.</i> • <i>You have to make sure that this is the right time for you to have sex.</i> • <i>You have to make sure that you are ready for sex.</i> • <i>You have to make sure that you are comfortable having sex with this person.</i>
FC	Gist Processing-Favourable Consequences	Mentioning favourable consequences of the risky behaviour.	<ul style="list-style-type: none"> • <i>Having sex with a girl will make me look cool in front of my friends. Especially if she is attractive.</i> • <i>Having sex is better than losing a relationship.</i> • <i>Driving, even when a little tipsy, can save you time and money. Plus you'll be helping your friends.</i>
UC	Gist Processing-Unfavourable Consequences	Anticipation of unfavourable consequences of the risky behaviour.	<ul style="list-style-type: none"> • <i>Don't ever drive while drunk since you can kill somebody.</i> • <i>Driving drunk is bound to have bad consequences.</i> • <i>Don't have sex with this boy if you're not ready since you might regret it later.</i> • <i>What will your parents think if they found out that you had sex?</i> • <i>You can ruin your reputation if you have sex with this person.</i>
FE	Gist Processing-Favourable Emotions	Mentioning positive emotional outcomes of a risky behaviour.	<ul style="list-style-type: none"> • <i>Having sex is fun.</i> • <i>Smoking makes you feel great.</i>

Table 5(continued)

Table 5 (con't)

	Code	Explanation	Examples
UE	Gist Processing- Unfavourable Emotions	Mentioning negative emotional outcomes of a risky behaviour.	<ul style="list-style-type: none"> • <i>You will feel horrible if you have sex with this boy, and then find out that you're one of the many girls he's doing it with.</i>
GR	Gist Processing-Global Risk	Describing risk as low, medium, or high.	<ul style="list-style-type: none"> • <i>There is a very high risk that you might get a ticket when driving drunk.</i> • <i>If you have unprotected sex with lots of people, you are very likely to get an STD.</i>
Verbatim Processing			
SR	Verbatim Processing: Specific Risk	Mentioning a specific outcome of a risky behaviour on a temporal scale.	<ul style="list-style-type: none"> • <i>If you keep on having sex with random people, you may get an STD in the next 6 months.</i>
QR	Verbatim Processing: Quantitative Risk	Mentioning a specific numerical probability of the outcome of a risky behaviour.	<ul style="list-style-type: none"> • <i>You only have a 25% chance of getting pregnant if you have unprotected sex.</i> • <i>Even if you drive drunk, the chances that the cops will stop you are about 50%/50%.</i> • <i>The risk of getting lung cancer is only 60% if you smoke.</i>
Not Directly Relevant Codes (NDRC)			
NDRC-BO	Behavioural Outcomes	Listing specific strategies/actions the person in the vignette could choose to do. This does not reflect participants' specific perception of the risky situation, or how they determine whether they should engage in it or not.	<ul style="list-style-type: none"> • <i>Explain to them the reasons you don't want to smoke.</i> • <i>You should see if there is someone who can pick you up. Otherwise, you will all have to pitch in for a cab. Or you can stay at the house you're at.</i> • <i>Call your parents, or you can call a cab.</i>

Table 5(continues)

Table 5 (continued)

	Code	Explanation	Examples
	NDRC-R	Repetition	Repetition of a statement, slightly paraphrased or repeated using exactly the same words, that has already been coded. Since the ratings are based on frequency, counting the same statement more than once is likely to misrepresent the participants' use of a particular thinking approach.
			<i>The statement "I wouldn't smoke if you're not a smoker" is coded as MVU. Then, the statement "You're not a smoker, don't do it" is given the code of NC since it expresses the same value in almost the same words.</i>
55	NDRC-AT	Ambiguous and Tangential	Ambiguous or tangential statements that are difficult to understand and classify into any given coding category.
			<ul style="list-style-type: none"> • <i>Or even if your friend brings the lady or the guy, or the lady to you, you can avoid going out with him, going out with her.</i> • <i>I know some people who smoke when they drink and I don't see the point in this.</i>
	NDRC-F	Factual	Statements that reflect facts or opinions that do not fit into any of the coding categories.
			<ul style="list-style-type: none"> • <i>You should not drive because you are not capable of executing this type of motor functions and to stay conscious awake the whole time. You need to use a lot of your parts of your brain and everything else to actually consciously drive correctly, so I would not drive.</i> • <i>Most of the time when you go out and drink, you should have money on you.</i>

or gist processing categories, or emotions) for reliability purposes. The coders coded the responses to each vignette according to the number of statements reflecting separate ideas relating to each coding category on a 4-point scale, with (1) absent (no statement reflecting the coding category), (2) implicitly present (one statement reflecting the coding category), (3) explicitly present (at least two statements reflecting separate ideas relating to the coding category), (4) explicitly present and dominant (more than two statements reflecting separate ideas relating to the coding category). The mean rating score for each coding category was calculated for each vignette for each participant. The gist score was calculated by obtaining the mean rating score across all gist processing categories across vignettes, resulting in an overall gist score for each participant. Similarly, the verbatim score was calculated by obtaining the mean rating score across all verbatim processing categories across coding scheme.

Coding Procedures

Training of coders. The training of the coders was conducted in four stages, following the procedures used in previous research that involved coding of transcribed speech (e.g., Goodwin, 2008). In the first stage, the researcher tested the coding scheme on three transcripts. In the second stage, four undergraduate students in the Psychology (Honours) program were recruited to volunteer as independent coders for the present study. They were briefed by the researcher on the ethical considerations in conducting research, and given a document outlining the ethical guidelines for conducting research published by the Canadian Psychological Association and the American Psychological Association. They met as a group with the researcher and were provided with an explanation of the coding scheme. They were also given the opportunity to practice on one of the transcripts already coded by the researcher. In the third stage, in keeping with the procedures typically used in research employing the think-aloud methodology (e.g., Blanchard-Fields, Stein, & Watson, 2004), the coders independently coded the transcripts of 19 participants in batches of four to five participants, with one batch coded every week. Specifically, once the protocols for five participants

were transcribed and coded, the researcher and coders met to discuss the discrepancies. This was done in order to monitor the coders' use of the coding scheme, and to address any issues with coding. Nine protocols were only used to train coders and were used to establish reliability, but were excluded from the main analyses because participants did not meet the age criteria. The protocols of the remaining ten participants were used in establishing reliability and were included in the main analyses.

As the coders applied the coding scheme to the data and became increasingly familiar with it, it became apparent that it was difficult to classify the data into a general "No Code" category. Therefore, the "No Code" category was refined and divided into four different categories: Not Directly Relevant Code-Behavioural Outcome, Not Directly Relevant Code-Repetition, Not Directly Relevant Code-Factual, and Not Directly Relevant Code- Ambiguous/Tangential. This modification made it easier to code data not directly relevant to the cognitive processes captured by the theoretical concepts in the coding scheme.

The data included in the main analyses were divided into 7 batches, each containing the transcripts of all three vignettes for 10 to 19 participants. The first of the 7 batches was rated by all four raters, whereas the remaining 6 batches were coded by different combinations of two coders. Specifically, the four coders were grouped together in the six possible ways, with each pair being assigned one-sixth of the data to code. The data were coded in batches of ten to fourteen, with approximately one batch being coded every week. Once each batch was coded, the coders met to discuss their coding and the discrepancies. The researcher was also present at these meetings in order to record the coding that each coder performed independently, as well as the agreements they came to as a result of the discussion of the discrepancies. Moreover, the researcher was present in order to break a tie in the event that the raters were not able to resolve a disagreement. As a rule, the researcher did not become involved in the discussions between coders as they were able to resolve most of the

discrepancies independently. The researcher had to break a tie only on three occasions throughout the coding process.

Intraclass correlations and percent agreement between raters. The inter-rater reliability between coders was obtained for each set of coders by calculating the intraclass correlation coefficient (ICC). While Pearson's product-moment correlation has at times been used to document reliability in the case of continuously coded data (e.g., Blanchard-Fields, 1986), this practice has been discouraged by many authors (e.g., Bedard, Martin, Krueger, & Brazil, 2000; Cicchetti, 1994). In contrast to Pearson's product-moment correlation, the ICC differentiates between the ratings made by different pairs of raters, as well as the agreement between raters, and corrects for the inter-rater agreement expected on the basis of chance alone (Cicchetti, 1994), which makes it a more useful reliability index to use. Therefore, this reliability index is argued to be most applicable to data coded on a continuous scale, and its use is recommended with this type of data (McGraw & Wong, 1996).

The intraclass correlation is the ratio of the variance that is attributable to true differences between participants on a particular characteristic over the sum of variance related to differences among participants plus error (McGraw & Wong, 1996; Shrout & Fleiss, 1979). The ICC is calculated by conducting an ANOVA with the ratings as the dependent variable and the raters as the independent variable. The resulting mean squares between and within subjects were used to calculate the ICC (Shrout & Fleiss, 1979). McGraw and Wong (1996) describe several models that can be used to calculate the ICC depending on the data and the study design. In the present study, ICC was calculated by using the random two-way ANOVA model, which accounts for differences in ratings between participants and between raters, as well as allowing for generalization of the coding scheme to any coder trained on the present coding scheme and the generalization of the results to the population.

The ICC calculated in the context of the present study can be interpreted as the absolute agreement for ratings that are averaged across raters and participants. The proposed guidelines to

evaluate the level of agreement represented by the ICC state that a coefficient below .40 indicates poor agreement, coefficients between .40 and .59 indicate fair agreement, coefficients between .60 and .74 indicate good agreement, whereas a coefficient of .75 and above indicates excellent agreement (Cicchetti, 1994).

The ICC calculated on the pilot data for training are displayed in Table G1 in the Appendix G. As can be seen, the ICC for the overall gist score, range between .41 (fair) and .81 (excellent). Examination of the data revealed that the coding categories included in the overall verbatim score were almost always given the same ratings by the coders, and therefore were characterized by lack of variability and very restricted range of scores. Specifically, they were mostly rated as (1), which indicates that all coders agreed that no statements in the participants' think-aloud were representative of this coding category. As noted by Bedard and colleagues (2000), some amount of between-subject variability in scores is necessary to calculate the ICC, and the homogeneity of scores between participants can often lead to a low ICC or difficulties in obtaining an ICC. Thus, it was not possible to calculate the ICC for the overall verbatim score. Upon examination of frequencies of scores associated with the different coding categories, it was determined that the verbatim processing was evidenced only by two participants. Given the insufficient use of verbatim processing in the present sample, it was not possible to conduct the planned analyses that included this variable. Instead, verbatim data were examined qualitatively.

In order to provide an additional reliability estimate for the overall verbatim score, in which the homogeneity of ratings prevented the calculation of the ICC, the percent agreement (PA) between the raters was also calculated. In addition, calculating the percent agreement for both verbatim and gist scores allowed for reliability comparisons across these categories of processing. The percent agreement was calculated by adding the number of times the same rating was given by the raters, then multiplying the number by a hundred and dividing the result by the number of coders. Percent agreement was

calculated for each coding category, each vignette, each participant and each set of coders. The results were then averaged out for each coding category for each vignette across all the participants rated by each set of coders. An average percent agreement was then obtained for each coding category across vignettes across all participants for each set of coders. The final percent agreement was obtained by calculating the average of the percent agreement across all the coding categories that were included in the gist and verbatim variables for each set of coders. The percent agreement was 87.5% for overall gist score and 99.7% for the overall verbatim score. Both ICC and percent agreement for each coding pair across vignettes are presented in Table 6.

Adjusted think aloud variables used in analyses. Given the fact that the protocols varied in length, it was necessary to account for the variability in participants' verbal output by creating ratio variables, as is the standard practice in research utilizing think-aloud protocols (e.g., Boschhuizen & Schmidt, 1990; Cromley, Snyder-Hogan, Luciw-Dubas, 2010; Wong & Watt, 1990). Following the procedure outlined in previous studies (Marian & Kauchanskaya, 2004; Schmitter-Edgecombe & Bales, 2005), the total number of words that comprise the statements representing each coding category was divided by the total number of words produced in response to each vignette to create ratio variables. This was done for overall gist processing, as well as gist processing favourable and unfavourable to risk across vignettes for each participant. Thus, the three variables created were: word count ratio-gist (total number of words coded across the coding categories representing gist processing divided by the total number of words), word count ratio-gist favourable to risk (total number of words coded across the coding categories representing gist processing that discourages risky behaviours divided by the total number of words), and word count ratio-gist unfavourable to risk (total number of words coded across the coding categories representing gist processing that encourages risky behaviours divided by the total number of words). The think-aloud study variables, other variables used in the analyses, and the associated abbreviations are presented in Table 7.

Table 6

Psychometric Characteristics of the Coding Variables Derived from the Think-Aloud Procedure (n=101)

Variables	Raters													
	1,2,3,4		1 and 2		1 and 3		1 and 4		2 and 3		2 and 4		3 and 4	
	ICC	PA ^a	ICC	PA	ICC	PA	ICC	PA	ICC	PA	ICC	PA	ICC	PA
Verbatim FS	N/A	99.6%	N/A	100%	N/A	100%	N/A	98.8%	N/A	100%	N/A	100%	N/A	100%
Gist FS	.81	89.0%	.41	87.1%	.69	90.6%	.50	83.9%	.69	85.9%	.51	87.9%	.45	88.1%
Not Directly Relevant Code Categories FS	.79	70.3%	.89	71%	.81	65%	.81	72%	.80	70.2%	.72	70.2%	.69	64.7%

Note: FS = Frequency Score; ICC = Intraclass Correlations; PA = Percent Agreement

Table 7
Study Variables

Variable Name	Abbreviation	Explanation
Self-Report-Experiential	SR-Experiential	Score on Rational-Experiential Inventory: Experiential Scale
Self-Report-Analytical	SR-analytical	Score on Rational-Experiential Inventory: Analytical Scale
Word Count Ratio-Gist	WCR-Gist	Ratio of words coded as part of the overall gist divided by total number of words in the Think Aloud protocol
Word Count Ratio-Gist Unfavourable to Risk	WCR-GUR	Ratio of words coded as part of the gist processing categories that discourage risk-taking divided by total number of words in the Think Aloud protocol
Word Count Ratio-Gist Favourable to Risk	WCR-GFR	Ratio of words coded as part of the gist processing categories that encourage risk-taking divided by total number of words in the Think Aloud protocol
Risk Factors	RF	Risk Factors score on the Communities that Care Youth Survey
Protective Factors	PF	Protective Factors score on the Communities that Care Youth Survey
Communication with Mother-Emerging Adult Report	CM-EA	Score on the Parent-Adolescent Communication Scale as reported by emerging adults regarding their mother
Communication with Father-Emerging Adult Report	CF-EA	Score on the Parent-Adolescent Communication Scale as reported by emerging adults regarding their father
Recent Risky Behaviours	Recent RB	Score on risky behaviours participants engaged in within the past month
Lifetime Risky Behaviours	Lifetime RB	Score on risky behaviours participants engaged in within their lifetime

CHAPTER III

RESULTS

Preliminary Analyses

Data screening and assumption testing. Prior to conducting the planned analyses, the data for the 125 participants included in the current analyses were screened for missing data. The missing data were handled according to the procedure recommended by Tabachnik and Fidell (2007). The SPSS MVA (Missing Values Analysis) command was used to determine whether the patterns of missing data are systematic or random since the latter causes fewer problems. The Little MCAR test was non-significant, which indicated that the data were missing at random. The expectation maximization procedure (EM) was used to estimate and fill in the missing values. The EM is an iterative procedure available in SPSS that derives missing data values based on the normal distribution and estimation of parameters.

The means and standard deviations of variables derived from questionnaires are presented in Table 4 on page 49. The means and standard deviations obtained from the think aloud protocol are presented in Table 8. Data were also screened for normality and univariate outliers on all the variables included in the planned analyses. The distribution of each variable was examined using frequencies, histograms, as well as indices of skewness and kurtosis. Additionally, z-scores were calculated in order to identify univariate outliers. In order to obtain an index of skewness and kurtosis, the procedure outlined by Field (2009) was used. Specifically, the skewness and kurtosis statistics for each variable were divided by their respective standard error statistics, and the result was compared to the cut-off of ± 3.29 (Field, 2009). Thus, any of the values lower than -3.29 and higher than 3.29 were considered as problematic, and as indicative of the violation of the assumption of normality.

The analysis revealed that risk factors, WCR-gist favourable to risk, recent risky behaviours, and

Table 8

Means and Standard Deviations for Variables Derived from the Think-Aloud Protocol (n =101)

Variable	Theoretical Range	Actual Range	<i>M</i>	<i>SD</i>
Overall Gist Scores	1-4	1-1.79	1.28	.16
Overall Verbatim Scores	1-4	1-1.17	1.01	.02
WCR-Gist	.00-1	.00-.94	.45	.16
WCR-Gist Unfavourable to Risk	.00-1	.00-.83	.41	.16
WCR-Gist Favourable to Risk	.00-1	.00-.32	.04	.06

Note: WCR = Word Count Ratio.

lifetime risky behaviours variables displayed problematic skewness and kurtosis. The distributions of all three variables were screened for outliers, using Field's (2009) cut of ± 3.29 . No outliers were found. The natural log, square root, and inverse transformations were attempted. The natural log transformation was successful at correcting the distribution for risk factors, whereas the inverse transformation was successful at correcting the distribution for lifetime risky behaviours. The transformations were unsuccessful at correcting the distribution for WCR-gist favourable to risk and recent risky behaviours. When transformations are not successful at correcting the distribution, it is recommended that the bootstrapping technique be used in the multiple regression analyses (Field, 2009; D. Jackson, personal communication, December 12, 2012). The bootstrapping method consists of estimating the properties of the distribution of the population from which the sample came using the sample data. Thus, the sample data are treated as the population from which smaller samples (bootstrap samples) are derived. The statistic of interest (Beta) is calculated in each sample, and an overall statistic is derived based on the statistics from each individual sample.

Prior to conducting the analyses, the data were screened to determine whether they met the assumptions for multiple regression analyses. The assumption testing was conducted for each regression analysis separately, and the transformed versions of risk factors and lifetime risky behaviours were used. The bootstrapping method was used in regressions in which WCR-gist favourable to risk and recent risky behaviours were the outcome variables.

The assumption of sufficient sample size was assessed using the formula recommended by Green (1991) for testing the fit of the overall model: $50 + 8k$. According to this formula, the minimum sample size for a regression that includes five predictors is 90 participants, which is exceeded by the sample of 125 participants whose data were used to test the first two hypotheses. Similarly, the sample of 101 participants used to test the remaining hypotheses exceeds the minimum of 82 participants needed to conduct a regression analysis with four predictors.

In order to identify outliers on predictors and outcome variables, the Leverage statistic was examined. Following the equation for the Leverage statistic $(3(k+1)/N)$, the cut-offs of .14 and .15 were calculated for the first two hypotheses and the remaining hypotheses, respectively. No cases above these cut-offs were identified. The data were also screened for influential observations by examining the DIFFIT and Cook's distance statistics. Any DIFFIT values above 2 and Cook's distance values above 1 are considered to be influential observations (Tabachnik & Fidell, 2007). No values above these cut-offs were identified. The assumption of independence of errors was tested using the Durbin-Watson test and considered met since the value was within the recommended range of 1 to 3 (Field, 2009). The assumption of absence of multicollinearity and singularity was met since the VIF value was lower than 1 and the tolerance value above 0.1 (Tabachnik & Fidell, 2007). Thus, the predictors offer a sufficient amount of unique contribution to change in the dependent variable. In order to test for the assumption of linearity, stating that the relationship between the independent and dependent variables is linear, the shape of the scatterplot was examined. The roughly rectangular shape of the scatterplot indicates that the assumption was met. Finally, the data were screened for the assumption of absence of homoscedasticity by examining the scatterplot of residuals. The band that contains the residuals is approximately equal in width at all values of the outcome variable. Thus, this assumption is considered to be met. The assumption of univariate normality was met for all variables after transformations were applied.

Preliminary testing. The think-aloud data were analysed to determine whether the order of presentation of vignettes had an effect on WCR-gist. The sample sizes in each cell were unequal, and the ratio of largest to smallest sample cell size was 9, which is considerably larger than the cut-off of 1.5 recommended by Stevens (2007). This is considered a large discrepancy that is likely to seriously undermine the results of parametric tests by threatening the homogeneity of variance, which is an important assumption of tests assessing mean differences (Stevens, 2007; Tabachnik & Fidell, 2007).

The use of non-parametric tests has been advised in these circumstances (Field, 2009). As such, the non-parametric equivalent of ANOVA, the Kruskal-Wallis test, was used to analyze order-related effects on WCR-gist. Three Kruskal-Wallis tests were conducted by entering order as the grouping variable and each of the coding variables as the independent variable. The test yielded non-significant results, with $H(4) = .95, p > .05$, suggesting that there is no difference in WCR gist based on the order of vignette presentation.

Correlational analyses were conducted for all the test variables (see Table 9 for the correlation matrix). As can be seen, the demographic variables of age and gender were significantly correlated with study variables. Specifically, age was significantly positively related to risk factors, as well as lifetime and recent risky behaviours. Age also showed a trend towards a negative correlation with protective factors. Gender was positively related to the think aloud variables WCR-gist and WCR-gist unfavourable to risk with females demonstrating a relatively higher proportion of gist. Gender demonstrated a trend towards a negative correlation with SR-analytical with females evidencing lower self-reported use of rationality in decision-making than males. Thus, gender was included as a control variable in the main regression analyses in which SR-analytical, WRC-gist, and WCR-gist unfavourable to risk were the outcomes. Age was included as the control variable in regressions analyses predicting recent and lifetime risky behaviours. Communication with mother and father as reported by young adults were positively correlated with each other, as well as demonstrating a consistent pattern of correlations with risk and protective factors.

Specifically, both were positively correlated with protective factors and negatively related to risk factors, with communication with mother as reported by emerging adults exhibiting a trend towards significance. As expected, risk and protective factors were significantly negatively correlated with each other. In addition, risk factors were significantly positively correlated with SR-experiential, as well as lifetime and recent risky behaviours. Protective factors were positively correlated with SR-analytical

Table 9

Zero-Order Correlations between Study Variables (N = 125)

	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	—											
2. Gender	.02											
3. CM-EA	.13	-.04										
4. CF-EA	-.01	-.09	.34**									
5. RF	.21*	.03	-.15 [†]	-.29**								
6. PF	-.15 [†]	.06	.29**	.41**	-.55**							
7. SR-Analytical	-.04	-.16 [†]	.02	.07	-.10	.26**						
8. SR-Experiential	.02	.14	-.07	.07	.24**	-.01	.27**					
9. WCR-Gist	.03	.28**	-.15	-.11	.11	-.19	-.05	-.10				
10. WCR-GUR	-.02	.23*	-.12	-.09	.11	-.16	-.03	-.04	.92**			
11. WCR-GFR	.11	.14	-.10	-.04	-.02	-.08	-.07	-.15	.22**	-.18 [†]		
12. Lifetime RB	.32**	-.02	-.14	-.13	.71**	-.44**	-.03	.26**	.12	.10	.06	
13. Recent RB	.27**	-.03	-.10	-.12	.76**	-.36**	-.10	.22**	.09	.06	.06	.78**

Note. CM-EA = Communication with Mother-Emerging Adult Report; CF-EA = Communication with Father-Emerging Adult Report, RF = Risk Factors, PF = Protective Factors, SR = Self-Report, WCR = Word Count Ratio, GUR = Gist Unfavourable to Risk, GFR = Gist Favourable to Risk, RB=Risky Behaviours,. * $p < .05$, ** $p < .01$, [†] $p < .10$

and negatively correlated with lifetime and recent risky behaviours. SR-analytical and SR-experiential were positively correlated with each other. SR-experiential was positively correlated with lifetime and recent risky behaviours. Lifetime and recent risky behaviours were significantly positively correlated with each other.

In addition to the correlational analyses, t-tests were conducted in order to determine whether there are significant differences between males and females on study variables (see Table 10 for results). The t-tests yielded significant differences on WCR-gist and WCR-gist unfavourable to risk, with female participants scoring significantly higher than males on these variables. The t-test testing gender differences on SR-analytical demonstrated a trend towards significance, with males scoring higher than females.

Description of pattern of results from the think-aloud procedure. Prior to testing the hypotheses related to the think-aloud variables, the data from think-aloud protocols were examined in terms of use of processes associated with different coding categories in response to each vignette. As can be seen from Table 11, which displays the means and standard deviations by code and vignettes, several codes were very rarely, if at all, reflected in participants' think-aloud protocols as they engaged in decision-making processes. Specifically, the processes related to codes of favourable consequences of risk (FCR), favourable emotions towards risk (FER), which are part of gist processes, as well as global risk (GR), specific risk (SR), and quantitative risk (QR), which are part of verbatim processes, were largely absent from the verbalizations. Across vignettes, appealing to morals and values unfavourable towards risk (MVUR) was the most frequent process used by participants, followed by thinking of the unfavourable consequences of risk (UCR) and using categorical reasoning (CR).

Smoking vignette. For the smoking vignette, participants most often engaged in thinking that reflects morals and values unfavourable to risk, as well as unfavourable consequences. In terms of morals and values unfavourable to risk, individuals' think-aloud protocols reflect the belief that

Table 10

Descriptives and Gender Differences by Study Variables

Variable	Male	Female	<i>t</i> (123)	<i>P</i>	95% CI	
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)			<i>UL</i>	<i>LL</i>
CM-EA	68.12(17.30)	66.22 (16.76)	.49	.63	-5.81	9.60
CF-EA	66.79(18.07)	63.20 (15.79)	.96	.34	-3.82	11.00
RF	48.34(6.87)	48.89 (6.30)	-.37	.71	-3.49	2.38
PF	35.70 (5.49)	36.40 (4.35)	-.66	.51	-2.79	1.39
Lifetime RB	17.53 (6.82)	17.51(6.08)	.01	.99	-2.82	2.89
Recent RB	27.06 (5.07)	26.68 (5.06)	.33	.74	-1.99	2.79
WCR-Gist ^a	.36 (.16)	.47 (.15)	-2.94	.004	-.19	-.03
WCR-Gist-UR ^a	.33 (.17)	.43 (.16)	-2.33	.02	-.17	-.01
WCR-Gist-FR ^a	.02 (.04)	.04 (.06)	-1.42	.16	-.05	.01
SR-Analytical	3.82 (.55)	3.52 (.74)	1.78	.08	-.03	.61
SR-Experiential	3.39 (.67)	3.63 (.65)	-1.63	.11	-.54	.05

Note. ^a*t*(99); CI = confidence interval, *LL* = lower limit, *UL* = upper limit, CM-EA = Communication with Mother-Emerging Adult Report, CF-EA = Communication with Father-Emerging Adult Report, RF= Risk Factors, PF = Protective Factors, WCR = Word Count Ratio, RB = Risky Behaviours, UR = Unfavourable to Risk, FR = Favourable to Risk, SR = Self-Report.

Table 11
Means and Standard Deviations by Coding Category in Think-Aloud Protocols (n = 101)

Variable	Smoking		Drinking and Driving		Sexual Situation		Across Vignettes	
	M(<i>SD</i>)	Range	M(<i>SD</i>)	Range	M(<i>SD</i>)	Range	M(<i>SD</i>)	Range
Categorical Risk	1.14 (.38)	1-3	1.62 (.68)	1-4	1.09 (.30)	1-2	1.29 (.34)	1-2.67
Moral and Values Favourable to Risk	1.10 (.33)	1-3	1.02 (.17)	1-2	1.34 (.55)	1-3	1.15 (.22)	1-2
Moral and Values Unfavourable to Risk	2.29 (.97)	1-4	1.28 (.62)	1-4	2.77 (1.04)	1-4	2.11 (.62)	1-4
Favourable Consequences of Risk	1.01 (.10)	1-2	1 (.00)	1-1	1.01 (.10)	1-2	1.01(.04)	1-1.33
Unfavourable Consequences of Risk	1.48 (.79)	1-4	1.98 (1.08)	1-4	1.38 (.83)	1-4	1.61 (.65)	1-3.67
Unfavourable Emotions Towards Risk	1.02 (.14)	1-2	1.04 (.21)	1-2	1.17 (.46)	1-4	1.08 (.19)	1-2.33
Favourable Emotions Towards Risk	1 (.00)	1-1	1 (.00)	1-1	1 (.09)	1-2	1.01 (.03)	1-1.33
Global Risk	1 (.00)	1-1	1 (.00)	1-1	1.01 (.09)	1-2	1.00 (.03)	1-1.33
Specific Risk	1 (.00)	1-1	1 (.00)	1-2	1 (.00)	1-1	1.00 (.03)	1-1.33
Quantitative Risk	1 (.00)	1-1	1 (.00)	1-1	1 (.00)	1-1	1.00 (.00)	1-1

even in a situation of peer pressure, a good friend should respect one's beliefs.

You respect her ways of choosing to smoke, she should respect yours with the fact that you don't want to smoke (female). (MVUR)

If she was your true friend, and you were really good friends, she should understand that you don't smoke and that you wouldn't want to try smoking (female). (MVUR)

Additionally, values discouraging of smoking also involved the necessity to care for one's health.

You have to do what's right for your health (female). (MVUR)

Statements reflecting consideration of unfavourable consequences of risk included mention of specific health-related problems.

It's not healthy, it causes a lot of damage to your body (female). (UCR)

Participants also produced statements that reflect categorical risk, mostly reflecting the belief that it is not worth it to engage in smoking simply to comply to peer pressure and gain peer approval. Moreover, participants expressed the idea of avoiding risk at all cost.

It's not worth looking cool to your friend (male). (CR)

Avoid him, stay away from him (male). (CR)

In terms of gist categories that encourage risk-taking, some participants produced statements reflective of the morals and values favourable towards risk. Specifically, some expressed the belief that one should engage in smoking as long as it satisfies one's own needs and desires.

If you want to smoke, then smoke (male). (MVFR)

If you yourself really really want to try what smoking is like, then you should try it (female). (MVFR)

Additionally, statements that reflect favourable consequences of risk as applied to smoking were highlighted by participants.

Consider what social benefits it may have (male). (FCR)

While verbatim processes were very rarely used by participants in the present study, there was a statement that reflected the specific risk coding category, highlighting the increased probability of specific negative health consequences of smoking.

And I know there's studies that say that smoking increases your likelihood for lung cancer (female). (SR)

Drinking and driving vignette. A similar pattern was evident for the vignette featuring drinking and driving. In terms of morals and values unfavourable to risk, participants simply stated the belief that this behaviour was not right.

Drinking and driving is so wrong (female). (MVUR)

Since they're urging you on and you know that it's not right, you should be the one to tell them that it's wrong (female). (MVUR)

Participants also described unfavourable consequences of risk of drinking and driving.

If you get caught, you can also go to jail and that can actually ruin your life (female). (UCR)

You're putting yourself at risk for getting into an accident, hurting your friends, hurting yourself (female). (UCR)

Categorical risk was used the most when responding to this vignette. Participants expressed strong opinions about the risks of this behaviour.

Never get behind the wheel when you're drunk, never (female). (CR)

(Talking about taking a cab) While it might be a little bit more expensive, I believe safety is more important than putting yourself at risk (female). (CR)

You're not only putting yourself at risk, but also the people you are driving with you (male). (CR)

The category of global risk (GR) was also reflected in participants' think-aloud protocols in response to this scenario, which emphasized the high risk of this behaviour.

Even though you're not drunk, you're sober, you're still under the influence and it's very hazardous (male). (GR)

In a related fashion, participants also often mentioned unfavourable emotional consequences of risk that are associated with the risk of drinking and driving.

You know, if anything were to happen to any of you, God forbid, or to somebody else, the guilt would be astronomical (female). (UER)

A statement reflecting the quantitative risk category was also produced in response to this vignette, with an emphasis on the prevalence of mortality related to drinking and driving.

Drinking and driving is one of the number one causes of death in teens especially (female). (QR)

Sexual situation vignette. Finally, the responses to the vignette describing a sexual situation reflected several different codes. Specifically, the morals and values favourable to risk and morals and values unfavourable to risk, as well as categorical reasoning were often reflected in participants' verbalizations to this vignette. Additionally, the coding category of emotions unfavourable to risk was frequently produced in response to this vignette.

With respect to morals and values unfavourable to risk, participants emphasized that one should only engage in sexual activity because of self-determined motives (i.e., being ready), as opposed to being pressured by others, and that a brief encounter is not enough for that.

From one date, you clearly can't be in love (female). (MVUR)

I don't think you should go for that on your first date and you don't feel comfortable (female). (MVUR)

Additionally, participants' responses also reflected the value of resisting peer pressure.

I wouldn't lose my virginity to a guy because my friends told me I should (female). (MVUR)

If you don't want it and you're doing it based on peer pressure, then obviously you should say no and he should respect that (female). (MVUR)

Participants' mention of categorical risk was mostly related to the initiation of sexual activity not being worth the potential negative consequences it could be associated with.

It's not worth getting yourself harmed in any way for it (female). (CR)

The unfavourable emotions towards risk with negative consequences listed by participants were often emotional.

You could really regret it afterwards if you didn't feel ready or you didn't feel comfortable doing it (female). (UER)

Additional unfavourable consequences of risk included health problems and pregnancy.

Along with putting yourself at risk for pregnancy, another really big one that people tend to overlook, especially young kids, is sexually transmitted diseases (female). (UCR)

With respect to coding categories that encourage risky behaviour, participants' think-aloud in response to this vignette at times contained statements that reflected the favourable consequences of risk, especially in terms of social benefits and personal enjoyment of an attractive sexual partner.

You know the benefits (favourable consequences of risk, female). (FCR)

That way, it will not ruin your popularity or your friendship with your friends (male).

(FCR)

Yes, I would have sex with her, especially if she is attractive (male). (FCR)

Additionally, some participants' responses contained statements that reflect the morals and values favourable to risk coding category. Specifically, some individuals emphasized the needs and desires of the protagonist in the dilemma.

If you want to sleep with the person, then by all means, you could do that (female).

(MVFR)

Main Analyses

The main analyses were comprised of two sets of multiple regressions analyses. The first set of analyses consisted of determining whether the analytical-experiential theory or the fuzzy-trace theory is supported by the pattern of associations between the background predictor variables and decision-making outcome variables. The predictor variables were risk and protective factors, communication with mother and father, and gender, which was a control variable. The outcome variables were SR-analytical, SR-experiential, based on the self-report data, and WCR-gist, WCR-gist unfavourable, and WCR-gist favourable, based on the think aloud data. In the second set of analyses, the regression analyses consisted of determining which of the two theories is supported by the pattern of associations between the decision-making variables from the think aloud data, which were entered as predictors (i.e., WCR-gist, WCR-gist unfavourable to risk, WCR-gist favourable), and the risky behaviour variables, which were entered as outcomes (i.e., recent risky behaviours and lifetime risky behaviours).

Hypothesis 1: Self-report analytical. The first hypothesis aimed to test whether the risk and protective factors, as well as communication with parents as reported by emerging adults would predict SR-analytical. Moreover, the pattern of relations between the predictors and SR-analytical was also examined in order to determine whether the analytical-experiential theory or the fuzzy-trace theory is supported. According to the analytical-experiential theory, rational decision-making is associated with optimal decisions (Klaczynski, 2001a, 2001b). Thus, based on the analytical-experiential theory, it was expected that SR-analytical would be positively associated with protective factors and communication with mothers, and negatively associated with risk factors. In contrast, based on the fuzzy-trace theory (Reyna & Brainerd, 1992, 2011), SR-analytical would be expected to be negatively associated with protective factors and communication with mother, and positively associated with risk factors.

A hierarchical regression was conducted with gender entered in the first step, whereas number of

risk factors, protective factors, communication with mother and father as reported by emerging adults were entered in the second step. SR-analytical was entered as the outcome variable. Table 12 displays the unstandardized regression coefficients (B), the standardized regression coefficients (β), the semipartial correlations, R^2 , change in R^2 , and change in F after entry of all independent variables. The overall model was significant, with $F(7, 127) = 2.37, p < .05$, thus indicating that gender, risk factors, protective factors, communication with mother and father as reported by emerging adults as a group significantly predicted SR-analytical. An examination of the β coefficients indicates that gender and protective factors significantly predicted change in SR-analytical, with the gender displaying a negative relation, indicating that male participants scored higher than female participants on SR-analytical. Protective factors exhibited a positive relation with SR-analytical. The squared semipartial correlations were also examined in order to determine the unique variance in the dependent variable associated with each independent variable. As can be seen in Table 12, protective factors and gender accounted for 7% and 3% of variance in total score in SR-analytical, respectively. These results lend support for the analytical-experiential theory as opposed to the fuzzy-trace theory since higher use of rationality in decision-making is associated with higher endorsement of protective factors.

Hypothesis 2: Self-report experiential. The second hypothesis focused on testing whether the self-reported use of experiential processing would be associated with risk and protective factors and communication with parents. Additionally, the patterns of relations between the variables were examined to determine whether the analytical-experiential or the fuzzy-trace theory is supported. Based on the analytical-experiential theory (Klaczynski, 2001a, 2001b), it would be expected that SR-experiential would be positively related to risk factors, and negatively related to protective factors and communication with mothers. In contrast, according to the fuzzy-trace theory (Reyna & Branerd, 1992, 2011), SR-experiential would be expected to be positively related to protective factors and communication with mother, and negatively related to risk factors.

Table 12

Summary of the Hierarchical Regression Predicting SR-Analytical from Risk and Protective Factors, and Communication with Mother and Father as Reported by Emerging Adults (N = 125)

Predictor Variables	R^2 change	B	$SE B$	β	sr^2	F change
Step 1						
Gender		-.35	.16	-.19	.04*	
Step 2						
	.08					2.77*
Gender		-.35	.16	-.19	.03*	
Risk Factors		1.16	1.37	.09	.005	
Protective Factors		.06	.02	.35	.07**	
CM-EA		-.01	.01	-.06	.003	
CF-EA		-.01	.01	-.04	.001	
Final Model	$R^2 = .11, F(5, 124) = 2.89^*$					

Note. CM-EA=Communication with Mother-Emerging Adult Report; CF-EA = Communication with Father-Emerging Adult Report; B = unstandardized regression coefficient, $SE B$ = standard error of the regression coefficient, β = standardized regression coefficient, sr^2 = squared semipartial correlation.

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

Since gender and age were not significantly correlated with SR-experiential, there was no need to control for these variables and they were not included in the regression analysis (see Table 9 on page 68 for correlation coefficients). Therefore, a standard regression was conducted with number of risk factors, protective factors, and communication with mother and father as reported by emerging adults entered as predictors, and SR-experiential was entered as the outcome variable. Table 13 displays the unstandardized regression coefficients (B), the standardized regression coefficients (β), the semipartial correlations, R^2 , and change in R^2 . The overall model was significant, with $F(4, 124) = 3.56, p < .05$, which demonstrates that risk factors, protective factors, and communication with mother and father as reported by emerging adults as a group significantly predicted SR-Experiential. The β coefficients show that risk factors was the only significant predictor of SR-experiential, and it exhibited a positive relation with the outcome variable. As can be seen in Table 13, the squared semi-partial correlation associated with risk factors indicates that this variable accounted for 9% of variance in total score in SR-Experiential. These results support the analytical-experiential theory as opposed to the fuzzy-trace theory since a higher self-reported use of intuition in decision-making was associated with more endorsement of risk factors.

Hypothesis 3: Gist processing. The focus of hypothesis 3 was to determine whether the risk and protective factors and communication with parents predicted WCR-Gist. Based on the analytical-experiential theory (Klaczynski, 2001a, 2001b), it would be expected that WCR-gist would be positively associated with risk factors and negatively associated with protective factors and communication with mother. In contrast, according to the fuzzy-trace theory (Reyna & Brainerd, 1992, 2011), WCR-gist would be expected to be positively associated with protective factors and communication with mother, and negatively associated with risk factors.

A hierarchical regression was conducted with gender entered in the first step, whereas number of risk factors, protective factors, communication with mother and father as reported by emerging adults

Table 13

Summary of the Standard Regression Predicting SR-Experiential from Risk and Protective Factors, and Communication with Mother and Father as Reported by Emerging Adults (N = 125)

Predictor Variables	<i>B</i>	<i>SE B</i>	β	<i>sr</i> ²
Risk Factors	4.38	1.25	.34	.09**
Protective Factors	.03	.02	.17	.01
CM-EA	-.01	.01	-.10	.008
CF-EA	.01	.01	.14	.01

$$R^2 = .11, F(4, 124) = 3.57^*$$

Note. CM-EA = Communication with Mother-Emerging Adult Report; CF-EA = Communication with Father-Emerging Adult Report; *B* = unstandardized regression coefficient, *SE B* = standard error of the regression coefficient, β = standardized regression coefficient, *sr*² = squared semipartial correlation.

**p* < .05

***p* < .01

were entered in the second step. WCR-gist was entered as the outcome variable. Table 14 displays the unstandardized regression coefficients (B), the standardized regression coefficients (β), the semipartial correlations, R^2 , change in R^2 , and change in F after entry of all independent variables. The overall model was significant, with $F(5, 100) = 3.05, p < .05$, thus indicating that gender, risk factors, protective factors, and communication with mother and father as reported by emerging adults as a group significantly predicted WCR-gist. An examination of the β coefficients indicates that gender was the only variable that contributed to significant change in WCR-gist and displayed a positive relation with the outcome, indicating that female participants scored higher than male participants on this variable. The squared semipartial correlation associated with gender indicates that it accounted for 9% of variance in WCR-gist.

Follow-up: Backwards entry regression. Since the results of the hierarchical regression were unclear (i.e., the overall model was significant, but the hypothesized predictors were not), an additional regression analysis was conducted. Specifically, a backwards entry model was used in order to determine the best model predicting WCR gist while controlling for suppressor effects (Field, 2007). The predictors were entered using the backwards entry method, while WCR-gist was entered as the outcome variable. The final model is presented in Table 15.

As can be seen, gender and protective factors were selected as the best predictors of WCR-gist, with $F(2, 100) = 7.25, p < .05$. Gender was positively related to the outcome variable, thus indicating that females scored higher than males on WCR-gist. Protective factors were negatively related to the outcome variable. An examination of the β coefficients indicates that gender and protective factors accounted for 9% and 4% of variance in WCR-gist, respectively. These results lend support for the analytical-experiential theory as opposed to the fuzzy-trace theory since they indicate that a lower number of protective factors is associated with more extensive use of gist processing.

Table 14

Summary of the Analyses Predicting WCR-Gist from Risk and Protective Factors, and Communication with Mother and Father as Reported by Emerging Adults (n = 101)

Predictor Variables	R^2 change	B	$SE B$	β	sr^2	F change
Step 1	.08					8.60*
Gender		.13	.04	.31	.09**	
Step 2	.06					1.61
Gender		.13	.04	.31	.09**	
Risk Factors		-.10	.37	-.03	.001	
Protective Factors		-.01	.01	-.21	.03	
CM-EA		-.01	.01	-.01	.008	
CF-EA		-.01	.01	-.01	.001	
Final Model	$R^2 = .13$, $F(5, 100) = 3.05^*$					

Note. CM-EA = Communication with Mother-Emerging Adult Report; CF-EA = Communication with Father-Emerging Adult Report; B = unstandardized regression coefficient, $SE B$ = standard error of the regression coefficient, β = standardized regression coefficient, sr^2 = squared semipartial correlation.

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

Table 15

Summary of the Backwards Entry Regression Analyses Demonstrating the Best Predictive Model for WCR-Gist ($n = 101$)

Predictor Variables	R^2 change	B	$SE B$	β	sr^2	F change
Step 1	.14					3.05
Gender		.13	.04	.31	.09**	
CM-EA		-.01	.01	-.10	.007	
CF-EA		.01	.01	-.01	.001	
Risk Factors		-.10	.37	-.03	.001	
Protective Factors		-.01	.01	-.21	.03	
Step 2	.00					.00
Gender		.13	.04	.31	.09**	
CM-EA		-.01	.01	-.10	.008	
Risk Factors		-.10	.37	-.03	.001	
Protective Factors		-.01	.01	-.21	.03 [†]	
Step 3	-.01					.08
Gender		.13	.04	.30	.09**	
CM-EA		-.01	.01	-.10	.008	
Protective Factors		-.01	.01	-.19	.03 [†]	
Step 4	-.01					.99
Gender		.13	.04	.31	.09**	
Protective Factors		-.01	.01	-.22	.04*	
Final Model						$R^2 = .13, F(2, 100) = 7.25^{**}$

Note. CM-EA = Communication with Mother-Emerging Adult Form, CF-EA = Communication with Father-Emerging Adult Form, B = unstandardized regression coefficient, $SE B$ = standard error of the regression coefficient, β = standardized regression coefficient, sr^2 = squared semipartial correlation.

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

Follow-up: Hierarchical regression predicting the use of gist processing unfavourable to risk in decision-making. A follow up regression analysis was conducted to further test the patterns of relations by focusing on a specific category of gist processing: WCR-gist unfavourable to risk. A hierarchical regression was conducted with gender entered in the first step, whereas number of risk factors, protective factors, communication with mother and father as reported by emerging adults were entered in the second step. WCR-gist unfavourable to risk was entered as the outcome variable. The overall model was not significant, with $F(5, 100) = 1.87, p > .05$.

Follow-up: Standard regression predicting the use of gist processing favourable to risk in decision-making. Another follow-up regression further investigated the pattern of relation between gist processing and the predictor variables by focusing on WCR-gist favourable to risk. A standard regression was conducted with number of risk factors, protective factors, as well as communication with mother and father, entered as predictors. WCR-gist favourable to risk was entered as the outcome variable. Since WCR-gist favourable to risk was not normally distributed, the bootstrapping technique was used as part of the regression analysis. The overall model was not significant, with $F(4, 100) = .42, p > .05$.

Hypothesis 4: Verbatim processing. The purpose of hypothesis 4 was to demonstrate whether the risk and protective factors and communication with parents are significantly associated with WCR-Verbatim. According to the analytical-experiential theory (Klaczynski, 2001a, 2001b), it was expected that that WCR-verbatim would be positively associated with protective factors and communication with mothers, and negatively associated with risk factors. In contrast, according to the fuzzy-trace theory (Reyna & Brainerd, 1992, 2011), it was predicted that WCR-verbatim would be positively associated with risk factors, and negatively associated with protective factors and communication with mothers. As explained earlier, it was not possible to conduct the planned analyses pertaining to this variable because very few participants evidenced verbatim processing.

Hypothesis 5: Lifetime risky behaviours. The goal of this hypothesis was to determine whether the intuition-based and rational decision-making processes, as assessed through think-aloud and self-report, would significantly predict reported lifetime risky behaviours. According to the analytical-experiential theory (Klaczynski, 2001a, 2001b), it was expected that lifetime risky behaviours would be negatively associated with SR-analytical and WCR-verbatim, and positively associated with WCR-gist and SR-experiential. In contrast, according to the fuzzy-trace theory (Reyna & Brainerd, 1992, 2011), lifetime risky behaviours would be expected to be positively associated with SR-analytical and WCR-verbatim, and negatively associated with SR-experiential and WCR-gist.

As explained above, it was not possible to include WCR-verbatim into the regression. Additionally, age was the only background variable that was significantly correlated with the outcome variable (see Table 9 on page 68). Therefore, a hierarchical regression was conducted with age entered in the first step and WCR-gist, SR-analytical, and SR-experiential entered in the second step was conducted. Lifetime risky behaviours was entered as the outcome variable. Table 16 displays the unstandardized regression coefficients (B), the standardized regression coefficients (β), the semipartial correlations, R^2 , change in R^2 , and change in F after entry of all independent variables. The overall model was significant, with $F(4, 100) = 6.53, p < .05$, thus indicating that WCR-gist, SR-analytical, and SR-experiential as a group significantly predicted lifetime risky behaviours. An examination of the β coefficients indicates that age and SR-experiential contributed to significant change in lifetime risky behaviours, both displaying a positive relation with the outcome. An analysis of the squared semipartial correlation indicates that SR-experiential and age contributed 7% and 11%, respectively, to the variance in lifetime risky behaviours. These results support the analytical-experiential theory and are the opposite of what would be expected based on the fuzzy-trace theory. Specifically, higher self-reported use of intuition-based decision-making was associated with more extensive engagement in lifetime risky behaviours.

Table 16

Summary of the Hierarchical Regression Predicting Lifetime Risky Behaviours from Decision-Making Variables (n = 101)

Predictor Variables	R^2 change	B	$SE B$	β	sr^2	F change
Step 1	.13					14.37**
Age		.01	.01	.34	.11**	
Step 2	.09					3.55*
Age		.01	.01	.34	.11**	
SR-Analytical		-.01	.01	-.07	.004	
SR-Experiential		.01	.01	.27	.07**	
WCR-Gist		.02	.01	-.15	.02	
Final Model	$R^2 = .21, F(4, 100) = 6.53^{**}$					

Note. B = unstandardized regression coefficient, $SE B$ = standard error of the regression coefficient, β = standardized regression coefficient, sr^2 = squared semipartial correlation.

* $p < .05$

** $p < .01$

Hypothesis 6: Recent risky behaviours. In order to account for the potential changes in the pattern of relations between background characteristics and risky behaviours due to experience, recent risky behaviours (i.e., within the past month) were included as outcome in a separate analysis. Thus, it was hypothesized that the intuition-based and rational decision-making processes, as assessed through think-aloud and self-report, would be associated with recent risky behaviours. Based on the analytical-experiential theory (Klaczynski, 2001a, 2001b), it was expected that recent risky behaviours would be positively associated with SR-experiential and WCR-gist, and negatively associated with SR-analytical and WCR-verbatim. According to the fuzzy-trace theory (Reyna & Brainerd, 1992, 2011), it was expected that recent risky behaviours would be negatively associated with SR-experiential and WCR-gist, and positively associated with SR-analytical and WCR-verbatim. Once again, it was not possible to include WCR-verbatim into the regression.

Additionally, age was the only background variable that was significantly correlated with the outcome variable (see Table 9 on page 68). Therefore, a hierarchical regression with age entered in the first step and WCR-gist, SR-analytical, and SR-Experiential entered in the second step. Recent risky behaviours were entered as the outcome variable. Since recent risky behaviour was not normally distributed, the bootstrapping technique was used when the regression was conducted. Table 17 displays the unstandardized regression coefficients (B), the standardized regression coefficients (β), the semipartial correlations, R^2 , change in R^2 , and change in F after entry of all independent variables. The overall model was significant, with $F(4, 100) = 6.36, p < .05$, thus indicating that WCR-gist, SR-analytical, and SR-experiential as a group significantly predicted recent risky behaviours. An examination of the β coefficients indicates that age and SR-experiential contributed to significant change in lifetime risky behaviours, with both being positively associated to the outcome variable. An analysis of the squared semipartial correlation indicated that SR-experiential and age contributed 5% and 12% to the variance in lifetime risky behaviours. The analytical-experiential theory was supported

Table 17

Summary of the Hierarchical Regression Predicting Recent Risky Behaviours from Decision-Making Variables (n = 101)

Predictor Variables	R^2 change	B	$SE B$	β	sr^2	F change
Step 1	.14					15.65**
Age		.02	.01	.35	.12*	
Step 2	.07					2.95**
Age		.02	.01	.35	.12**	
SR-Analytical		-.02	.01	-.15	.02	
SR-Experiential		.03	.01	.24	.05*	
WCR-Gist		.04	.05	.09	.01	
Final Model	$R^2 = .21$, $F(4, 100) = 6.53^{**}$					

Note. B = unstandardized regression coefficient, $SE B$ = standard error of the regression coefficient, β = standardized regression coefficient, sr^2 = squared semipartial correlation.

* $p < .05$

** $p < .01$

once again, since higher use of intuition-based decision-making predicts a more extensive engagement in recent risky behaviours.

Summary of the Analyses

The pattern of relations between background psychosocial factors and decision-making variables, as well as between decision-making variables and risky behaviours were examined. Specifically, the purpose of the analyses was to determine whether the risk and protective factors, as well as communication between emerging adults and their parents, would be associated with intuition-based and rational decision-making processes measured through self-report and think-aloud. Additionally, the relations between intuition-based and rational decision-making processes entered as predictors and lifetime and recent risky behaviours entered as outcomes, were also examined. The patterns of findings were considered as lending support to either the analytical-experiential (Klaczynski, 2001a, 2001b) or the fuzzy-trace theory (Reyna & Brainerd, 1992, 2011) of decision-making. Additionally, the analyses were focused on determining whether the measurement of the decision-making processes with the think-aloud method and the self-report questionnaire method would be related.

The results demonstrated that psychosocial background variables are significantly related to the intuition-based and rational decision-making processes. Moreover, significant relations between decision-making processes and risky behaviours were also documented. In terms of the patterns of associations that emerged from the analyses, the results lend support to the analytical-experiential theory. Specifically, the relations between psychosocial variables, intuition-based and rational decision-making, and lifetime and risky behaviours indicate that a favourable psychosocial background characterised by a high numbers of protective factors and a low number of risk factors is associated with higher use of rational decision-making and less engagement in risky behaviours. This is the opposite of the predictions of the fuzzy-trace theory, based on which the intuition-based decision-making was

hypothesized to be associated with a favourable psychosocial background and lesser engagement in risky behaviour. A summary of the analyses is presented in Table 18.

Table 18

Summary of the Analyses

Variables	Results	
<i>Hypothesis 1: SR-Analytical</i>	HYPOTHESIS 1- PARTIALLY SUPPORTED	
Outcome: SR-Analytical	The overall model was significant. Protective factors were positively associated, whereas gender was negatively associated with SR-analytical. The analytical-experiential theory is supported.	
Predictor in Block 1: Gender		
Predictors in Block 2: Risk Factors Protective Factors CM-EA CF-EA		
<i>Hypothesis 2: SR-Experiential</i>		HYPOTHESIS 2- PARTIALLY SUPPORTED
Outcome: SR-Experiential		The overall model was significant. Risk factors were positively associated with SR-Experiential. The analytical-experiential theory is supported.
Predictors: Risk Factors Protective Factors CM-EA CF-EA		

Table 18 (continues)

Table 18 (continued)

Variables	Results
<i>Hypothesis 3. Gist Processing</i>	
HYPOTHESIS 3- PARTIALLY SUPPORTED	
Outcome: WCR-Gist Predictors in Block 1: Gender Predictors in Block 2: Risk Factors Protective Factors CM-EA CF-EA	The overall model was significant. Gender was positively associated with the outcome.
<i>Follow Up: Best Predictive Model for Gist Processing</i>	
Outcome: WCR-Gist Predictors: Gender Risk Factors Protective Factors CM-EA CF-EA	The best predictive model included gender and protective factors. Gender was positively associated, whereas protective factors were negatively associated with WCR-Gist. The analytical-experiential theory was supported.

Table 18 (continues)

Table 18 (continued)

Variables	Results
<p><i>Follow-Up: Gist Processing-Unfavourable to Risk</i></p> <p>Outcome: WCR-Gist Unfavourable to Risk</p> <p>Predictors in Block 1: Gender</p> <p>Predictors in Block 2: Risk Factors Protective Factors CM-EA CF-EA</p>	<p>The overall model was non-significant.</p>
<p><i>Follow-Up: Gist Processing-Favourable to Risk</i></p> <p>Outcome: WCR-Gist Favourable to Risk</p> <p>Predictors: Risk Factors Protective Factors CM-EA CF-EA</p>	<p>The overall model was non-significant.</p>
<p><i>Hypothesis 4: Verbatim Processing</i></p>	<p>The regression analysis was not performed due to the extremely rare occurrence of this code (i.e., only two participants evidenced this code).</p>

Table 18 (continued)

Table 18 (continued)

Variables	Results
<i>Hypothesis 5: Lifetime Risky Behaviours</i>	
Outcome: Lifetime Risky Behaviours	HYPOTHESIS 5- PARTIALLY SUPPORTED The overall model was significant. Age and SR-Experiential were positively associated with Lifetime Risky Behaviours. The analytical-experiential theory was supported.
Predictors in Block 1: Age	
Predictors in Block 2: WCR-Gist SR-analytical SR-Experiential	
<i>Hypothesis 6: Recent Risky Behaviour</i>	
Outcome: Recent Risky Behaviours	HYPOTHESIS 6- PARTIALLY SUPPORTED The overall model was significant. Age and SR-Experiential were positively associated with Recent Risky Behaviours. The analytical-experiential theory was supported.
Predictors in Block 1: Age	
Predictors in Block 2: WCR-Gist SR-analytical SR-Experiential	

CHAPTER IV

DISCUSSION

The present study aimed to investigate the relation of rational and intuition-based decision-making processes to background psychosocial characteristics and risky behaviours in emerging adults. Specifically, the rational and intuition-based decision-making processes were examined in the context of individuals' risk and protective factors, communication with parents, as well as engagement in lifetime and recent risky behaviours (i.e., within the last month). It was hypothesized that risk and protective factors and communication with parents would predict rational and intuition-based decision-making processes as measured through self-report and think-aloud. It was also hypothesized that the rational and intuition-based decision-making would predict engagement in recent and lifetime risky behaviours. It was hypothesized that, based on the risk and protective factors literature (Danielson et al., 2006; Salwyc et al., 2008), individuals with more protective factors and less risk factors would exhibit a decision-making style that would enable them to avoid engaging in risky behaviours.

Depending on the specific patterns of associations between the variables, the results were expected to lend support to either the analytical-experiential theory or the fuzzy-trace theory. Although both theories are dual process theories that acknowledge the importance of two decision making processes, the analytical-experiential theory posits that the rational decision-making process enables individuals to avoid engaging in risky behaviours (Amsel et al., 2009), whereas the fuzzy-trace theory posits that the intuition-based decision-making is primarily responsible for preventing risky behaviour (Mills et al., 2008; Reyna et al., 2011). Finally, both the think-aloud and self-report methods of assessing decision-making processes were used in the current study to compare their patterns of associations with background variables and risky behaviours.

Psychosocial Background and Decision-Making

Rational and intuition-based decision-making processes, as assessed by self-report and think-aloud, were predicted from risk and protective factors, as well as communication with parents, with age or gender entered as a control variables whenever they were significantly correlated with the outcome variables. The results indicated that, as a group, risk and protective factors, as well as communication with parents, predicted the use of rationality and intuition-based decision making processes. Additionally, as a group, decision-making processes predicted engagement in lifetime and recent risky behaviours. However, only some of the predictors significantly predicted the outcome variables. Specifically, the psychosocial risk and protective factors, as well as gender, were significant predictors of decision-making processes, as measured both through self-report and think-aloud protocol. Self-report of intuition-based decision making and age emerged as significant predictors of both lifetime and recent risky behaviours. In terms of the two theories examined in the present study, the results supported the analytical-experiential theory. Specifically, self-report of rationality was positively associated with protective factors, whereas self-report of intuition was positively associated with risk factors. The pattern of results supporting the analytical-experiential theory was also evident in the analyses predicting intuition-based decision-making as assessed through the think-aloud measure. Thus, the think-aloud measure of intuition-based decision-making was negatively associated with protective factors. As such, the results indicate that the rational approach to decision-making is associated with a favourable psychosocial background. In contrast, reliance on the intuition-based approach to decision-making as assessed in the current study was associated with a less favourable psychosocial background. Moreover, lifetime and recent (i.e., within the last month) risky behaviours were predicted from self-report and think-aloud measures of rational and intuition-based decision-making processes. Both lifetime and recent risky behaviours were positively associated with self-report of intuition-based decision-making. This provides additional evidence for the analytical-experiential

theory, which proposes that the use of intuition-based decision-making increases the likelihood of individuals' engagement in risky behaviours (e.g., Amsel et al., 2009).

The results lend support to rational processing being more adaptive than intuition-based processing amongst emerging adults in the present sample since it was related to less risky behaviours. However, this also may be associated with the psychosocial background of the sample. Specifically, participants' risk and protective factor scores, as well as risky behaviours scores were at the lower end of the possible scores, while their protective factors and communication with parents scores were at the higher end of possible scores. Thus, the participants in the present study came from relatively favourable backgrounds, which are characterized by protective factors, a close relationship with parents, and restricted engagement in risky behaviours. Many authors have suggested that heuristic judgment develops with age (Klaczynski & Robinson, 2000) and as a result of experience with risky behaviours (Jacobs & Klaczynski, 2002; Reyna et al., 2003). Specifically, as individuals engage in certain behaviours and experience the outcomes of their decisions, they extract rules and values relating to these behaviours (Jacobs & Klaczynski, 2002). Thus, individuals, such as the participants in the present study, who have experienced psychosocial adversity and engaged in risky behaviours to a lesser extent, may not have had the opportunity to develop and consistently use intuition-based judgements in risky situations (Reyna & Farley, 2006). Thus, a self-reported preference for the rational decision-making process was found in this sample of individuals at relatively low psychosocial risk.

Given that the participants in studies of fuzzy-trace theory were recruited primarily from the general population and their levels of risk and protective factors were not specifically measured and accounted for (e.g., Mills, 2010; Mills et al., 2008; Reyna et al., 2011), its' application to the specific groups that may be considered at risk of maladjustment is at the speculation stage. However, it is within the group of individuals who present with a high number of risk factors and a low number of protective factors that the fuzzy-trace theory may be supported. Specifically, individuals within this

group could be expected to make decisions based on verbatim processing. Additionally, some of the individual risk factors (e.g., higher sensation seeking, poor impulse control, difficult temperament, deficient metacognitive skills, mental health diagnosis) may interact with environmental risk factors (e.g., antisocial peers, impoverished school and home environments) to make it difficult for these youths to develop gist representations that are unfavourable to risk. Thus, although they may have had extensive experience with risk and risky behaviours, they may not have learned from the consequences by developing risk aversive gist representations. As such, they may continue to rely on verbatim processing while making decisions or develop gist representations that are favourable to risk because for them, the potential rewards from risky behaviours outweigh the costs. Therefore, the individual and environmental risk factors together may forestall the development of risk aversive gist representations and promote the use of verbatim processing or gist representation favourable to risk in some individuals. In this instance with a sample at risk for maladjustment, the fuzzy-trace theory may be supported.

The use of rational and intuition-based decision making is fluid, and many authors have documented that both are used by individuals at different times and in different situations (Klaczynski, 2001a, b; Reyna & Farley, 2006). This fluidity might be related to the quantity and quality of experiences with risky behaviours, individuals' background characteristics, as well as the specific situations in which individuals are required to make decisions. Specifically, it is possible that individuals could exhibit more intuition-based processing when they have to make a decision in a familiar situation for which they have developed a coherent gist representation, whereas they could exhibit more rational processing when required to make a decision in a less familiar context for which they have not yet developed a coherent gist representation. The differences in experiences with risky behaviours, as well as the ability to learn from these experiences, could also explain the continuity in individuals' exhibiting more or less 'informed' gut responses, which could affect their use of gist

representations in decision making. The ways in which experiential, situational, and background psychosocial characteristics, as well as their interaction, affect decision-making processes should be further investigated. Studies on the decision-making of experts and novices have documented that experts often use heuristics to make decisions in their field of expertise (Reyna 2004). These heuristics are based on domain-specific knowledge that is represented in long-term memory, and triggered by information coming from the environment (Hoffman, Aitken, & Duffield, 2009; Morrow et al., 2009). Thus, as individuals develop more extensive knowledge in a variety of situations, they are also more likely to rely on gist representations when making decisions. Moreover, the processes triggered may differ depending on whether individuals' beliefs are challenged (e.g., Klaczynski & Lavalley, 2005). Specifically, individuals tend to use intuition-based processing when the information coming from their environment is consistent with their beliefs, whereas they use rational processing when the information is contrary to their beliefs.

In the present study, the risky behaviours assessed included antisocial behaviours, which have been posited to follow two distinct pathways. The early onset pathway is characterized by onset in childhood, and persistence throughout adolescence and into young adulthood, whereas the adolescent-limited pathway is characterized by antisocial behaviour that is only displayed during adolescence (Moffitt, 1993, 1996). The early onset pathway is characterized by high levels of environmental and individual risk (Tuvblad, Eley, & Lichtenstein, 2005), with difficult temperament playing an especially important role (Frick & Sheffield Morris, 2004). In contrast, the adolescent-limited pathway is mainly influenced by environmental factors, such as the peer group (Pitzer, Esser, Schmidt, & Laucht, 2010). Additionally, distinctions have been made between overt antisocial behaviours, which include physical violence, and covert antisocial behaviours, which include delinquency, substance use, and truancy (Loeber, 1985). The overt behaviours are often part of a persistent pathway of antisocial behaviours, whereas the covert behaviours are more characteristic of the adolescent-limited pathway (Loeber &

Southamer-Loeber, 1998). Since the participants in the current study come from relatively favourable psychosocial backgrounds and endorsed a relatively low rate of engagement in risky behaviours, they can be placed within the less severe end of the adolescent-limited pathway. Thus, the present study does not capture the decision-making of individuals who may follow the early onset pathway or of those who show more serious antisocial behaviours within the context of the adolescent-limited pathway.

Gender and Age Differences in Decision-Making

Gender and age also showed significant associations with decision-making and risky behaviours. Specifically, gender was positively associated with intuition-based decision-making as assessed through the think-aloud protocol, thus indicating that female participants used this approach to decision-making to a greater extent than male participants. The opposite was observed for the self-report use of rational decision-making, which males reported using to a greater extent than females. The gender differences in self-reported rationality documented in the present study are consistent with some studies conducted in the tradition of analytical-experiential theory (Epstein, Pacini, Denes-Raj, & Heier, 1996; Sladek, Bond, & Phillips, 2010), but inconsistent with others, in which no significant gender differences were found (A. G. Marks, personal communication, August 26, 2012). Moreover, the authors of fuzzy-trace theory did not find gender differences in the use of intuition-based decision-making (e.g., Reyna et al., 2011). This may be explained by the composition of the sample. Specifically, in the present study, the male participants may represent a select group of men, whereas the female participants represent a larger and more diverse group of women. Thus, background characteristics related to gender that were not controlled for in the present study may have accounted for the documented differences. This may be due to the differences in measurement methods. Specifically, in the present study, the gist and verbatim representations were measured through think-aloud protocol, whereas Reyna and her colleagues (2011) used a self-report questionnaire method. It is

possible that the specific self-report method used by Reyna and her colleagues (2011) pulled for a more balanced report of the use of the two types of decision-making processes since it gave participants the opportunity to reflect upon their decision-making approach. In contrast, the think-aloud method asked participants to engage in decision-making as opposed to reflecting on it. As such, the scenarios, all of which had a strong social component, may have triggered the activation of gist representations amongst females to a greater extent compared to males. These differences may also be understood in the context of socialization, whereby socialization of adolescent and emerging adult females often encourages them to base their values and morals on maintaining relationships (Malti & Buchmann, 2010).

Age was another demographic characteristic that emerged as significant in the present study. Specifically, as participants' age increased, so did their report of engaging in lifetime and recent risky behaviours. This is consistent with the general trend of emerging adulthood, whereby individuals continue to engage in a variety of risky behaviours beyond adolescence (Arnett & Tanner, 2011; Canadian Alcohol and Drug Use Monitoring Survey, 2011; Road Safety in Canada, 2011; Rotermann, 2012).

Relationship with Parents and Decision-Making

Many studies have documented the importance of supportive relationships with parents, which include closeness and positive communication, in emerging adults' adjustment (e.g., Bartle-Haring et al., 2002; Hair et al., 2008; Leas & Mellor, 2000; Perosa, Perosa & Tam, 2002). In the present study, communication between parents and emerging adults was not found to be a significant predictor of decision-making or risky behaviours. However, its positive associations with protective factors and negative associations with risk factors indicate that it may have been acting as a protective factor. Moreover, these findings are based on emerging adults' reports of their communication with their parents, since the sample of participating parents was too small to include in the analyses. Also, it is

possible that the emerging adult participants in the present study are at a point in their lives when they are somewhat disengaged from their families and less reflective about their relationship with their parents.

The challenges in recruiting parents for participation in research have been documented by others (e.g., Phares, 1995, Phares, Lopez, Fields, Kamboukos, & Duhig, 2005). Generally, maternal participation rates range between about 60% and 97% (Phares, 1995; Hops & Seeley, 1992). However, fathers appear to be more difficult to recruit, with the ratio of mother to father participants being 3:1 (Hops & Seeley, 1992). Demands on time and special procedures (e.g., coming to the laboratory) have been found to be associated with decreased parental participation (Phares, 1995). The recruitment strategy for questionnaire-based studies often involves recruiting parents through their adolescent and emerging adult children, either by asking them to give the questionnaire to their parents (e.g., Baker, Yardley, & McCaul, 2001) or requesting that they provide an address to which the researchers mail the questionnaires with a pre-paid envelope (e.g., Phares, 1995). In the present study, the demands on the parents' time were minimal, and efforts were made to reach the parents through their emerging adult children, as well as to provide a variety of ways to participate. However, the participation rate is much lower than in other studies of emerging adults and their parents. It has been reported that parents who are employed and who discount the importance of research tend to participate less (Baker et al., 2001). Since the emerging adults in the present study come mostly from middle to upper middle class families in which parents are likely to be employed, it may have been difficult for parents to find time to participate despite the little time required to do so. It is also possible that emerging adults may not have informed parents about the study and may not have solicited their participation. However, this was not tracked in the present study.

Measurement of Decision-Making

It was not possible to obtain direct comparisons between the think-aloud and self-report assessments

of decision-making since it was not possible to obtain a representative score for the think-aloud measure of rational decision-making (i.e., verbatim processing). Additionally, the decision-making processes as assessed by the two methods were not related to the same study variables. However, the overall pattern of relations between the psychosocial background variables and the two approaches to decision-making as assessed by the two methods did present a cohesive whole. Specifically, the self-report of intuition-based decision-making was positively associated with risk factors, whereas the think-aloud measure of intuition-based decision-making was negatively associated with protective factors. This confirms once again that intuition-based decision-making is associated with a less favourable psychosocial background, which is consistent with the position of the analytical-experiential theory in the current sample.

Thus, the picture of individuals' decision-making processes varies depending on how it is measured. Specifically, participants in this study responded almost exclusively by using 'gist' or intuition-based processing in the context of the hypothetical scenarios used in the think-aloud protocol. However, when directly asked in the context of a self-report measure, they reported using both rational and experiential processing overall. It is possible that reflecting upon and reporting on one's decision-making processes and actually engaging in decision-making behaviors involve different skills. Moreover, the self-report measure of decision-making was comprised of de-contextualized statements describing decision-making, and thus may have engaged metacognitive skills by prompting individuals to think more critically of their decision-making process. In contrast, since context activates specific heuristic judgements (Epstein, 1994), it is likely that the intuition-based processing may be activated in response to specific situations, such as the ones presented in the vignettes. The activation of gist representation may have been even more prominent given the social context presented in the vignettes (Jacobs & Potenza, 1991). Moreover, the vignettes in the present study present situations that may have been over-rehearsed in health education classes and in the messages given in communication

from public health campaigns. As such, participants may have already acquired gist representations that are aversive to risk, which were triggered as they engaged in the think-aloud in response to the vignettes.

Limitations

While the results provide a glimpse into the background characteristics associated with decision-making, there are also limitations in the present study. Specifically, the sample was restricted in terms of demographic and psychosocial background characteristics. Moreover, the think-aloud assessment of decision-making used three vignettes with three common situations that were expected to be familiar to emerging adults. However, they represent a restricted set of risky situations in which emerging adults may be called upon to make decisions. Additionally, a significant correlation was found between the experiential and rational decision-making processes as assessed through the Rational-Experiential Inventory for Adolescents. While these two subscales are typically reported to be uncorrelated (e.g., Marks et al., 2008), small negative and positive correlations have been reported in some studies (e.g., Fletcher, Marks, & Hine, 2011; A. G. Marks, personal communication, January 16, 2013). It is likely that the participants in the present sample reported comparable use of the two decision-making processes, which resulted in lack of differences between the two processes as assessed in the current study. Furthermore, this measure has been modified from the adult version of this questionnaire, which in turn has been developed with the theoretical lens of the analytical-experiential theory. As such, it has not been used to test the fuzzy-trace theory. However, since the fuzzy-trace theory and the analytical-experiential theory are both defined as dual process theories, and the two processes hypothesized within the analytical-experiential theory are conceptually equivalent to those hypothesized within the fuzzy-trace theory, this measure was used in the current study to interpret the findings in light of both theories.

Implications and Directions for Future Research

In light of the current findings, future research should examine the associations between background characteristics, decision-making, and risky behaviours in more diverse samples. Specifically, future studies should investigate these relations amongst individuals across ages and developmental stages (e.g., adolescence, emerging adulthood), as well as the developmental level (i.e. level of wisdom and experiences with risky behaviours). While it is known that some exposure to risk and risky behaviours enables individuals to develop heuristics that are activated as part of intuition-based processing, it is unclear what levels of exposure to risk would promote the learning of adaptive decision-making. Thus, investigating experience with risky behaviours and exposure to background risk and protective factors in association with specific decision-making processes and outcomes is likely to elucidate the contribution of experience to the development of decision-making. The current study demonstrated that rational decision-making process was associated with less risk-taking amongst emerging adults from relatively favourable psychosocial background. Thus, as practitioners work with emerging adults who have not had much experience with difficult life circumstances and risky behaviours, they may work on promoting rational decision-making while individuals gain experience and develop risk-averse gist representations.

Additionally, investigating decision-making processes amongst youth who have experienced a high level of psychosocial risk would be especially beneficial for prevention and intervention efforts. Specifically, conducting studies that include youth who present with high levels of environmental risk (e.g., low socio-economic status, associations with antisocial peers), as well as individual risk (e.g., high on sensation seeking, poor impulse control, difficult temperament, presenting with mental health problems) would provide a clearer test of the theories. Moreover, such research can also provide information regarding specific patterns of decision-making processes and outcomes as evidenced by individuals from different psychosocial backgrounds, thus enabling practitioners to map interventions

to the specific needs of the clients. For instance, investigating the different ratio of rational and intuition-based processing used and their associations with psychosocial background and risky behaviours may be especially relevant for intervention.

Moreover, the contextual variables that pull for rational and intuition-based processing should also be investigated. Situations that are relatively context free (e.g., an abstract dilemma involving probabilities) and those that present a specific context (e.g., relationships, personal safety and risk) may also trigger different types of processing. It has been reported that social situations are likely to promote intuitive and heuristic judgements, whereas situations from which social context is removed are likely to promote rational processing (Jacobs & Potenza, 1991) Thus, using think-aloud protocols and self-report measures to assess individuals' decision-making processes across different types of situations could provide further insight into how situational demands influence the specific type of decision-making process that is triggered. For instance, as was documented in previous research, situations that do not involve the social context may be used to prompt individuals to use rational processing, whereas situations involving relationships or personally-relevant values could be used to trigger intuition-based processing (Jacobs & Potenza, 1991; Klaczynski & Gordon, 1996; Klaczynski & Lavalley, 2005). Emotional responses to situations and anticipatory emotions have been documented to be important components of intuition-based processing (Amsel et al., 2005; Haase & Silbereisen, 2011; Rivers et al., 2008). Thus, the emotions triggered by personally-relevant scenarios may play a role in the activation and application of intuition-based processing in these situations. It is likely that emotions are not activated to the same extent in situations that are less personally relevant. Thus, assessing the type and intensity of emotions activated by a given decision-making scenario could provide information on the activation of rational and intuition based approaches to decision-making. Moreover, investigating the way in which emotions, values, and contextual cues can be incorporated into health messaging in order to promote risk avoidance should also be investigated. For instance,

different health messages could be developed depending on the population that they are targeting, thus effectively appealing to the decision-making process characteristic of that population.

While it has been documented that presence of peers increases risk-taking (Gardner & Steinberg, 2005), the specific ways in which peers or family members influence individuals' decision-making processes has not been studied. Specifically, specific elements of the dialogue between the individuals and others while they are in the process of making a decision, as well as the ways in which these elements can affect the sequence of individuals' decision-making, have not yet been investigated at the time of writing of the present document. It is likely that the discussion between decision-makers and their friends or family members may influence the sequence of their decision-making, as well as the processes they rely on. As such, an individual may make the decision to engage in a risky behaviour because their decision-making process was influenced by their friends or family. For instance, those who are involved in the cycle of antisocial behaviour tend to come from families or associate with peers that encourage such behaviours (Ary, Duncan, Duncan, & Hops, 1999; Denault & Poulin, 2012; Patterson et al., 1989; Stepp, Pardini, Loeber, & Morris, 2012).

Furthermore, situations with which individuals have had personal experiences may trigger different types of processing than situations which are unfamiliar. Thus, assessing individuals' familiarity with a situation described in a particular decision-making scenario may shed light on the association between experience and decision-making. Gender is another aspect that warrants investigation in relation to situational context. Specifically, the differences in processing may in part be due to the differences in how men and women perceive the situational context. The gender differences in decision-making found in the present study may have in part be due to the measurement methods (i.e., self-report vs. think-aloud). Thus, the response of male and female participants to these two methods of measurement in the context of assessment of decision-making should be further investigated.

Finally, the measurement of decision-making should be expanded in order to provide adequate construct validity. The results of the present study documented the complexity of decision-making, and the necessity of using both self-report and think-aloud measurement since they each yield separate information on individuals' use of decision-making processes. Moreover, since think-aloud has not often been used as a measurement strategy in decision-making research, this assessment procedure should be refined in future research. Specifically, the coding scheme used to evaluate think-aloud protocols should be further refined. Notably, the level of precision of the information available to individuals as they make decisions appears to play an important role in the decision-making processes triggered (Brown, Nowlan, Taylor, & Morley, 2013), and should be reflected in the assessment approach. Additionally, the situations featured in vignettes presented to participants should also be revised. For instance, a pilot study may be conducted asking participants to generate situations which they believe are risky. Then, these situations may be used in a study in which participants are asked to engage in think-aloud as they decide what they would do in that particular situation. In order to obtain a comprehensive picture of decision-making, as well as having a basis for comparison across participants, a standardized procedure could be incorporated into the think-aloud. Specifically, after they engaged in spontaneous decision-making elicited by the vignette, they could be asked to respond to specific prompts regarding the situation and their decision.

Conclusion

Overall, the current study is one of the few to investigate the association between background variables and decision-making. The results provide support for the associations between background psychosocial risk and protective factors, and the use of rational and intuition-based decision-making processes in situations involving risk. Moreover, self-report of the use of intuition-based decision-making was associated with both lifetime and recent risky behaviours. Overall, in the current sample of emerging adults, the rational approach to decision-making was associated with favourable outcomes,

thus lending support to the analytical-experiential theory. Further investigations of individual and environmental risk and protective factors, situational aspects, and the decision-making processes they trigger will further clarify situations that put individuals at-risk of engaging in risky behaviours. This can assist professionals who work with adolescents and emerging adults in identifying situations in which decision-making should be targeted. Additionally, studying these variables in a diverse sample of youth will further guide intervention efforts. Identifying the levels and types of risk and protective factors at which individuals are most vulnerable to engage in risky behaviours is likely to help with efforts to prevent risky behaviours.

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Appendix A

Recruitment Steps

Steps	Timeline
Participant Pool	
September 2010	Data collection started within the Participant Pool
School Boards within the Windsor-Essex County	
September 2010	<p>Application submitted to two school boards and approval received from one of the school boards, pending additional documentations (i.e., instruments to be used in the study).</p> <p>Submission of the documents requested to the school board.</p> <p>Official approval received from the school board. The researcher is advised that the study can only be conducted at a school with the approval of the principal.</p>
October 2010	Email and phone contact with high school principals. Responses from and meetings with two principals.
November 2010-February 2011	Concerns regarding the repercussion of the results of the study on the reputation of the school board if it were specifically identified were brought up, and the approval to conduct research within that school board was revoked.
February-April 2011	<p>Researcher negotiated with the school board authorities and agreed to not specifically identify the school board in her write up of the study. The study was approved once again.</p> <p>One of the principals initially interested in the study decline to allow the recruitment in their school. The other principal attempted to schedule the study to occur during school hours. However, the school board authorities did not allow this. Despite the researcher's best efforts to contact the principal and negotiate a different time for students to complete the study were unsuccessful.</p>
Community Organizations	
May 2011-August 2011	Contacting the managers at two local community organizations. The manager at one community organization serving adolescents agreed to participate.
August 2011-October 2011	<p>Researcher was in communication with the manager to arrange for the study to be conducted at the community organization. Communication with participants over the phone and during a series of short presentations of the study at the community organization. The researcher briefly summarized the study, invited the adolescents to participate, and left the information about the study for them to take home.</p> <p>Data collection at the community organization with adolescents and parents who agreed to participate.</p>

APPENDIX B

Package for Emerging Adults from the Participant Pool



LETTER OF INFORMATION FOR CONSENT TO PARTICIPATE IN RESEARCH

Title of Study: Everyday Life Issues amongst Adolescents and Young Adults-University Student Form

You are asked to participate in a research study conducted by Tatiana Nedecheva, Doctoral student in the Clinical Psychology Program (Child Track), from the Department of Psychology at the University of Windsor. This is a dissertation research project conducted by Tatiana Nedecheva in partial fulfilment of the Doctor of Philosophy degree in Clinical Psychology (Child Track). This research is supported by a Canada Graduate Scholarship awarded to Tatiana Nedecheva by the Social Sciences and Humanities Research Council. If you have any questions or concerns about the research, please feel to contact Tatiana Nedecheva at nedeche@uwindsor.ca, or her dissertation advisor, Dr. Julie Hakim-Larson at (519) 253-3000, ext. 2241.

PURPOSE OF THE STUDY

The purpose of this study is to examine how adolescents go about dealing with stressful everyday life situations. Also, I am interested in how young adults' relationships with their parents, and the difficulties they may be dealing with in their day-to-day life, affect the choices they make.

PROCEDURES

1. During the first testing session, participants will be asked to fill out three questionnaires online at a computer lab at the University of Windsor. This will take about 1 hour. At the end of this session, a second session will be scheduled. You will also be given a Letter of Information about the study, as well as forms to give your parents where they will indicate whether they are interested in participating in the study. You will be asked to bring the form back to the second session. After you have completed the questionnaires, you will be asked to provide your first name and email address in order to keep track of the bonus points you earn in the present study.
2. During this session, participants will listen to an audio-recording and will be audio-recorded in a private room. This will take approximately half an hour.

POTENTIAL RISKS AND DISCOMFORTS

There are no foreseeable major physical or psychological risks associated with participation in this study. However, it is possible that some participants may be distressed by some questions, or by the audio-recording. In this case, participants may choose to make use of one of the resources on the resource list provided by the researcher.

If you volunteer to participate in this study, we would ask you to do the following things:

The study will take place in two sessions at the university.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

You will not directly benefit from participating in this study. However, the results will help us better understand how adolescents deal with everyday life stressors. Also, the results will be used to help adolescents to deal with stress.

PAYMENT FOR PARTICIPATION

There is no payment for participation. However, participants will receive bonus points. Overall, this study is worth 1.5 bonus points for 90 minutes of participation towards the psychology participant pool, if registered in the pool and you are registered in one or more eligible courses.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential. This means that your answers to the questionnaires and the audio-recording will not be shared with

anyone without your permission. The identifying information will be separated from your answers, which will remain anonymous. Your answers to the questionnaires will be stored on an Excel file, where you will be identified by a number. The researcher, research assistants, web developers, and web administrators will have access to the data. After the completion of the data collection, the Excel file will be stored on a USB key with password protection, and deleted from the online system. The data file with your responses to the questionnaires and the audio-recording will be stored in a locked file cabinet. As a participant in the present study, you have the right to review and edit the recordings. Only the researcher and research assistants will have access to the complete Excel file with questionnaire responses and the recordings. The recordings and the questionnaires will be destroyed ten years after this study is completed. The names and email addresses provided to keep track of the Participant Pool bonus points will be destroyed after the Participant Bonus Points are allocated. The only circumstances in which the researcher is required by law to break confidentiality involve situations where individuals express an intent to harm themselves or others, or disclose ongoing childhood abuse. In the event that participants make such a disclosure to the researcher, she will report it to the appropriate authorities (e.g., Children's Aid Society, police).

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time. However, in keeping with the Participant Pool policies, you will receive the amount of points that is proportional to the duration of your participation before withdrawal. You may also refuse to answer any questions you don't want to answer and still remain in the study. If you chose to withdraw, you may have your answers withdrawn from the study. However, you have to specifically state this to the researcher.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE SUBJECTS

Participants will be able to view the results of the study at the following web address: www.uwindsor.ca/reb.

Date when results are available: Summer of 2012

SUBSEQUENT USE OF DATA

The data may be used in subsequent studies.

RIGHTS OF RESEARCH SUBJECT

You may withdraw your consent at any time and discontinue participation without penalty.

If you have questions regarding your rights as a research subject, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

Signature of the Investigator

Date



CONSENT TO PARTICIPATE IN RESEARCH

Title of Study: Everyday Life Issues amongst Adolescents and Young Adults-University Student Form

You are asked to participate in a research study conducted by Tatiana Nedecheva, Doctoral student in the Clinical Psychology Program (Child Track), from the Department of Psychology at the University of Windsor. This is a dissertation research project conducted by Tatiana Nedecheva in partial fulfilment of the Doctor of Philosophy degree in Clinical Psychology (Child Track). This research is supported by a Canada Graduate Scholarship awarded to Tatiana Nedecheva by the Social Sciences and Humanities Research Council. If you have any questions or concerns about the research, please feel to contact Tatiana Nedecheva at nedeche@uwindsor.ca, or her dissertation advisor, Dr. Julie Hakim-Larson at (519) 253-3000, ext. 2241.

PURPOSE OF THE STUDY

The purpose of this study is to examine how adolescents go about dealing with stressful everyday life situations. Also, I am interested in how young adults' relationships with their parents, and the difficulties they may be dealing with in their day-to-day life affect the choices they make.

PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following things:

The study will take place in two sessions at the university.

1. During the first testing session, participants will be asked to fill out three questionnaires online at a computer lab at the University of Windsor. This will take about 1 hour. At the end of this session, a second session will be scheduled. You will also be given a Letter of Information about the study, as well as forms to give your parents where they will indicate whether they are interested in participating in the study. You will be asked to bring the form back to the second session. After you have completed the questionnaires, you will be asked to provide your first name and email address in order to keep track of the bonus points you earn in the present study.
2. During this session, participants will listen to an audio-recording and will be audio-recorded in a private room. This will take approximately half an hour.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

You will not directly benefit from participating in this study. However, the results will help us better understand how adolescents deal with everyday life stressors. Also, the results will be used to help adolescents to deal with stress.

PAYMENT FOR PARTICIPATION

There is no payment for participation. However, participants will receive bonus points. Overall, this study is worth 1.5 bonus points for 90 minutes of participation towards the psychology participant pool, if registered in the pool and you are registered in one or more eligible courses.

POTENTIAL RISKS AND DISCOMFORTS

There are no foreseeable major physical or psychological risks associated with participation in this study. However, it is possible that some participants may be distressed by some questions, or by the audio-recording. In this case, participants may choose to make use of one of the resources on the resource list provided by the researcher.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential. This means that your answers to the questionnaires and the audio-recording will not be shared with anyone without your permission. The identifying information will be separated from your answers, which will remain anonymous. Your answers to the questionnaires will be stored on an Excel file, where you will be identified by a number. The researcher, research assistants, web developers, and web administrators will have

access to the data. After the completion of the data collection, the Excel file will be stored on a USB key with password protection, and deleted from the online system. The data file with your responses to the questionnaires and the audio-recording will be stored in a locked file cabinet. As a participant in the present study, you have the right to review and edit the recordings. Only the researcher and research assistants will have access to the complete Excel file with questionnaire responses and the recordings. The recordings and the questionnaires will be destroyed ten years after this study is completed. The names and email addresses provided to keep track of the Participant Pool bonus points will be destroyed after the Participant Bonus Points are allocated. The only circumstances in which the researcher is required by law to break confidentiality involve situations where individuals express an intent to harm themselves or others, or disclose ongoing childhood abuse. In the event that participants make such a disclosure to the researcher, she will report it to the appropriate authorities (e.g., Children's Aid Society, police).

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time. However, in keeping with the Participant Pool policies, you will receive the amount of points that is proportional to the duration of your participation before withdrawal. You may also refuse to answer any questions you don't want to answer and still remain in the study. If you chose to withdraw, you may have your answers withdrawn from the study. However, you have to specifically state this to the researcher.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE SUBJECTS

Participants will be able to view the results of the study at the following web address: www.uwindsor.ca/reb.
Date when results are available: Summer of 2012

SUBSEQUENT USE OF DATA

The data may be used in subsequent studies.

RIGHTS OF RESEARCH SUBJECT

You may withdraw your consent at any time and discontinue participation without penalty. If you have questions regarding your rights as a research subject, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

SIGNATURE OF RESEARCH SUBJECT/LEGAL REPRESENTATIVE

I understand the information provided for the study Everyday Life Issues amongst Adolescents and Young Adults as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

Name of Subject

Signature of Subject

Date

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

Signature of Investigator

Date



CONSENT FOR AUDIO RECORDING

Young Adults's Name: _____

Title of the Project: Everyday Life Issues amongst Adolescents and Young Adults.

I consent to the audio-recording of procedures in which I am participating.

I understand these are voluntary procedures and that I am free to withdraw my participation at any time by requesting that the taping be stopped. I also understand that my name will not be revealed to anyone and that taping will be kept confidential. Tapes are filed by number only and stored in a locked cabinet.

I understand that confidentiality will be respected and that the audio recordings will be for research use only.

(Signature of Research Subject)

(Date)

List of Community Resources for University Student Participants

Community Resources in Case You Need to Talk to Someone...

Student Counselling Centre

2nd Floor of CAW Student Centre at the University of Windsor

Canadian Mental Health Association Windsor-Essex County Branch

1400 Windsor Avenue

Windsor (Ontario)

519-255-7440

www.cmha-wecb.on.ca

info@cmha-wecb.on.ca

Windsor Regional Hospital Addictions Assessment and Outpatient Services

1453 Prince Road

Windsor (Ontario)

519-257-5220

Windsor Regional Hospital Mood Anxiety Treatment Service

1453 Prince Road

Windsor (Ontario)

519-257-5125

Bulimia Anorexia Nervosa Association (BANA)

2109 Ottawa Street

Suite 400

Windsor (Ontario)

519-969-2112

www.bana.ca

Hotel Dieu Grace Hospital Community Crisis Centre of Windsor-Essex County

519-973-4435 (24-hour crisis telephone line)

www.hdgh.org

John Howard Society of Windsor-Essex County

880 Ouellette Avenue

Suite 703

Windsor (Ontario)

519-252-3461

Sexual Assault Crisis Centre of Essex County

519-253-3100 (24-hour crisis line)

sacc@cogeco.net

Appendix C

Emerging Adults Demographic Questionnaire

Please complete the following form.

1. Your age: _____

2. Your birth date: year _____

3. Your sex: (1) ___ Male (2) ___ Female

4. Ethnicity (Optional):

(1) ___ White

(2) ___ Chinese

(3) ___ South Asian (for example; East Indian, Pakistani, Punjabi, Sri Lankan)

(4) ___ Black (for example; African, Haitian, Jamaican, Somalian)

(5) ___ Native/Aboriginal people (North American Indian, Métis or Inuit/Eskimo)

(6) ___ Arab/West Asian (for example; Armenian, Egyptian, Iranian, Lebanese, Moroccan)

(7) ___ Filipino

(8) ___ South East Asian (for example; Cambodian, Indonesian, Laotian, Vietnamese)

(9) ___ Latin-American

(10) ___ Japanese

(11) ___ Korean

(12) ___ Other (Please specify)

5. Were you born in Canada? (1) ___ Yes (2) ___ No

If not, what country were you born in? _____

6. What is the approximate total income bracket of your family? (Optional)

(1) ___ less than 10,000

(5) ___ 41,000-50,000

(9) ___ 81,000-90,000

(2) ___ 11,000-20,000

(6) ___ 51,000-60,000

(10) ___ 91,000-100,000

(3) ___ 21,000-30,000

(7) ___ 61,000-70,000

(11) ___ 101,000-110,000

(4) ___ 31,000-40,000

(8) ___ 71,000-80,000

(12) ___ 111,000-120,000

7. What is the composition of your family of origin?

_____ Two-parent family

_____ Other (please specify)

_____ Single-parent family (led by mother)

_____ Single-parent family (led by father)

_____ Shared custody between mother and father

8. Which parent/guardian/caregiver do you feel knows you the best?

Appendix D

Table D1

Comparison of Means and Standard Deviations by Scale of the Communities that Care Youth Survey
N = 125

Scale	Arthur et al. (2012) M(<i>SD</i>)	Present Study M(<i>SD</i>)
Risk Factors		
Community		
Low Neighborhood Attachment	2.30 (.85)	2.68 (.39)
Community Disorganization	1.61 (.62)	1.92 (.43)
Transitions and Mobility	1.96 (.69)	2.00 (.68)
Laws and Norms Favorable to Drug Use	2.30 (.63)	2.27 (.49)
Perceived Availability of Drugs	2.72 (.92)	2.94 (.76)
Perceived Availability of Guns	1.98 (1.11)	1.21 (.55)
Family		
Poor Family Management	2.00 (6.13)	2.33 (.57)
Family Conflict	2.20 (.79)	2.23 (.78)
Family History of Antisocial Behaviour	2.27(1.01)	2.60 (.86)
Parental Attitudes Favorable to Drug Use	1.48 (.68)	1.67 (.68)
Parental Attitudes Favorable towards Antisocial Behavior	1.35 (.53)	1.68 (.68)
School		
Academic Failure	1.95 (.68)	1.99 (.58)
Low Commitment to School	2.55 (.68)	2.23 (.59)
Peer-Individual		
Rebelliousness	1.93 (.72)	1.65 (.58)
Early Initiation of Drug Use	1.60 (1.80)	1.29 (1.26)
Early Initiation of Antisocial Behaviour	.67 (1.28)	.21 (.67)
Attitudes Favourable to Antisocial Behaviour	1.63 (.59)	1.44 (.37)
Attitudes Favourable to Drug Use	1.84 (.85)	1.93 (.70)
Intention to Use	1.81 (.73)	1.77 (.54)
Perceived Risk of Drug Use	2.03 (.82)	2.32 (.38)
Interaction with Antisocial Peers	.30 (.56)	1.01 (.19)
Friends' Drug Use	1.21 (1.16)	2.02 (.92)
Rewards for Antisocial Involvement	1.82 (.88)	1.58 (.64)
Gang Involvement	.34 (1.20)	.81 (.66)
Protective Factors		
Community		
Opportunity for Prosocial Involvement	2.65 (.67)	2.46 (.72)
Rewards for Prosocial Involvement	2.22 (.84)	2.79 (.88)
Family		
Opportunities for Prosocial Involvement	2.85 (.79)	2.91 (.75)
Rewards for Prosocial Involvement	2.92 (.718)	2.98 (.66)
Attachment	3.13 (.74)	2.87 (.73)

Table D1 (*continues*)

Table D1 (continued)

Scale	Arthur et al. (2012) M(<i>SD</i>)	Present Study M(<i>SD</i>)
School		
Opportunity for Prosocial Involvement	2.89 (.51)	2.74 (.44)
Rewards for Prosocial Involvement	2.65 (.62)	2.35 (.51)
Peer-Individual		
Religiosity	2.44 (1.28)	2.39 (1.02)
Social Skills	2.89 (.74)	3.08 (.59)
Belief in the Moral Order	2.95 (.60)	3.39 (.46)
Interaction with Prosocial Peers	2.25 (1.02)	2.32 (.93)
Prosocial Involvement	3.54 (1.93)	3.79 (1.79)
Rewards for Prosocial Involvement	2.89 (1.03)	3.58 (1.02)

Appendix E

Drama Student Consent Form for Audio-Recording



CONSENT FOR AUDIO TAPING

Drama Student's Name:

Title of the Project: Psychosocial Risks and Decision-Making Processes in Adolescents.

I consent to be audio-taped enacting vignettes with adolescent themes. I understand that my name will not be revealed to anyone. The tapes will be used in the dissertation study conducted by Tatiana Nedecheva, M. A. under the supervision of Dr. Hakim-Larson in order to fulfil the requirements of her Ph.D. in Clinical Psychology (Child Track).

I understand that confidentiality will be respected and that the audio tape will be for research use only. In acknowledgement for my contribution, I will receive a 15\$ gift certificate to be redeemed at the University of Windsor Bookstore. This study has been approved by the University of Windsor REB.

Signature

Date

Appendix F

Vignettes for Think-Aloud Protocol and Permission to Reproduce

(modified from Santor, Messervey, and Kussumakar (1999) with permission from the authors and reproduced with permission of Springer (Springer Customer Service Center GmbH, Haberstrasse 7, 69126 Heidelberg, Germany).

Introductory Script

Listen to the audio-recording, and audio-record yourself helping the peer in the vignette with advice about what to do. While you do this, think of friends with similar problems or imagine yourself in the situation.

Vignette 1: Engaging in Smoking

I don't smoke, but I just discovered that the guy/girl I like and I'm hanging out with smokes. He/she is surprised that I don't smoke and urges me to have a cigarette. What do I do?

Vignette 2: Drinking and Driving

I am at a party and I am having a few beers with my friends. By this time, my friends and I have a good buzz going, but the person who was going to drive our car has already left. My friends and I are left at the party without anybody sober to drive us home. When it is time to go home, my friends urge me to drive. What do I do?

Vignette 3: Engaging in Sexual Activity

I am one of the few people in my group of friends who has not had sex yet. At a school dance, I met somebody who is very popular and attractive and I have arranged to go out on a date the following week. Throughout the week, my friends have pressured me to sleep with this person. When the night arrived, I went out to a movie and later I began fooling around with him/her. This person asked me if I want to go all the way. What do I do?

Appendix G

Table G1

Reliability Across Four Raters for Training Batches (n=20)

Variable	Batch 1		Batch 2		Batch 3		Batch 4	
	ICC	PA	ICC	PA	ICC	PA	ICC	PA
Gist Score	.72	84.9%	.78	93.5%	.80	93.1%	.72	93.4%
Verbatim Score	N/A	100%	N/A	100%	N/A	100%	N/A	100%
Unfavourable Emotions Towards Risky Behaviours	.84	71.7%	N/A	100%	.49	95.8%	N/A	98.6%
Favourable Emotions Towards Risky Behaviours	N/A	100%	N/A	100%	N/A	100%	N/A	100%
No Code ^a	.46	71.6%	.53	71.7%				
Not Directly Relevant Codes ^b					.89	78.1%	.69	75.5%

Note: ICC = Intraclass Correlation; PA = Percent Agreement

^an=10

^bn=10

VITA AUCTORIS

Tatiana Nedecheva Carreira was born in Moscow, Russia, and moved to Canada with her family when she was eight years old. In 2006, she graduated from McGill University in Montreal, Quebec, Canada, with a Bachelor of Arts in Psychology and a minor in Hispanic Studies-Spanish Literature and Culture. In 2008, she completed her Master's degree in Clinical Psychology-Child Track at the University of Windsor, Windsor, Ontario, Canada. She has successfully completed her Pre-Doctoral Internship with children, adolescents, and families at Eastern Health in St. John's, Newfoundland, Canada. She plans to graduate from the University of Windsor in October 2013 with a Doctor of Philosophy degree in Clinical Psychology-Child Track.