What was he thinking? Comparing a cognitive with a psychosocial developmental approach in explaining young adult risk taking.

Submitted in support of candidature for a Bachelor of Arts (Hons) in Psychology

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Table of Contents

Declaration ............................................................................................................................. vii
Abstract ............................................................................................................................... viii

Chapter 1. Introduction ..................................................................................................... 1
  1.1. Decision theory ...................................................................................................... 2
  1.2. Cognitive developmental approach ......................................................................... 5
    1.2.1. Description of the cognitive developmental approach to decision making .......... 6
    1.2.2. Neuropsychological perspective to the cognitive developmental approach ....... 8
  1.3. Psychosocial approach ......................................................................................... 9
    1.3.1. Early psychosocial approaches to development .............................................. 10
    1.3.2. Emerging Adulthood .................................................................................. 10
  1.4. Implications of the cognitive developmental approach and psychosocial developmental approach for risk taking of young males .... 12
    1.4.1. Predictions of each approach ..................................................................... 12
    1.4.2. Evidence regarding males and risk taking .................................................. 13
  1.5. Investigation of the cognitive developmental and psychosocial developmental approaches using number of consequences .............. 14
    1.5.1. Predictions of each approach ..................................................................... 14
    1.5.2. Evidence regarding age-related number of consequences .......................... 15
1.6. Investigation of the cognitive developmental and psychosocial
developmental approaches using personality variables ......................... 16

1.6.1. Predictions of each approach...................................................... 18

1.6.2. Evidence regarding time orientation and sensation seeking in risk
taking ................................................................................................. 18

1.7. Implications of the cognitive developmental and psychosocial
developmental approaches with respect to life experience ....................... 20

1.7.1. Predictions of each approach....................................................... 20

1.7.2. Evidence regarding the impact of experience on risk taking
behaviour ........................................................................................... 21

Chapter 2. The current study .................................................................. 22

2.1. Research Aims ............................................................................... 22

2.1.1. Risk taking behaviours investigated ............................................ 22

2.1.2. Investigation of consequences anticipated ................................. 23

2.2. Hypotheses ..................................................................................... 23

2.2.1. Hypotheses regarding predictive value of age and gender ........ 23

2.2.2. Hypotheses regarding mediating effect of number of
consequences ....................................................................................... 24

2.2.3. Hypotheses regarding mediating effect of personality variables 24

2.2.4. Research question regarding the impact of experience ......... 25

Chapter 3. Method .................................................................................. 26

3.1. Participants .................................................................................... 26
3.2. Materials ........................................................................................................... 27
3.3. Procedure ......................................................................................................... 31

Chapter 4. Results ................................................................................................. 33

4.1.1. Hypotheses relating to age, gender and interaction (Hypotheses 1.1 to 1.3) ................................................................................................................. 34
4.1.2. Hypotheses relating to mediating effects of number of consequences (Hypotheses 2.1 and 2.2) ................................................................. 35
4.1.3. Hypotheses relating to mediating effects of time orientation and sensation seeking (Hypotheses 3.1 to 3.3) .............................................................. 37
4.1.4. Research Question regarding impact of experience ......................... 39
4.1.5. Post hoc analyses ......................................................................................... 43

Chapter 5. Discussion ......................................................................................... 45

5.1.1. Discussion relating to age and gender hypotheses (Hypotheses 1.1 to 1.3) ................................................................................................................. 45
5.1.2. Discussion relating to hypotheses regarding number of consequences (Hypotheses 2.1 and 2.2) ................................................................. 46
5.1.3. Discussion of hypotheses relating to mediating effects of time orientation and sensation seeking (Hypotheses 3.1 to 3.3) .............................. 47
5.1.4. Discussion of impact of experience research question .................. 48

5.2. Discussion of Methodology ....................................................................... 50

5.2.1. Generation vs selection of consequences ............................................. 50
5.2.2. Age of participants .................................................................................... 51
List of Tables

Table 1. Risky Scenarios Presented to Participants ..................... 27
Table 2. Consequences of Behaviour for which Participants Indicated
Their Level of Experience................................................. 30
Table 3. Concepts Identified through Content Analysis as Significant
Events Perceived to Affect Risk Taking ............................... 32
Table 4. Means and Standard Deviations of Anticipated Likelihood
of Engaging in Risk Taking Behaviours ............................... 33
Table 5. Summary of Hierarchical Regression Analysis with
Participant’s Self-reported Likelihood of Speeding as the Dependent
Variable ............................................................................. 35
Table 6. Hierarchical Regression of Age and Number of Positive
and Negative Consequences on Self-reported Likelihood of Speeding 36
Table 7. Hierarchical Regression of Age and Personality Variables on
Self-reported Likelihood of Speeding ................................. 38
Table 8. Means and Standard Deviations of Anticipated Likelihood of
Speeding Following Significant Life Events ....................... 40
Table 9. Significant Events Listed as Influencing Responses to
Questionnaire ................................................................. 42
Table 10. Means and Standard Deviations of Personality Variables
for Participants With and Without Children ....................... 43
Declaration

I declare that this report does not incorporate without acknowledgement any material previously submitted for a degree in any University, College of Advanced Education, or other educational institution, and that to the best of my knowledge and belief in does not contain any material previously published or written by another person except where due reference is made in the text.

I further declare that the ethical principles and procedures specified in the Faculty of Life and Social Sciences Human Research Ethics Committee document have been adhered to in the preparation of this report.

Name: Shelley Connell

Signed:
Abstract
The study aimed to compare two competing theoretical explanations for young adult risk taking. A cognitive developmental theory was compared with a psychosocial developmental theory identifying a new life phase: emerging adulthood. The primary risky behaviour investigated was speeding down an open highway. Three hundred and eight participants aged 18 to 66 completed an internet questionnaire. The hypotheses that self-perceived likelihood of speeding would decrease with age and that males would report greater likelihood of speeding were supported, with no interaction between gender and age. Contrary to expectations, the number of consequences anticipated as a result of speeding did not increase with age; rather the number of positive consequences anticipated decreased with age and this mediated the relationship between age and anticipated likelihood of speeding. Younger participants were less future oriented, more present oriented and more sensation seeking than older participants. Sensation seeking mediated the relationship between age and self-reported likelihood of speeding. The impact of life experiences on anticipated risk taking was investigated using a mixed methods approach combining quantitative and qualitative data. The results suggested a number of life experiences which were perceived to affect risk taking and could be investigated in future research. The findings generally supported the psychosocial developmental explanation for risk taking in early adulthood and suggestions for further research are given.
Chapter 1. Introduction

On April 17, 2005, nine young Australians were arrested for drug trafficking offences in Bali, Indonesia (Powell, 2005, April 19). Today, six of them are on death row, awaiting death by firing squad, two are serving life and one serving 20 years in an Indonesian jail (Foreign Prisoner Support Services [FPSS], 2007). Perhaps they did not consider the consequences of their actions, perhaps they thought they would not be caught, yet at the time of their arrests, another young Australian was detained in an Indonesian jail for drug trafficking offences and her verdict and sentence were as yet unknown (Powell, 2005, April 15). All the evidence suggested that Indonesia’s stance on drugs was very severe indeed. What could be the rationale behind taking such flagrant risks with their lives? Eight of the “Bali Nine” were male, and all were under the age of 30 (Powell, 2005, April 19). While immaturity could be an explanation for the poor judgement shown in this instance, it is worthwhile investigating what is meant by maturity of judgement and its relation to decisions about risk taking behaviour.

Young adults are an extremely vulnerable group in society. In Australia, 18 to 25 year olds are disproportionately represented in the road toll (Transport Accident Commission [TAC], 2006) and the 15 to 24 year old age group has the second highest proportion of reported injuries (17%), closely following the 0 to 14 year old age group (18%) (Australian Bureau
of Statistics [ABS], 2003). Males between the ages of 24 and 29 are the most represented group in Australian prisons (ABS, 2002). If immaturity leads to poor decisions, this immaturity is having devastating consequences on a large portion of Australian society. Some countries have responded to the tendency of young people to engage in risk taking behaviour by increasing the legal drinking age, as in the United States (Alcohol Policy Information System [APIS], 2007), or enforcing a probationary period for young drivers, which includes a zero blood alcohol level, as in Australian states such as Victoria (Royal Automobile Club of Victoria [RACV], 2005). These measures may be useful, but if people learn from experiencing negative consequences, then these measures will simply delay the onset of the period of greatest susceptibility to risk. Therefore, an understanding of the factors that predict decisions to engage in risk taking behaviour will better inform interventions to protect young adult Australians.

1.1. Decision theory

Theories about how people make decisions have informed research about a number of issues, including ethics (e.g., Latham, 2006), jury processes (e.g., Arkes & Mellers, 2002), consumer behaviour (e.g., Moscati, 2007) and health choices (e.g., Jones, 2007). The concept is of interest to areas as diverse as mathematics, psychology, economics and neuroscience (Sanfey, Loewenstein, McClure & Cohen, 2006). Decision theory includes the two highly interrelated fields of normative decision theory, which is
concerned with the process people should follow in order to reach optimal decisions, and descriptive decision theory, which attempts to describe the processes which people do follow in the non-ideal circumstances of the real world. Descriptive decision theory often examines how actual decision making differs from the heuristics prescribed by normative decision theories, and involves the incorporation of factors such as societal norms and personal values with the purely cognitive elements of the normative theories (Yates & Stone, 1992).

Thus the heuristics identified in normative theories form a subset of the decision making process described by descriptive theories. The root of decision theories lies in expectancy value theory, which suggests that behavioural intentions are the product of the expectation of a particular outcome occurring and the value placed on that outcome, or subjective expected utility theory, which is essentially the same concept, but allows for a more subjective value to be placed on the outcome. Subjective expected utility theory can be described mathematically as

$$\text{Subjective Expected Utility} = \sum p(x)u(x)$$

where $p$ represents the likelihood of the specific outcome, $x$, and $u$ represents the subjective value of that outcome. It can be seen that in making a decision whether or not to participate in any potentially risky behaviour, a person must first generate all the potential outcomes of the behaviour, next assess the likelihood and the desirability of each of those
outcomes, then combine these assessments in order to make a judgement as to whether or not engaging in the behaviour has subjective expected utility, or if it is a good idea.

Examination of the decision making processes that occur when a person is faced with behaviours that have a number of uncertain outcomes is clearly relevant to decisions about risk taking behaviour. The *Oxford English Reference Dictionary* (1995) defines risk as “a chance or possibility of danger, loss, injury or other adverse consequences” (p.1242). According to this definition, almost any behaviour could be termed risk-taking behaviour since there is no specification of what the probability of the loss occurring needs to be in order for the behaviour to be risky (Yates & Stone, 1992). Yates and Stone use subjective expected utility theory to define risk as consisting of three elements: the potential losses and potential gains, the significance of each of those outcomes and the uncertainty of the outcomes. They also point out that, with any behaviour choice, the potential gains must also be considered as well as the importance and probability of those gains.

The road toll statistics suggest that the final behaviour after the decision making process is different for younger adults than for older adults. This in turn intimates that some step or steps in the process may be generating different outputs which input into the final decision or behavioural intention. An important step in the analysis proposed by subjective expected utility theory is the initial generation of the potential
outcomes of engaging, or not engaging, in the behaviour. The differences between adolescents and adults in their generation of potential consequences from a given situation or behaviour has been investigated as a possible explanation for the increased risk taking among young people (see Beyth-Marom & Fischhoff, 1997, for a review). There are many different possible explanations for these differences, including two which come from different theoretical positions. The cognitive developmental perspective suggests that the cognitive abilities required in order to generate possible outcomes are still developing as individuals go through adolescence into adulthood. In contrast, a psychosocial perspective suggests a new phase in the lifespan: emerging adulthood. The advent of this phase is a social phenomenon which has appeared as some of the social milestones traditionally marking adolescence are reached earlier than previous generations, but other milestones, for example, parenthood, are reached much later.

1.2. Cognitive developmental approach

The generation of potential outcomes from a situation or behaviour requires a number of higher order cognitive processes. Counterfactual thinking refers to the ability to run through a scenario as if the behaviour has been engaged in, generate the possible consequences, follow through the consequences of those immediate outcomes, and perform the same process imagining the behaviour has not been engaged in. This requires thought
processes which are believed to typically develop late in adolescence (Baird & Fugelsang, 2004).

1.2.1. Description of the cognitive developmental approach to decision making

The main premise of cognitive developmental theories is that development is an interaction between physical maturation (in this case brain maturation) and experience, which helps to shape the cognitive processes (Kohlberg, 1969). Stage-sequence models, generally based on Piaget (1954), look at the different stages individuals go through, and the skills they acquire during each stage which enable adaptation to the environment. The development of judgement, or moral reasoning, has been investigated according to these models by Piaget himself, as well as researchers such as Kohlberg and those who follow a neo-Kohlberg approach (e.g., Gibbs, Basinger, & Fuller, 1992). Particular skills which may contribute to decision making are generally attributed by most models to development in adolescence.

Piaget (1954) believed formal abstract reasoning, or formal operational thinking, was achieved during adolescence. This stage includes the ability to engage in hypothetico-deductive reasoning, or the development of theories and the operations required in order to develop and test specific hypotheses to determine which theory is correct. Reasoning is no longer dependent upon concrete facts; it is possible to deduce
conclusions which follow from theoretical premises. One of the cognitive developments facilitating hypothetico-deductive reasoning is decentration. This is the skill which enables the individual to focus on more than the central issue, to look at other ways of viewing the event and to put it in context (Gibbs et al., 1992). According to Piagetian models of development, decentration is a concept which is initially developed in the early school years, when children learn not to concentrate solely on one property of a problem, for example, the height of a liquid, at the expense of other properties, such as the width of the container. Decentration generalises as the individual matures, so that mature adults are able to broaden their own personal perspectives to look at situations from other people’s points of view, and also to see more than the immediate situation and view it in terms of the past and see the potential future consequences.

Cognitive developmental approaches to moral judgement emphasise decentration as one of the mechanisms by which adolescents learn to make their own decisions about right and wrong, rather than relying on what they have been taught about moral behaviour (Gibbs et al., 1992).

While Piaget (1954) believed that formal operations, with its abstract reasoning, was the end of development, later theorists (e.g., Sinnott, 1998) have posited a post-formal operations stage in which differences in context can be integrated into the deductions drawn. This suggests there is further development occurring in adulthood.
1.2.2. Neuropsychological perspective to the cognitive developmental approach

In recent years there has been a movement towards integrating the fields of economics, psychology and neuroscience in research into decision making (Sanfey et al., 2006). This research has demonstrated separate areas of the brain being excited by each element of the subjective expected utility equation. The striatum has been implicated in the determination of the value of an outcome, \( u(x_i) \), with the medial prefrontal cortex being involved in the calculation of the expected probability of the outcome occurring, \( p(x_i) \). In performing the calculation of what the expected utility is, based on the probability and value, the lateral intraparietal area appears to be involved (Sanfey, 2007). In addition to the evaluation of probability, the prefrontal cortex, in particular the dorsolateral prefrontal cortex, has also been implicated in the generation of potential outcomes from hypothetical situations (see Baird & Fugelsang, 2004, for a review).

The role of the prefrontal cortex in decision making is relevant to the cognitive developmental approach because this area is still maturing throughout adolescence and possibly beyond. Two changes in particular may be relevant to the process of decentration. The first of these is synaptic pruning which results in a decrease of grey matter in the brain and may facilitate the integration of emotional processing with cognitive processing, allowing a more holistic analysis of new situations. The other prominent
change, the increase of white matter in the brain as a result of further myelination, allows messages to be passed around the brain more rapidly, thereby enabling the generation and subsequent processing of more potential outcomes. Baird and Fugelsang (2004) have suggested that the reason for the delay in the full development of this region may be that it allows individuals to adapt to the environment in which they will spend their adult lives.

Hudspeth and Pribram (1990), in a re-analysis of quantitative electroencephalogram results and other brain measurements, demonstrated a stage-sequence model of brain maturation. They were able to show evidence for changes relating not only to Piaget’s (1954) original stages, but also for the proposed stage of post formal operations occurring in early adulthood.

1.3. Psychosocial approach

Rather than viewing differences in decision making between young adults and older adults as being due to cognitive deficits, they can be viewed as resulting from group differences in the salient aspects of the situation. This still affects the inputs to the subjective utility equation but in a different way.
1.3.1. Early psychosocial approaches to development

Erikson’s (1964) psychosocial theory of development concentrated on the conflicts which need to be resolved at each stage in the lifespan, rather than the cognitive skills which are acquired. The resolution of each conflict, through interaction with the environment, leads to the formation of the individual’s ego identity. For example, the first stage is identified by the conflict of trust versus mistrust, where the infant learns from the warmth and responsiveness of his/her parents that the world can be trusted.

Erikson’s theory has an advantage over Freud’s (1926) psychosexual theory of development, upon which it is based, in that his eight stages include the adult years, acknowledging a continuing interaction between individuals and their environments throughout their lives. Two conflicts are of particular interest to the discussion of decision making in young adulthood. The first conflict is identity versus identity confusion, where adolescents define who they are as people and what is important to them. The second conflict of intimacy versus isolation is where the young adult attempts to create and maintain intimate relationships with others (Erikson).

1.3.2. Emerging Adulthood

In response to changes in society, and therefore the environment in which the individual develops, Arnett (2000a) has proposed a new phase of development, referred to as emerging adulthood, which is applicable to young people in their twenties in Western society. This stage is between
adolescence and young adulthood, and is suggested because major life transitions such as starting a career and having children occur later than in previous decades, while other transitions such as the onset of puberty and leaving home are occurring earlier.

Arnett (2000a) suggests that this period of emerging adulthood contains many of the characteristics and conflicts which Erikson (1964) defined as belonging to adolescence, such as identity exploration. Emerging adulthood is also a period of instability, feeling in-between, being focused on the self and of possibilities. The characteristic of identity exploration suggests that young people will be sensation seeking and will embrace as many experiences as they can. Combined with the view of emerging adulthood as the age of possibility, this suggests that people in this age group would find the positive aspects of a scenario to be more salient than would older adults. Similarly, the present would be more salient than the future, as new ideas are still being explored.

While the traditional concept of concrete events which mark the transition into and out of emerging adulthood has been rejected in favour of more intangible psychological states of mind (Arnett, 2000a), it has been acknowledged that one event which can shorten the stage of emerging adulthood is that of becoming a parent (Arnett, 2006).
1.4. Implications of the cognitive developmental approach and psychosocial developmental approach for risk taking of young males

Any exploration of risk taking among young adults would be incomplete without addressing the prevalence of young males in, for example, the road toll of drivers and in prisons. The two theoretical approaches previously described have very different implications regarding risky behaviours in males.

1.4.1. Predictions of each approach

The cognitive developmental approach. From the cognitive developmental perspective, the gender differences in risk taking behaviour could be explained by differences in cognitive development. By taking a neuropsychological perspective, differences in the rate at which the brain matures could be implicated. This idea was explored in a study of gender differences in moral maturity in early adolescence (Silberman & Snarey, 1993) which found that girls demonstrated moral maturity two years ahead of boys. In a more direct measurement of brain maturation, De Bellis et al. (2001) found an interaction between gender and age in changes to cerebral grey and white matter in 118 children and adolescents aged 6 to 17 years of age. Contrasting with Silberman and Snarey, however, the interaction De Bellis et al. found was that males had more pronounced decreases in grey matter and increases in white matter, which suggests a greater rate of cognitive maturation than females.
The psychosocial developmental approach. In contrast, the psychosocial approach of emerging adulthood does not anticipate any interaction between gender and risk taking. One of the social changes which is argued to precipitate the emerging adulthood stage is the vast expansion of educational and occupational opportunities for women (Arnett, 2000a). With women’s environment becoming more similar to that of men during this period, it would not be anticipated that age-related gender differences in behaviour would be apparent.

1.4.2. Evidence regarding males and risk taking

The number and type of consequences to risk taking behaviour identified by young men and women was investigated in a study of undergraduate psychology students at the University of California (Harris, Jenkins, & Glaser, 2006). Males in the study reported they would be more likely to take risks in the domains of health, recreation and gambling than women although this did not apply to the social domain. Women believed that negative consequences were more likely and more severe than men’s ratings for the same activities. While males’ risk-taking behaviour was primarily determined by their evaluation of the severity of possible consequences, females’ behaviour was more likely to be based on the evaluated likelihood of any injury or loss occurring. Women in the study also anticipated less enjoyment from the risky activities, should the negative consequences not occur, than men did. The authors suggested that these
findings could be interpreted using evolutionary explanations, either in
terms of men engaging in risk-taking behaviour in order to attract a mate, or
women avoiding risk taking behaviour because they need to be more aware
of risks in the world in order to protect their children.

1.5. Investigation of the cognitive developmental and psychosocial
developmental approaches using number of consequences

One way of investigating the cognitive and psychosocial approaches
to explaining risk taking behaviour is to look at the number of consequences
adults of different ages can see arising from various situations. While both
approaches predict differences between younger and older adults in the
consequences generated, the cognitive approach predicts quantitative
differences whereas the psychosocial approach predicts qualitative
differences.

1.5.1. Predictions of each approach

The cognitive approach predicts that increased risk taking behaviour
in younger adults would be due to a lower cognitive capacity. Specifically,
the approach would predict that younger adults would not be able to
generate as many consequences from a scenario or behaviour as older
adults. Because this is due to cognitive deficits, the type of consequence
would not matter.
The psychosocial approach, however, would suggest that the differences would be due not to cognitive differences but in differences in what is judged to be important. Because emerging adulthood is seen as a time of optimism and exploration, this theory would predict that younger adults might see less negative consequences but they would see more positive consequences and this would explain their increased risk taking behaviour.

1.5.2. Evidence regarding age-related number of consequences

Several studies have compared younger and older people on the number of consequences they can generate for various risk taking scenarios. American middle to upper class parents and adolescents were compared in the number of consequences they could generate from various courses of action (Beyth-Marom, Austin, Fischhoff, & Palmgren, 1993). The authors found that adults generated more consequences of drinking and driving as well as smoking marijuana than adolescents did, although both groups reported more negative consequences than positive.

Lawton and associates investigated attitudes toward speeding in a community sample in the United Kingdom (Lawton, Parker, Stradling, & Manstead, 1997). In a number of scenarios of different road conditions, younger people and those who felt that the potential negative consequences were less important were more likely to report speeding under all the conditions, and the conditions in which people were most likely to speed
were down a dual carriageway or motorway at 10 miles per hour over the speed limit.

1.6. Investigation of the cognitive developmental and psychosocial developmental approaches using personality variables

A person’s thinking about the consequences of situations can be investigated not only in terms of how many consequences can be identified in a specific situation but also in terms of a general style of relating to the world. Two aspects of personality which may be relevant to risk taking behaviour are time orientation, or the degree to which an individual takes into consideration the past, present and future in day to day living, and sensation seeking, or the degree to which an individual seeks out new and stimulating experiences.

Zimbardo and colleagues (Boyd & Zimbardo, 2005; Zimbardo & Boyd, 1999) have investigated the notion of time perspective, which is the way individuals organise their experiences according to timeframes. Thus, a future-oriented individual might consider the potential consequences a particular choice of action might bring, whereas someone who was less future-oriented but more present-oriented might choose to “live in the moment” and not think about the long-term effects. The facets of time orientation which they have identified are future, present-hedonistic (‘live in the moment’), present-fatalistic (‘there’s no point in thinking of the future’), past-positive and past-negative. Although these facets are independent, a
tendency of an individual to favour one or two domains over others, referred to as a 
*temporal bias*, may become a style of relating to the world, and part of the individual’s disposition. Because of the multi-faceted nature of time perspective, Zimbardo and Boyd caution against placing too much emphasis on one dimension, and suggest profiling people in terms of the particular facets which they use the most as well as those they use the least.

It has been suggested that future time perspective requires not only the cognitive ability to generate and weigh the risks and benefits, but also the psychosocial skill of being able to forego immediate gratification for long-term gain (Steinberg & Cauffman, 1996).

The concept of sensation seeking began in an investigation of individuals who participate in extreme sports. According to Zuckerman’s (1994) theory, certain individuals have a lower base level of stimulation, and therefore need to increase their level using external stimulation. As a result, they involve themselves in extreme sports, and other types of risk behaviour such as gambling, unsafe sex and risky driving. While personality is considered to be a fairly stable construct once formed, there is some evidence of changes throughout the adult lifespan (McAdams, 2002). These changes are considered to be very modest after the age of 30 (Terracciano, Costa & McCrae, 2006) and the causes are not well understood (Costa & McCrae, 2006). Sensation seeking, more than many other personality traits, has been demonstrated to decrease with increasing
age, although Zuckerman has attributed this to generational rather than developmental differences. Some longitudinal studies, however, have shown decreases in sensation seeking as the participants get older.

1.6.1. Predictions of each approach

The cognitive developmental approach proposes less mature thought processes in young adults. For this theory, continuing decentration throughout adulthood, in this respect in relation to time, would imply that present orientation would decrease with age and future orientation would increase with age and that this would explain the higher risk taking behaviour of younger adults.

The exploratory nature of emerging adulthood suggests that sensation seeking would offer a better explanation of the increased risk taking in this phase of life. This is because younger people would be more sensation seeking than older people as they seek out new experiences and stimulation.

1.6.2. Evidence regarding time orientation and sensation seeking in risk taking

Temporal perspective has been linked to a number of behaviours, including health behaviours such as breast examinations and various types of risk-taking behaviour (see Boyd & Zimbardo, 2005 for a review). An investigation of risky driving behaviours among college students from
various United States universities found that both present-hedonistic and future orientations were related to risk taking while driving, and to speeding (Zimbardo, Keough, & Boyd, 1997). Present-hedonistic orientation was the strongest of the time orientation predictors of risky driving behaviours, and was positively related to risk taking while driving, while future orientation was also a significant predictor and was negatively related to risky driving behaviours. The series of studies also found evidence that present orientation was a separate predictor from sensation seeking, and independently contributed to the model, although sensation seeking was the stronger predictor (Zimbardo et al.).

Another study which looked at time perspective was a study comparing secondary school students with adult age college students on three dimensions of judgement maturity: responsibility, temperance and perspective (including time perspective) (Cauffman & Steinberg, 2000). The researchers found increases in time perspective among the high school students. However, they were unable to find any significant increase after approximately 19 years of age. A possible methodological explanation is that the adults in their study were all college students. Because development is an interaction with the environment, it would be useful to investigate perspective using a wider age range, and participants who have achieved independence, both by living independently and by being employed in their chosen occupations.
1.7. Implications of the cognitive developmental and psychosocial developmental approaches with respect to life experience

Both the cognitive developmental approach and the psychosocial developmental approach could predict an impact of experience on risk taking behaviour. The predictions for each approach would be very similar.

1.7.1. Predictions of each approach

The cognitive developmental approach assumes an interaction between the organism and the environment. Therefore, experience is one of the mechanisms, in addition to simple age-related maturation, which would modify the structure of the brain (Hudspeth & Pribram, 1990). Interaction with the environment would include experience of potential negative consequences of behaviour. It could also include general life experiences such as becoming a parent. Both types of experience would provide learning opportunities and potentially impact on the likelihood of engaging in risk taking behaviour.

Psychosocial developmental approaches such as emerging adulthood would suggest similar outcomes. According to Arnett’s investigations into emerging adulthood, the one event which is most likely to curtail the period is that of having a child (Arnett, 2006). Therefore, it could reasonably be expected that having a child might affect a person’s decisions about engaging in any risk taking behaviour.
1.7.2. Evidence regarding the impact of experience on risk taking behaviour

In a study of criminal decision making, Fried and Reppucci (2001) showed video footage of a delinquent act to adolescents in detention and adolescents of a similar age who were not in detention. The researchers found that adolescents in detention were more likely to consider the potential future consequences of the decisions shown than similar adolescents who had not been in detention. Adolescents in detention were also less likely than their non-detained counterparts to consider the influence of peers on the actions of the youths in the video. The findings of these authors suggest that the experience of negative consequences of decisions can affect the way future decisions are processed.
Chapter 2. The current study

2.1. Research Aims

The cognitive developmental and psychosocial developmental approaches clearly have different predictions for many aspects of risk taking behaviour. The self-reported likelihood of engaging in various risky behaviours does not necessarily reflect actual behaviour, but it does reflect behavioural intention, which is an element of actual behaviour (Ajzen, 1991). The aim of the present study was to compare the cognitive developmental and psychosocial developmental theories in explaining behavioural intention. This was achieved by investigating the predictions of the cognitive developmental approach. While there is strong evidence that adolescent cognition is different to adult cognition, evidence from neuroscience, the road toll and prison populations suggest that the differences should also be apparent between younger adults and older adults.

2.1.1. Risk taking behaviours investigated

For the purpose of the present study, the risk taking behaviours investigated were those which could potentially lead to the consequences in which young adults are disproportionately represented. For example, risky driving behaviours and illegal behaviours.
2.1.2. Investigation of consequences anticipated

Previous research had suggested that there are limitations to asking participants to select rather than generate consequences (Beyth-Marom et al., 1993), however in the interests of reducing the time taken to complete the survey and avoiding boredom rather than cognitive processes being the determining factor in the number of consequences generated, selection was the approach utilised. Allowing for indirect consequences necessitated counterfactual thinking in generating not only immediate outcomes, but also the potential consequences of those outcomes.

2.2. Hypotheses

2.2.1. Hypotheses regarding predictive value of age and gender

Silberman and Snarey’s (1993) findings of differences between males and females in the development of moral judgement suggested that males and younger people would engage in more risk taking behaviour, and that there would be an interaction between age and gender in the prediction of risky behaviour.

Hypothesis 1.1. It was hypothesised that reported anticipated likelihood of engaging in risk taking behaviour would decrease with participants’ age.

Hypothesis 1.2. It was expected that males would be more likely to anticipate engaging in risk taking behaviour than females.
Hypothesis 1.3. It was further anticipated that there would be an interaction between gender and age in predicting participants’ reported likelihood of engaging in risk taking behaviour.

2.2.2. Hypotheses regarding mediating effect of number of consequences

The cognitive developmental approach suggested that, as in the study of Beyth-Marom et al. (1993), younger people would see fewer consequences of the risk taking behaviours than older people. The anticipated relationship between number of consequences and anticipated likelihood of risk taking, as suggested by the relationship found with attitude towards speeding (Lawton et al., 1997), was expected to mediate the predictive value of age.

Hypothesis 2.1. It was expected that the number of consequences, both negative and positive, of risk taking behaviour identified would increase with the age of participants.

Hypothesis 2.2. It was further expected that the number of consequences would mediate the relationship between age and engaging in risk taking behaviour.

2.2.3. Hypotheses regarding mediating effect of personality variables

Zimbardo et al.’s (1997) study into risky driving behaviours suggested that present and future time orientation, as well as sensation
seeking would be related to risky behaviours. Similar findings were anticipated in the present study.

*Hypothesis 3.1.* Younger people were expected to be less future-oriented and more present-oriented than older people.

*Hypothesis 3.2.* It was expected that this difference in time orientation would also mediate the relationship between age and engaging in risk taking behaviour.

*Hypothesis 3.3.* Sensation seeking was expected to contribute to the prediction of risk taking behaviour, but time orientation was still expected to predict risky behaviour when sensation seeking was controlled for.

2.2.4. Research question regarding the impact of experience

The impact of experiences was also investigated. Because of the similarities between predictions from the two approaches, this was an exploratory research question.

*Research Question.* The final research question was whether experiences such as having a child, or suffering negative consequences such as injury, loss of a friend or legal consequences impacted on people’s decisions to engage in risk taking behaviour.
Chapter 3. Method

3.1. Participants

Three hundred and ten people completed the survey, although two females were removed from the analysis because they were outliers based on their ages (over 70 years). The final participants were 188 ($M = 35.1$ years, $SD = 10.9$ years) females from 18 to 65 years old and 120 ($M = 39.2$ years, $SD = 10.4$ years) males from 18 to 66 years. The great majority of participants (92.9%) resided in Australia. A majority (84.7%) described their nationality as Australian.

Participants were recruited via email from a sample of convenience, that is, acquaintances of the student researcher, making use of the snowball effect. The email directed potential participants to a web address which contained the plain language statement and continued to the survey. Because of this method of recruitment, it was not possible to determine refusal rates. Participation was voluntary and anonymous, with completion of the survey being interpreted as consent for participation in the survey.

Constraints on the length of the survey and the time it would take participants to complete precluded questions on educational background, employment status or socio-economic status. Due to the nature of recruitment and the use of the internet for response, respondents were anticipated to be predominantly tertiary educated and financially secure.
3.2. Materials

All the measures were combined into an internet questionnaire, a copy of which is contained in Appendix A. This survey was compiled using the Opinio software. Physical maturity was measured simply as the age of the participant in whole years. Participants were also asked to indicate their gender, country of residence and nationality.

Participants responded to a number of questions regarding their anticipated behaviour in four scenarios, listed in Table 1. For each scenario, they were asked how likely they would be to engage in the behaviour described.

Table 1
*Risky Scenarios Presented to Participants*

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driving Home</td>
<td>You’ve had a few drinks with friends, and now it’s time to go home. You figure you’re probably all right to drive. How likely would you be to drive home in this situation?</td>
</tr>
<tr>
<td>Lady Luck</td>
<td>How likely would you be to bet with your whole week’s pay?</td>
</tr>
<tr>
<td>An idea</td>
<td>Someone you know asks you if you will carry a package from Australia to Malaysia for them. They offer you a large amount of money to do this. How likely would you be to do this?</td>
</tr>
<tr>
<td>The need for speed</td>
<td>It’s a bright, sunny day and you are driving with your friends down a country highway. There is not another person in sight. You want to see how fast you can go. How likely would you be to speed in this situation?</td>
</tr>
</tbody>
</table>

*Note.* Likelihood of engaging in the behaviour was indicated on a scale from 1 (“Extremely Unlikely”) to 5 (“Extremely Likely”)
In order to test the hypotheses regarding the mediating effect of the number of anticipated consequences, hypotheses 2.1 and 2.2, the number of consequences participants could generate for each scenario was determined. This variable was measured by asking the participant to select the possible outcomes from a list of 30. The potential outcomes ranged from obvious immediate outcomes such as “I could lose money” through distantly related outcomes (e.g., “My future career choices could be limited”) to apparently unrelated outcomes (e.g., “The Australian economy could be affected”). The potential outcomes included 7 positive outcomes and 23 negative outcomes.

Future and Present orientation, utilised in hypotheses 3.1 to 3.3, were measured using the Zimbardo Time Perspective Inventory (ZTPI) (Zimbardo & Boyd, 1999). Two scales were utilised – Future and Present Hedonistic. Each scale consisted of items for which responses were selected from a 5-point Likert scale with responses ranging from 1 (“not at all like me”) to 5 (“very like me”). The 13-item Future scale asked respondents to endorse items that indicated a tendency to think of the future (e.g., “I believe that a person’s day should be planned ahead each morning”) resulting in a score from 13 to 65, while the 15-item (scores from 15 to 75) Present-Hedonistic scale contained items which suggested a tendency to immerse oneself in the present and enjoy it (e.g., “I try to live my life as fully as possible, one day at a time”). Zimbardo and Boyd found the future
(Chronbach’s $\alpha = .77$) and present-hedonistic (Chronbach’s $\alpha = .79$) scales to be reliable. The future time orientation (Chronbach’s $\alpha = .76$) and present-hedonistic (Chronbach’s $\alpha = .83$) were found to be moderately internally reliable for the sample of participants in the present study.

Sensation seeking, for hypothesis 3.3, was measured using the Brief Sensation Seeking Scale as developed by Hoyle, Stephenson, Palmgreen, Pugzles, Lorch and Donohew (2002). This consisted of eight items (e.g. “I would like to explore strange places”) with responses indicated on a 5-point Likert scale. Hoyle et al. found the scale to be reliable (Chronbach’s $\alpha = 0.76$). The scale was also found to be internally reliable in the current study (Chronbach’s $\alpha = .73$). The original scale had responses labelled “strongly disagree”, “disagree”, “neither disagree nor agree”, “agree”. This was changed for the present study to label only the extremities “Not at all like me” and “Very much like me” so the items could be interleaved with the ZTPI (Zimbardo & Boyd, 1999) items.

The research question regarding experience was explored with a mixed methods approach combining quantitative and qualitative data. A triangulation mixed methods design was used, a design in which different but complementary data is collected on the same topic. In the present study, in addition to the quantitative variables already described, experience of consequences was measured by asking participants what experience they had of a variety of potential consequences (see Table 2) from the original
scenarios. Participants were asked the extent of their involvement in the experience, and could select as many options as were relevant from: “I didn’t know the people concerned – I saw it/heard about it through the media”, “I didn’t know the people concerned, but I was told about it by someone who did know the people concerned”, “I had met at least one of the people once or twice”, “At least one of the people was a distant relative or acquaintance of mine”, “At least one of the people was a close relative or friend of mine”, “I (have faced the consequence) myself”. Participants were also asked whether they had children or not, in order to determine whether they had this life experience.

Table 2

Consequences of Behaviour for which Participants Indicated Their Level of Experience

<table>
<thead>
<tr>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Someone who has won a lot of money gambling</td>
</tr>
<tr>
<td>Someone losing a lot of money gambling</td>
</tr>
<tr>
<td>Someone having to go to court because of a car accident</td>
</tr>
<tr>
<td>Someone having to face other legal consequences because of a car accident</td>
</tr>
<tr>
<td>A car accident in which serious injury occurred</td>
</tr>
<tr>
<td>A car accident in which death occurred</td>
</tr>
<tr>
<td>Someone having to go to court for any reason at all</td>
</tr>
<tr>
<td>Someone who has had to face other legal consequences for any reason at all</td>
</tr>
</tbody>
</table>

The qualitative data was collected using an open-ended question, inviting participants to write about any events that had happened in their lives which had changed the way they responded to the previous questions.
This provided another way of identifying experiences which might have influenced their risk taking behaviour and judgements about potential consequences.

3.3. Procedure

Following completion of the survey by participants, responses were stored in the Opinio database and then exported as data files for statistical analysis. The raw data files and subsequent analysed files were stored on a password-protected computer.

The responses to the final, qualitative, question were investigated using content analysis. The majority of responses were short and mentioned between one and four concepts as simple sentences or bullet points. The original 34 categories were reduced to 20 concepts in order to facilitate clearer representation. An example of this was combining comments such as “breakup of relationships”, “separation”, “My sister who gave me a lot of the emotional support I needed growing up, went overseas for 2 years” and “being a single after a failed relationship” into the category of Disrupted relationships. The final 20 concepts or groupings are shown in Table 3. The coding instructions to identify concepts within each response are attached as Appendix B.
Table 3  
*Concepts Identified through Content Analysis as Significant Events Perceived to Affect Risk Taking*

<table>
<thead>
<tr>
<th>Having/Adopting a Child</th>
<th>Others’ Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disrupted Relationships</td>
<td>Witness/Close Call</td>
</tr>
<tr>
<td>Legal Consequences</td>
<td>Own Illness</td>
</tr>
<tr>
<td>Mental Health</td>
<td>Everyday Stuff</td>
</tr>
<tr>
<td>Work</td>
<td>Financial Difficulties</td>
</tr>
<tr>
<td>Physical Limitations</td>
<td>Role Models</td>
</tr>
<tr>
<td>Location of Living</td>
<td>Government</td>
</tr>
<tr>
<td>Non Violent Death</td>
<td>Learning, Faith, Therapy</td>
</tr>
<tr>
<td>Violent Death</td>
<td>Abuse</td>
</tr>
<tr>
<td>Others’ Illness</td>
<td>Financial Loss</td>
</tr>
</tbody>
</table>
Chapter 4. Results

The raw data were processed using the statistical software package SPSS for Windows, Release 11.5.0. For each of the risk-taking behaviours investigated, the means and standard deviations of the anticipated likelihood of engaging in the behaviours for males and females are shown in Table 4. A two-tailed t-test was used to determine whether there was a significant difference between males and females for each risk taking behaviour.

Table 4
Means and Standard Deviations of Anticipated Likelihood of Engaging in Risk Taking Behaviours

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Males (n = 120)</th>
<th>Females (n = 188)</th>
<th>t-test (df = 306)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Drinking and driving</td>
<td>2.72</td>
<td>1.32</td>
<td>2.32</td>
</tr>
<tr>
<td>Gambling</td>
<td>1.28</td>
<td>0.82</td>
<td>1.15</td>
</tr>
<tr>
<td>Carrying a package</td>
<td>1.21</td>
<td>0.72</td>
<td>1.14</td>
</tr>
<tr>
<td>Speeding</td>
<td>2.63</td>
<td>1.21</td>
<td>1.96</td>
</tr>
</tbody>
</table>

N = 308
* p < .05. ** p < .01. *** p < .001.

It can be seen from Table 4 that there were no significant differences between males and females for the scenarios of gambling with a week’s pay or carrying a package from Australia to Malaysia. For both driving after a few drinks and speeding down an open highway, males reported a significantly higher likelihood of engaging in the behaviour than females.
With respect to the relationship between age and engaging in risk taking behaviour, the only scenario for which a significant relationship was found was the relationship between age and speeding down an open highway ($r = -0.17, p < 0.005$). Details of correlations for the other behaviours can be found in Appendix C. The weak, negative correlation between age and speeding suggested that younger adults were more likely to report they would speed than older adults. Because speeding was the only behaviour for which a relationship was found with both age and gender, this behaviour was utilised for the hypotheses regarding the potential explanations for the relationship between age and risk-taking behaviour.

4.1.1. Hypotheses relating to age, gender and interaction (Hypotheses 1.1 to 1.3)

In order to investigate further the predictive value of age and gender in likelihood of speeding, and any interaction between the two, a hierarchical multiple linear regression was performed with likelihood of speeding as the dependent variable. The independent variables of age and gender were introduced in the first stage, with the interaction variable (age by gender) introduced in the second stage. Age and anticipated likelihood of speeding were converted to $z$-values before the analysis, and the dichotomous variable of gender recoded to have values of 0 (female) or 1 (male), in order to determine effect sizes for the predictors and the interaction. The results of this analysis are shown in Table 5.
Table 5

Summary of Hierarchical Regression Analysis with Participant’s Self-reported Likelihood of Speeding as the Dependent Variable

<table>
<thead>
<tr>
<th>Variable</th>
<th>Stage 1</th>
<th>Stage 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$sr_i^2$</td>
<td>$\beta$</td>
</tr>
<tr>
<td>Age</td>
<td>.04***</td>
<td>-.22***</td>
</tr>
<tr>
<td>Gender</td>
<td>.10***</td>
<td>-.32***</td>
</tr>
<tr>
<td>Interaction term</td>
<td>&lt;.01</td>
<td>.05</td>
</tr>
</tbody>
</table>

$R^2$ change = .002

$R^2 = .128***$

Adjusted $R^2 = .123***$

$R^2 = .130$

Adjusted $R^2 = .122$

$N = 308$

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 5 shows that age and gender together explained 12.3% of the variation in self-reported likelihood of speeding down an open highway. The addition of the interaction term did not significantly explain any further variation. There was no significant interaction between age and gender in prediction of likelihood of speeding.

4.1.2. Hypotheses relating to mediating effects of number of consequences
(Hypotheses 2.1 and 2.2)

In order to test the hypotheses that younger people generated less consequences than older adults and that this mediated the relationship between age and risk taking behaviour, a hierarchical regression analysis was performed with speeding at the dependent variable. Age was the only
independent variable introduced in the first stage, with the potential mediators, number of positive consequences generated and number of negative consequences generated, added in the second stage. Data screening revealed one multivariate outlier, necessitating the removal of one participant from this analysis. The correlations between the variables and the results of the multiple hierarchical regression are shown in Table 6.

Table 6

Hierarchical Regression of Age and Number of Positive and Negative Consequences on Self-reported Likelihood of Speeding

<table>
<thead>
<tr>
<th>Var</th>
<th>Speed</th>
<th>Age</th>
<th>Pos</th>
<th>Neg</th>
<th>Age alone</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-.16**</td>
<td>.03*</td>
<td>-.16*</td>
<td>.01</td>
<td>-.08</td>
<td></td>
</tr>
<tr>
<td>Pos</td>
<td>.38***</td>
<td>-.22***</td>
<td>.17***</td>
<td>.44***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neg</td>
<td>-.18**</td>
<td>-.05</td>
<td>.25***</td>
<td>-.08***</td>
<td>-.29***</td>
<td></td>
</tr>
</tbody>
</table>

$M = 2.21$  
$SD = 1.16$  

$R^2 = .027**$  
$R^2_{\text{change}} = .206***$  
$R^2 = .233***$  
$\text{Adj } R^2 = 024*$  
$\text{Adj } R^2 = .226***$

$N = 307$

Note. Pos = number of positive consequences identified; Neg = number of negative consequences identified.

* $p < .05$. ** $p < .01$. *** $p < .001$.

It can be seen from the bivariate correlations in Table 6 that age was not significantly related to negative consequences. It was, however,
correlated with the number of positive consequences identified, in that younger people perceived more potential positive consequences than older people did. It can also be seen from Table 6 that number of positive consequences was positively related to intention to speed, and when this variable was added to the model, age was no longer a significant predictor. This indicates that the number of positive consequences foreseen mediates the relationship between age and anticipated likelihood of speeding. Table 6 also shows that when positive and negative consequences are added to the model, the model explains a further 20.6% of the variability in anticipated likelihood of speeding in the situation.

4.1.3. Hypotheses relating to mediating effects of time orientation and sensation seeking (Hypotheses 3.1 to 3.3)

A similar method was utilised to investigate the mediating effect of time perspective and sensation seeking on the relationship between age and risk taking behaviour. A hierarchical multiple regression was performed with intention to speed as the dependent variable. The independent variable of age was introduced at the first stage, with future time perspective, present-hedonistic time perspective and sensation seeking in the next stage. The results from this analysis are shown in Table 7.
Table 7
Hierarchical Regression of Age and Personality Variables on Self-reported Likelihood of Speeding

<table>
<thead>
<tr>
<th>Variable</th>
<th>Speed</th>
<th>Age</th>
<th>Future</th>
<th>Pres</th>
<th>Sens</th>
<th>Age</th>
<th>Time</th>
<th>Sensation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.16**</td>
<td>-.16**</td>
<td>.03**</td>
<td>-.11</td>
<td>&lt;.01</td>
<td>-.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Future time</td>
<td>-.13*</td>
<td>.13*</td>
<td>&lt;.01</td>
<td>-.06</td>
<td>&lt;.01</td>
<td>-.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present time</td>
<td>.22***</td>
<td>-.28***</td>
<td>-.33***</td>
<td>.02*</td>
<td>.17*</td>
<td>&lt;.01</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>Sensation</td>
<td>.28***</td>
<td>-.38***</td>
<td>-.28***</td>
<td>.67***</td>
<td>.02*</td>
<td>.20*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>2.22</td>
<td>36.69</td>
<td>45.29</td>
<td>43.23</td>
<td>20.58</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>1.17</td>
<td>10.89</td>
<td>7.21</td>
<td>7.87</td>
<td>5.86</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>R² change = .036**</td>
<td>R² change = .021**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>R² = .027**</td>
<td>R² = .063**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Adj R² = .024**</td>
<td>Adj R² = .054**</td>
<td></td>
</tr>
</tbody>
</table>

N = 308

* p < .05. ** p < .01. *** p < .001.
It can be seen from Table 7 that all the potentially mediating variables were significantly related to age. Age, future time perspective, present-hedonistic time perspective and sensation seeking were all significantly related to intention to speed. When future time perspective and present time perspective were added to the model, a further 3.6% of variability in intention to speed was explained, with only present time perspective a significant predictor at this stage. The addition of sensation seeking to the model explained a further 2.1% of variance. Only sensation seeking was a significant predictor at Stage 3, indicating that sensation seeking mediated the relationship between age and intention to speed.

4.1.4. Research Question regarding impact of experience

In order to explore whether life experiences, either related or unrelated to potential consequences of the behaviour, affected risk taking behaviour, independent samples t-tests were conducted comparing the intention to speed in those who had the experience, or had a close friend who had the experience, with those who had not. The means and standard deviations, and results of the difference tests, are shown in Table 8.

It can be seen from Table 8 that the people with experience, or with close friends or family with experience, of going to court or other legal consequences, as a result of a car accident or another reason, were significantly more likely to speed than those who did not have these experiences. The other life experiences investigated, such as the death or
injury of friends or being a parent, did not show a significant difference in the likelihood of speeding.

Table 8

Means and Standard Deviations of Anticipated Likelihood of Speeding Following Significant Life Events

<table>
<thead>
<tr>
<th>Experience</th>
<th>No Experience</th>
<th>Had Experience</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td>Court over Car</td>
<td>2.14</td>
<td>1.13</td>
<td>238</td>
</tr>
<tr>
<td>Legal over Car</td>
<td>2.13</td>
<td>1.15</td>
<td>249</td>
</tr>
<tr>
<td>Injured in Car</td>
<td>2.23</td>
<td>1.17</td>
<td>196</td>
</tr>
<tr>
<td>Accident</td>
<td>2.21</td>
<td>1.16</td>
<td>239</td>
</tr>
<tr>
<td>Court Any</td>
<td>2.06</td>
<td>1.09</td>
<td>141</td>
</tr>
<tr>
<td>Legal Any</td>
<td>2.03</td>
<td>1.10</td>
<td>195</td>
</tr>
<tr>
<td>Having children</td>
<td>2.28</td>
<td>1.15</td>
<td>180</td>
</tr>
</tbody>
</table>

N = 308

* p < .05. ** p < .01. *** p < .001.

Note. Court over Car denotes going to court because of a car accident; Legal over Car denotes any legal consequences as a result of a car accident; Injured in Car denotes being injured in a car accident; Accident denotes an accident in which death occurred; Court Any denotes going to court for any reason; Legal Any denotes any legal consequences for any reason.

Another method of investigating the impact of life experiences was the qualitative question. One hundred of the participants answered this question and mentioned significant life experiences which influenced their decisions regarding risk taking. The proportion of those who responded to the qualitative question who were female (67.0%) was somewhat higher
than the proportion of females in the whole study (61.0 %). The reported
likelihood of speeding among participants who responded to the qualitative
question seemed to follow a similar pattern to the results from the whole
sample, with 63 % of participants reporting they would be extremely
unlikely or unlikely to speed, compared with 64.6 % in the whole sample,
similarly, 18 % compared with 17.9 % reported they would be neither likely
nor unlikely, and 19 % compared with 17.5 % would be either likely or
extremely likely to speed. Some participants listed more than one
experience as contributing to their tendency to take risks. The significant
events identified through content analysis of the responses to this question
are shown in Table 9.

It can be seen from Table 9 that having a child was reported as a
significant event affecting their behaviour by a large proportion of people
who reported they would be unlikely to speed and also of those who would
be likely to speed. However, as Table 7 shows, no significant difference
was found between those with and without children in anticipated likelihood
of speeding down an open highway.
Table 9

*Significant Events Listed as Influencing Responses to Questionnaire*

<table>
<thead>
<tr>
<th>Significant Event</th>
<th>Unlikely (n = 63)</th>
<th>Neutral (n = 18)</th>
<th>Likely (n = 19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having or adopting children</td>
<td>28.6%</td>
<td>16.7%</td>
<td>21.1%</td>
</tr>
<tr>
<td>Disruptive or disrupted relationships</td>
<td>15.9%</td>
<td>15.6%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Nonviolent death of friends or family</td>
<td>14.3%</td>
<td>16.7%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Witness or close call of accident</td>
<td>14.3%</td>
<td>5.6%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Illness of friends or family</td>
<td>12.7%</td>
<td>5.6%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Learning, faith or therapy</td>
<td>11.1%</td>
<td>5.6%</td>
<td>15.8%</td>
</tr>
<tr>
<td>Violent death of friends or family</td>
<td>7.9%</td>
<td>11.1%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Work responsibilities</td>
<td>6.3%</td>
<td>5.6%</td>
<td></td>
</tr>
<tr>
<td>Living location</td>
<td>6.3%</td>
<td>11.1%</td>
<td>21.1%</td>
</tr>
<tr>
<td>Legal consequences</td>
<td>4.8%</td>
<td>5.6%</td>
<td></td>
</tr>
<tr>
<td>Injury of friends or family</td>
<td>4.8%</td>
<td>5.6%</td>
<td></td>
</tr>
<tr>
<td>Personal ill health</td>
<td>4.8%</td>
<td>11.1%</td>
<td></td>
</tr>
<tr>
<td>Everyday stuff</td>
<td>4.8%</td>
<td>5.6%</td>
<td></td>
</tr>
<tr>
<td>Role models</td>
<td>4.8%</td>
<td>5.6%</td>
<td></td>
</tr>
<tr>
<td>Loss of money through own or other</td>
<td>4.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal mental health issues</td>
<td>3.2%</td>
<td>16.7%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Hardship/Financial difficulties</td>
<td>3.2%</td>
<td>5.6%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Suffering abuse</td>
<td>3.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical restrictions</td>
<td>1.6%</td>
<td>5.6%</td>
<td></td>
</tr>
<tr>
<td>Government initiatives</td>
<td>1.6%</td>
<td>5.6%</td>
<td>5.3%</td>
</tr>
</tbody>
</table>
4.1.5. Post hoc analyses

A number of post hoc tests were suggested by the responses to the qualitative question. Post hoc analysis showed that of the 52 participants who had children and answered the qualitative question about significant events, 42.3% mentioned parenthood as a significant event affecting their behaviour.

The dominance of having children as a significant life experience suggested a post hoc comparison between the personality variables of differences between those with and without children in the personality variables of future time orientation, present-hedonistic time orientation and sensation seeking. The means and standard deviations were calculated for the variables of interest and are represented in Table 10.

Table 10
Means and Standard Deviations of Personality Variables for Participants With and Without Children

<table>
<thead>
<tr>
<th></th>
<th>No children (n = 180)</th>
<th>Have children (n = 128)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Future time orientation</td>
<td>44.42</td>
<td>7.55</td>
</tr>
<tr>
<td>Present hedonistic time orientation</td>
<td>44.87</td>
<td>7.58</td>
</tr>
<tr>
<td>Sensation seeking</td>
<td>22.21</td>
<td>5.83</td>
</tr>
</tbody>
</table>

N = 308
A one-way between-groups multivariate analysis of covariance indicated that when age was taken into account, there was still a statistically significant difference between people who had and did not have children, $F(3,303) = 3.17, p < .05; \text{Wilks' Lambda} = .970; \text{partial } \eta^2 = .03$. The results for the dependent variables were considered separately, utilising a Bonferroni adjusted alpha level of .017. Sensation seeking differed significantly between participants with and without children, $F(1,305) = 8.65, p < .005, \text{partial } \eta^2 = .03$. An inspection of the mean scores indicated that people with children were less sensation seeking than people who did not have children. Present-hedonistic time orientation did not differ significantly when age was statistically controlled for as a covariate, $F(1,306) = 4.91, p > .017$, observed power = .60, nor did future time orientation, $F(1,306) = 2.56, p > .017$, observed power = .36.
Chapter 5. Discussion

The risk taking behaviour intention investigated was speeding down an open highway. The hypotheses were generally supported, although the positive consequences of engaging in the behaviour, and the personality characteristic of sensation seeking were important, rather than the negative consequences or orientation towards the future. The investigation into the impact of experience on these variables gave mixed results which prompt further investigation.

5.1.1. Discussion relating to age and gender hypotheses (Hypotheses 1.1 to 1.3)

The hypotheses that males would be more likely to intend to speed (Hypothesis 1.1) than females and that the tendency to speed would decrease with age (Hypothesis 1.2) were both supported. However, the hypothesis that there would be an interaction between gender and age in the tendency to speed (Hypothesis 1.3) was not supported.

The finding that males were more likely to speed than females and that likelihood of speeding increased with age reflected the statistics that younger males are a highly represented group in many types of risk taking behaviour, including the road toll (Transport Accident Commission, 2006). It also reflected the findings of Lawton et al. (1997), who had found the same tendencies in a number of different road conditions. The lack of
support for the hypothesis that gender and age would interact in the prediction of anticipated speeding behaviour was not consistent with the findings that females’ judgement develops at a different rate from that of males (e.g., De Bellis et al., 2001; Silberman & Snarey, 1993). It therefore does not support the cognitive developmental approach to risk taking in young adults. The lack of an interaction was predicted by the psychosocial developmental approach suggesting a new phase of the lifespan, emerging adulthood. The findings do not, however, necessarily support this view over the cognitive developmental approach. The previous studies which had found an interaction used an adolescent sample. It is possible that while brain maturation continues into adulthood, the gender differences in development have resolved themselves by 18 years of age.

5.1.2. Discussion relating to hypotheses regarding number of consequences (Hypotheses 2.1 and 2.2)

Contrary to expectations from Hypothesis 2.1, there was no significant relationship between age and negative consequences, and rather than positive consequences increasing with age, it was actually younger adults who saw more positive consequences. The difference between these findings and those of Beyth-Marom et al. (1993) could once again be explained by the difference in ages of the younger participants, as the latter study was also comparing adolescents with adults. However, in conjunction with the finding that young people saw more rather than less positive
consequences, this would appear to support the notion of emerging adulthood over the cognitive developmental approach.

Hypothesis 2.2, that the number of consequences people could see would mediate the relationship between age and intention to speed, was supported in that the number of positive consequences mediated the relationship between age and anticipated likelihood of speeding. However, this did not support the findings of Lawton et al. (1997), who had found a relationship with negative consequences foreseen, not a negative relationship with positive consequences. This finding also provided support for the idea of an emerging adulthood stage in the lifespan, attributing increased risk taking to a higher salience of the positive possibilities of the situations. Arnett (2000b) has investigated the relevance of the optimistic bias of this period to the risky health behaviour of smoking. He found that emerging adult smokers were more likely than older adult smokers to believe they would be able to stop any time they wanted to.

5.1.3. Discussion of hypotheses relating to mediating effects of time orientation and sensation seeking (Hypotheses 3.1 to 3.3)

While the predictions that younger people would be less future-oriented and more present-oriented than older people were supported, neither age nor time orientation significantly predicted anticipation of likelihood of speeding when sensation seeking was added to the model.
Sensation seeking mediated the relationship between time orientation and speeding.

These findings did not support those of Zimbardo et al. (1997) as present time perspective was not a significant predictor when controlling for sensation seeking. The findings therefore failed to support the cognitive developmental theory that the development of decentration was a continuing process throughout adulthood. The findings were more in keeping with the predictions of the psychosocial developmental approach, as emerging adulthood is seen as a period of exploration and gathering up as many new experiences as possible (Arnett, 2000a). The connection of sensation seeking to risk taking has been well documented (see Zuckerman, 1994, for a review) and its place in adolescent risk taking has also been investigated (Arnett, 1996).

5.1.4. Discussion of impact of experience research question

The findings from the quantitative data analysis found intention to speed differed significantly only for participants who had experiences relating to legal consequences, including going to court, for both traffic offences and all offences. However, while it would seem reasonable that experience of these negative consequences would reduce people’s intention to speed, the self perceived likelihood of speeding was actually higher for these groups. This suggests that people who are more likely to anticipate speeding are also more likely to have engaged in this and other risky
behaviours in the past, resulting in their experiences of legal consequences. It is also possible that this experience has left people more accurate in judging whether they are likely to engage in such behaviour. It does not appear to have changed their behaviour, however.

The findings of the qualitative analysis added an interesting dimension to the question regarding whether certain life experiences influenced intention to engage in risky behaviour. Although analysis of the quantitative data had not found a significant difference in anticipated likelihood of speeding between people with children and without children, the answers to the open question about significant events suggested many people viewed having a child as greatly impacting their approaches to life. This was the case both for people who reported being unlikely to speed and those who reported being likely to speed, but not for those who were ambivalent about the question. The further quantitative analyses which this suggested found that people who had children were less sensation seeking than those who did not have children. This provides some support for Arnett’s (2006) contention that a significant event which can curtail the highly optimistic, exploratory and sensation seeking period of emerging adulthood is parenthood. However, these findings do not support the notion of emerging adulthood as an explanatory construct for decisions regarding engaging in speeding and other types of risk taking behaviour.
The other frequently mentioned events, such as relationship issues or disruptions, non-violent death of friends or family and witnessing an accident or experiencing a close call, offer suggestions for future quantitative research in this area. While significant events may not have affected anticipated likelihood of engaging in speeding or other types of risk taking behaviour, an exploration of the impact of these life events on personality variables may be warranted. An investigation of this nature may offer some insight into the origins of the small changes in personality that have been demonstrated to occur throughout adulthood (Terracciano, Costa & McCrae, 2006; Costa & McCrae, 2006).

5.2. Discussion of Methodology

5.2.1. Generation vs selection of consequences

The primary methodological concern with the present study was the use of closed options for the potential consequences. The findings of Beyth-Marom et al. (1993) suggested that the generation of consequences was more appropriately measured by open ended questions which did not involve prompts from the researchers’ beliefs. However, the population of interest was males in early adulthood, and there is evidence that men write less than women in open ended formats (e.g., Colley et al., 2004; Robinson, Behbehani & Shukkur, 1999). The decision to use a closed format was to avoid potential systematic errors in the number of consequences generated.
by males and females. To address the concerns with a closed format, the list included indirect consequences. This necessitated counterfactual thinking to generate not only immediate outcomes, but also the potential consequences of those outcomes. As a relationship with age was discovered, although only for positive consequences, this suggests that the technique was effective in identifying age-related differences. The limitations of this technique in identifying potential cognitive differences were recognised, however. The support for the psychosocial developmental approach over the cognitive developmental approach was not based only on this measurement.

5.2.2. Age of participants

The participants were all adults. This was necessary because the behaviours investigated related to driving which in Australia requires a licence which is not granted until 18 years of age. Also, ethical concerns with the use of the internet for the recruitment of participants led to restricting the participants to an adult sample despite the fact that it may have been preferable to include adolescents in the sample. This would make it possible to identify any changes in cognition as well as in sensation seeking before and after 18 to 25 years of age, the period of high risk taking.
5.2.3. *Cohort effects*

The use of a cross sectional rather than longitudinal design always risks cohort effects. In particular, this may be implicated in the age effects discovered for apparently stable personality traits such as sensation seeking. Zuckerman (1994) has reported increases in sensation seeking among women with age, which he attributed to cohort effects due to exposure to the Women’s Liberation movement of the 1960’s. In the present study, it was impossible to determine whether differences between younger and older participants were due to developmental changes or due to differences in experiences between the different generations.

5.2.4. *Mixed methods research question*

The use of a mixed method research design, combining quantitative and qualitative data, in investigating the research question of the impact of significant life events on risk taking behaviour was productive. The results from the qualitative question prompted further analyses of the quantitative data, which yielded findings supporting the concept of emerging adulthood (Arnett, 2000a) as a modern phenomenon.

5.3. *General discussion of findings*

It should be noted that the relationships uncovered in the present study, while significant, were modest, and the majority of the variability in anticipated likelihood of speeding was unexplained in even the most
comprehensive of the models. However, the general picture created did allow for interpretation in terms of the cognitive developmental approach and psychosocial developmental approach to explaining the risk taking of young adults.

The findings overall did not support the general premise that continuing cognitive development is responsible for increased risk taking among younger adults, as younger adults did not see less consequences of situations and although they did not appear to view events in the context of the future as much as older adults, this did not have an impact on reported speeding behaviour once sensation seeking had been accounted for. Rather, the present study supported the psychosocial developmental explanation that emerging adults are in a period of intense identity exploration and optimism, and this leads them to seek out as many experiences as they can. This was supported by the increase in positive consequences anticipated as a result of speeding, as well as by the increased sensation seeking with decrease in age of participants.

5.4. Implications for further research

The findings of the present study which warrant further investigation are the emphasis on the positive potential consequences and on a need for stimulating experiences. In terms of the subjective utility equation, this would imply that younger adults could be generating the possible consequences just as successfully as older adults, and processing the full
equation as efficiently. However, there are positive outcomes anticipated by younger adults which are not salient for older adults. Fischhoff (1992) suggested this as a possible consideration in the developmental perspective to risk taking. He indicated that it was possible that there were no cognitive deficits involved in younger people deciding to engage in risk taking behaviour, rather that there were potential outcomes, such as an adrenaline rush, that were anticipated positively by younger people but that older people would not anticipate enjoying.

Although the present study did not support a cognitive developmental explanation for increased risk taking in young adulthood, one study cannot prove or disprove either theory and must be taken in context with similar studies. There is strong evidence that adolescents differ from adults in cognitive capacity for judging the consequences of situations and this has been linked to increased risk taking in adolescence (e.g., Baird & Fugelsang, 2004; Cauffman & Steinberg, 2000b). Many authors have argued against trying adolescents as adults for serious offences, on the grounds of this apparent diminished capacity (e.g., Grisso et al., 2003; Steinberg & Cauffman, 1999). If risk taking and law breaking behaviour in adolescence is due to diminished cognitive capacity, it is unlikely that the 18 to 30 year old age group is overrepresented in these behaviours for completely different reasons. Some level of continuity is likely, and so further research is required to investigate both the cognitive developmental
and psychosocial developmental approaches to explaining increased risk
taking.

As previously mentioned, one aim for future research would be to
investigate changes in consequences foreseen and sensation seeking from
early adolescence to late adulthood, in order to capture the whole picture of
changes throughout the lifespan. Clearly, it would be difficult to investigate
this for the behaviours investigated in the present study, as driving and
gambling are only legal once adulthood has been reached. However, an
investigation of the consequences foreseen could be carried out, without
looking at intended behaviour in that situation.

Investigating different behaviours may also be fruitful. Only one of
the current study’s four scenarios showed any age effects for intention of
engaging in the behaviour, although all were based on behaviours in which
young adults are overrepresented. While some allowance needs to be made
for the documented phenomenon that intention to behave in a certain way
does not equate to that behaviour (Ajzen, 1991), it is a part of the equation,
and the lack of an age effect on three of the four scenarios suggests that they
were not appropriately representative of the risky behaviours young adults
engage in. Alternative behaviours could be identified using a qualitative
study asking 18 to 25 year olds what risky behaviours they find exciting, or
by asking older age groups what activities they engaged in when they were
young adults that they now see as risky.
The investigation of the impact of experience in the present study was exploratory and the findings suggest future avenues for research. Incorporating some of the categories identified through the qualitative question into a future quantitative analysis could be useful. The results from the present study would suggest that appropriate hypotheses for future research might be that people who have had children are less sensation seeking, that people who have experienced the death of a loved one are more present oriented and sensation seeking and that those who have suffered a relationship breakdown are less present oriented or sensation seeking. These types of hypotheses may offer some explanation for the origins of the modest changes in personality throughout the adult lifespan, which are currently not well understood (Costa & McCrae, 2006).

As gender was a more prominent predictor of anticipated likelihood of speeding than age, it would be useful to investigate the potential explanations for why males engage in more risk taking behaviour than females across the lifespan. Developmental approaches would not be appropriate for this explanation. Harris et al. (2006) suggest that an evolutionary psychological perspective could be valuable in the explanation of risk taking in males.

5.5. Implications for legal thought

Some authors have argued that diminished capacity for decision making in younger people, particularly adolescents, necessitates a different
approach to them in the legal system as they are not as responsible for their actions as adults (Grisso et al., 2003; Steinberg & Cauffman, 1999). If the development of the cognitive skills that enable effective decision making continues in adulthood, then arguably should influence the legal consequences for young adults for similar reasons. However, the present study’s findings do not support this interpretation, as they do not suggest deficits in decision making about engaging in risk taking behaviour, and rather attribute the choice to engage in risk taking behaviour to the valence attributed to positive outcomes by young adults, rather than the lack of consideration for the negative outcomes.

5.6. Implications for education

The findings of the present study are more relevant to appropriate community interventions to reduce risk taking behaviour among young people in society. In Australia, advertisements designed to reduce behaviours such as speeding (e.g., TAC, 2001, 2007), drink driving (e.g., TAC, 2003), gambling (e.g., State Government of Victoria [SGV], 2002) and drug taking (e.g., Commonwealth Department of Human Services and Health [CDHSH], 1996) focus on impressing upon the public the potential negative consequences attached to these activities. The findings of the present study suggest, however, that young adults are just as cognisant of the potential negative consequences as older adults. If this is the case, then interventions which focus on communicating potential negative outcomes,
or increasing the severity of those outcomes, will not result in reduced risk taking among the target audience. The impact of the anticipation of positive consequences and sensation seeking which was suggested by the results of the present study provide an alternative avenue for designing interventions.

5.7. Conclusion

In conclusion, the findings of the present study have suggested that a psychosocial explanation of risk taking in early adulthood fitted the data, rather than an explanation of continued cognitive development into early adulthood. Arnett’s (2000a) proposal of emerging adulthood as a new phase in the life span of people in modern Western society offered a useful explanation for the relationships found in the study. Anticipation of positive consequences and sensation seeking appeared to explain the negative relationship between age and speeding. This was in keeping with the view of emerging adulthood as a time of exploration and search for stimulating experiences, as well as a time of optimism.

While further research is warranted to more comprehensively investigate the potential cognitive developmental explanation for risk taking behaviour among young adults, the findings of the present study suggest implications for interventions to reduce these behaviours. In particular, an acknowledgement of the positive outcomes young adults anticipate from the behaviours, and the provision of suggestions to enjoy these outcomes in
different ways or in safer circumstances, may be more successful than current interventions such as advertising campaigns.
Chapter 6. References


Appendix A
Copy of Questionnaire

You are invited to participate in a fourth year student research project conducted by Shelley Connell and supervised by Associate Professor Ann Knowles of Swinburne University. The aim of the study is to investigate how the way we evaluate situations affects our behaviour in those situations. Your participation will help us to explore the many factors which may explain individual differences in adults' behaviour in different situations.

In the following questionnaire, you will be asked to think about hypothetical situations you could find yourself in as well as actual situations (such as a car accident) you may have been involved in or known people who were involved in. These questions may be confronting if this is the case. Should any of these questions cause distress or raise issues of concern you are urged to contact the Swinburne Psychology Clinic on (03) 9214 8653 or otherwise seek referral to a psychological professional.

Your privacy will be protected as there is no section of this survey that asks for information that would identify you in any way. If you choose to save your responses so you can return to the questionnaire at a later time, you will be asked for an email address. This is simply for the purpose of allowing you to return to the questionnaire later, and is in no way associated with your responses when they are submitted after you complete the questionnaire.

Participation in this study is voluntary. You are free to withdraw your consent at any time. Only completed and submitted questionnaires will be utilised in the study. The submission of a completed questionnaire will be taken as your consent to participate. The results of this study will be submitted for a fourth year thesis. In addition, they may be submitted for publication. However, only group results will be reported so your anonymity is protected.

Any questions regarding the project entitled Consequences of Significant Life Experiences can be directed to the Senior Investigator, Associate Professor Ann Knowles. If you have any concerns about the conduct of this research project, you may contact: Research Ethics Officer, Office of Research and Graduate Studies (H68), Swinburne University of Technology, P O Box 218, HAWTHORN VIC 3122 or Tel (03) 9214 5218.

Thank you in anticipation of your support

Shelley Connell and Associate Professor Ann Knowles
A little bit about you

Please answer a few quick questions about yourself

What is your country of residence?
Australia
Other ___

What is your nationality? ___

Please indicate your gender

Male  Female

Your age in whole years
___

You will now be asked questions about a number of situations you might possibly find yourself in. Not all possible answers will be relevant to each scenario. Please answer the questions as yourself in the scene, not as someone who you think might be likely to find themselves in the situation, or who would make different decisions to you.
# Driving home

You've had a few drinks with friends, and now it's time to go home. You figure you're probably all right to drive.

**How likely would you be to drive home in this situation?**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely Unlikely</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extremely Likely</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**What possible outcomes do you think there could be from driving home after a few drinks? Please select all that apply.**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Outcome</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>I could make money</td>
<td>I could lose money</td>
<td>I could die</td>
</tr>
<tr>
<td>A friend of mine could die</td>
<td>A friend of mine could be injured</td>
<td>A friend of mine could be injured</td>
</tr>
<tr>
<td>My friends might be impressed by me</td>
<td>My friends might stop speaking to me</td>
<td>My friends might stop speaking to me</td>
</tr>
<tr>
<td>I could go to jail</td>
<td>I could have my future career choices limited</td>
<td>I could disgrace my family</td>
</tr>
<tr>
<td>I could end up with a child to support</td>
<td>I could end up homeless</td>
<td>A stranger could die</td>
</tr>
<tr>
<td>A stranger could be injured</td>
<td>A friend could get an illness</td>
<td>A stranger could get an illness</td>
</tr>
<tr>
<td>A friend could go to jail</td>
<td>A stranger could go to jail</td>
<td>My family or friends could be bankrupted</td>
</tr>
<tr>
<td>My friends or family could make heaps of money</td>
<td>The environment could be affected</td>
<td>The Australian economy could be affected</td>
</tr>
<tr>
<td>I could be famous</td>
<td>I could learn valuable information</td>
<td>I might get an adrenaline rush (a &quot;buzz&quot;)</td>
</tr>
<tr>
<td>I could feel good about myself</td>
<td>I could feel bad about myself</td>
<td>I could disgrace myself</td>
</tr>
</tbody>
</table>


Section Break

Lady Luck

How likely would you be to bet with your whole week's pay?

1 2 3 4 5
Extremely Unlikely Extremely Likely

What possible outcomes do you think there could be from betting a week's pay? Please select all that apply.

- I could make money
- A friend of mine could die
- My friends might be impressed by me
- I could go to jail
- I could end up with a child to support
- A stranger could be injured
- A friend could go to jail
- My friends or family could make heaps of money
- I could be famous
- I could feel good about myself
- I could lose money
- I could be injured
- My friends might stop speaking to me
- I could have my future career choices limited
- I could end up homeless
- A friend could get an illness
- A stranger could get an illness
- A friend could go to jail
- The environment could be affected
- I could learn valuable information
- I could feel bad about myself
- I could die
- A friend of mine could be injured
- I could disgrace my family
- I could get an illness
- A stranger could die
- A stranger could get an illness
- My family or friends could be bankrupted
- The Australian economy could be affected
- I might get an adrenaline rush (a "buzz")
- I could disgrace myself
**Section Break**

**An idea**

Someone you know asks you if you will carry a package from Australia to Malaysia for them. They offer you a large amount of money to do this.

How likely would you be to do this?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Extremely Unlikely</td>
<td></td>
<td></td>
<td></td>
<td>Extremely Likely</td>
</tr>
</tbody>
</table>

What possible outcomes do you think there could be from carrying something to Malaysia? Please select all that apply.

<table>
<thead>
<tr>
<th>I could make money</th>
<th>I could lose money</th>
<th>I could die</th>
<th>A friend of mine could die</th>
</tr>
</thead>
<tbody>
<tr>
<td>A friend of mine might be impressed by me</td>
<td>My friends might stop speaking to me</td>
<td>I could disgrace my family</td>
<td>I could die</td>
</tr>
<tr>
<td>I could go to jail</td>
<td>I could have my future career choices limited</td>
<td>I could get an illness</td>
<td>A friend of mine could die</td>
</tr>
<tr>
<td>I could end up with a child to support</td>
<td>I could end up homeless</td>
<td>A stranger could die</td>
<td></td>
</tr>
<tr>
<td>A stranger could be injured</td>
<td>A friend could get an illness</td>
<td>A stranger could get an illness</td>
<td></td>
</tr>
<tr>
<td>A friend could go to jail</td>
<td>A stranger could go to jail</td>
<td>My family or friends could be bankrupted</td>
<td></td>
</tr>
<tr>
<td>My friends or family could make heaps of money</td>
<td>The environment could be affected</td>
<td>The Australian economy could be affected</td>
<td></td>
</tr>
<tr>
<td>I could be famous</td>
<td>I could learn valuable information</td>
<td>I might get an adrenaline rush (a &quot;buzz&quot;)</td>
<td></td>
</tr>
<tr>
<td>I could feel good about myself</td>
<td>I could feel bad about myself</td>
<td>I could disgrace myself</td>
<td></td>
</tr>
</tbody>
</table>
The need for speed

It's a bright, sunny day and you are driving with your friends down a country highway. There is not another person in sight. You want to see how fast you can go.

How likely would you be to speed in this situation?

1 2 3 4 5
Extremely Unlikely Extremely Likely

What possible outcomes do you think there could be from speeding on an open highway? Please select all that apply.

I could make money
A friend of mine could die
My friends might be impressed by me
I could go to jail
I could end up with a child to support
A stranger could be injured
A friend could go to jail
My friends or family could make heaps of money
I could be famous
I could feel good about myself
I could lose money
I could be injured
My friends might stop speaking to me
I could have my future career choices limited
I could end up homeless
A friend could get an illness
The environment could be affected
I could learn valuable information
I could feel bad about myself
I could die
A friend of mine could be injured
I could disgrace my family
I could get an illness
I could disgrace myself
A stranger could die
A friend could get an illness
My family or friends could be bankrupted
The Australian economy could be affected
I might get an adrenaline rush (a "buzz")
I could disgrace myself
Section Break

A little more about you

Please read each item and, as honestly as you can, answer the following question: "How characteristic or true is this of you?" (1 = very uncharacteristic, 2 = uncharacteristic, 3 = neutral, 4 = characteristic, 5 = very characteristic)

I believe that getting together with one's friends to party is one of life's important pleasures (zhed1)

1 2 3 4 5

Very Uncharacteristic Very Characteristic

Fate determines much in my life (zfut)

1 2 3 4 5

Very Uncharacteristic Very Characteristic

I would like to explore strange places (sens)

1 2 3 4 5

Very Uncharacteristic Very Characteristic

My decisions are mostly influenced by people and things around me. (zpast)

1 2 3 4 5

Very Uncharacteristic Very Characteristic

I believe that a person's day should be planned ahead each morning (zfut)

1 2 3 4 5

Very Uncharacteristic Very Characteristic

I do things impulsively (zhed)

1 2 3 4 5

Very Uncharacteristic Very Characteristic

I get restless when I spend too much time at home. (sens)

1 2 3 4 5

Very Uncharacteristic Very Characteristic

If things don't get done on time, I don't worry about it (zfut – R)

1 2 3 4 5

Very Uncharacteristic Very Characteristic
When I want to achieve something, I set goals and consider specific means for reaching those goals (zfut)

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<td>Very Uncharacteristic</td>
<td>Very Characteristic</td>
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When listening to my favourite music, I often lose all track of time (zhed)

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<td>Very Uncharacteristic</td>
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I like to do frightening things (sens)

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Meeting tomorrow's deadlines and doing other necessary work comes before tonight's play (zfut)

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<td>Very Uncharacteristic</td>
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Since whatever will be will be, it doesn't really matter what I do (zfat)

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<tr>
<td>Very Uncharacteristic</td>
<td>Very Characteristic</td>
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</table>

I try to live my life as fully as possible, one day at a time (zhed)

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It upsets me to be late for appointments (zfut)

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Ideally, I would live each day as if it were my last (zhed)

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<td>Very Uncharacteristic</td>
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I like wild parties. (sens)

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<td>Very Uncharacteristic</td>
<td>Very Characteristic</td>
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</table>

I meet my obligations to friends and authorities on time (zfut)

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<th>1</th>
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<tbody>
<tr>
<td>Very Uncharacteristic</td>
<td>Very Characteristic</td>
<td></td>
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</tbody>
</table>
I make decisions on the spur of the moment *(zhed)*

1 2 3 4 5

Very Uncharacteristic     Very Characteristic

I take each day as it is rather than try to plan it out *(zfut - R)*

1 2 3 4 5

Very Uncharacteristic     Very Characteristic

It is important to put excitement in my life *(zhed)*

1 2 3 4 5

Very Uncharacteristic     Very Characteristic

I feel that it's more important to enjoy what you're doing than to get work done on time *(zhed)*

1 2 3 4 5

Very Uncharacteristic     Very Characteristic

I would like to take off on a trip with no pre-planned routes or timetables. *(sens)*

1 2 3 4 5

Very Uncharacteristic     Very Characteristic

Before making a decision, I weigh the costs against the benefits *(zfut)*

1 2 3 4 5

Very Uncharacteristic     Very Characteristic

Taking risks keeps my life from becoming boring *(zhed)*

1 2 3 4 5

Very Uncharacteristic     Very Characteristic

It is more important for me to enjoy life's journey than to focus only on the destination *(zhed)*

1 2 3 4 5

Very Uncharacteristic     Very Characteristic

It takes joy out of the process and flow of my activities, if I have to think about goals, outcomes and products *(zfat)*

1 2 3 4 5

Very Uncharacteristic     Very Characteristic

You can't really plan for the future because things change so much *(zfat)*

1 2 3 4 5

Very Uncharacteristic     Very Characteristic
My life path is controlled by forces I cannot influence (zfat)

1 2 3 4 5
Very Uncharacteristic Very Characteristic

It doesn't make sense to worry about the future, since there is nothing that I can do about it anyway (zfat)

1 2 3 4 5
Very Uncharacteristic Very Characteristic

I complete projects on time by making steady progress (zfat)

1 2 3 4 5
Very Uncharacteristic Very Characteristic

I take risks to put excitement in my life (zhed)

1 2 3 4 5
Very Uncharacteristic Very Characteristic

I make lists of things to do (zfat)

1 2 3 4 5
Very Uncharacteristic Very Characteristic

I often follow my heart more than my head (zhed)

1 2 3 4 5
Very Uncharacteristic Very Characteristic

I am able to resist temptations when I know that there is work to be done (zfat)

1 2 3 4 5
Very Uncharacteristic Very Characteristic

I prefer friends who are excitingly unpredictable (sens)

1 2 3 4 5
Very Uncharacteristic Very Characteristic

I find myself getting swept up in the excitement of the moment (zhed)

1 2 3 4 5
Very Uncharacteristic Very Characteristic

Life today is too complicated; I would prefer the simpler life of the past (zfat)

1 2 3 4 5
Very Uncharacteristic Very Characteristic
I prefer friends who are spontaneous rather than predictable (zhed)

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I keep working at difficult, uninteresting tasks if they will help me get ahead (zfut)

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I would like to try bungee jumping. (sens)

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Spending what I can on pleasures today is better than saving for tomorrow's security (zfat)

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Often luck pays off better than hard work (zfat)

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I like my close relationships to be passionate (zhed)

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I would love to have new and exciting experiences, even if they are illegal. (sens)

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There will always be time to catch up on my work (zfut – R)

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</table>
Section Break

Please tell us about your life experiences

Following are a number of questions about events that you may have experienced. It may be that you have experienced them only through hearing about someone who has been through this, or you may have seen a news report about this. For each one, please select all the options which apply to you. For example, for the first question, if you have seen a news report about a lottery win, and you also have a distant acquaintance who has won a great deal of money through gambling, and you have personally won a lot of money through gambling, you would select three options.

Please indicate any experience you have (including through seeing/hearing about it in the media) of someone who has won a lot of money through gambling. Please select all options which apply.

I didn't know the people concerned - I saw it / heard about it through the media
I didn't know the people concerned, but I was told about it by someone who did know the people concerned
I had met at least one of the people once or twice
At least one of the people was a distant relative or acquaintance of mine
At least one of the people was a close relative or acquaintance of mine
I have won a lot of money myself

Please indicate any experience you have (including through seeing/hearing about it in the media) of someone losing a lot of money through gambling. Please select all options which apply.

I didn't know the people concerned - I saw it / heard about it through the media
I didn't know the people concerned, but I was told about it by someone who did know the people concerned
I had met at least one of the people once or twice
At least one of the people was a distant relative or acquaintance of mine
At least one of the people was a close relative or friend of mine
I have lost a lot of money myself
Please indicate any experience you have (including through seeing/hearing about it in the media) of someone having to go to court because of a car accident. Please select all options which apply.

I didn't know the people concerned - I saw it / heard about it through the media
I didn't know the people concerned, but I was told about it by someone who did know the people concerned
I had met at least one of the people once or twice
At least one of the people was a distant relative or acquaintance of mine
At least one of the people was a close relative or friend of mine
I had to go to court myself

Please indicate any experience you have (including through seeing/hearing about it in the media) of someone who has had to face other legal consequences (e.g. loss of licence) because of a car accident. Please select all options which apply.

I didn't know the people concerned - I saw it / heard about it through the media
I didn't know the people concerned, but I was told about it by someone who did know the people concerned
I had met at least one of the people once or twice
At least one of the people was a distant relative or acquaintance of mine
At least one of the people was a close relative or friend of mine
I was facing legal consequences myself

Please indicate any experience you have (including through seeing/hearing about it in the media) of a car accident in which serious injury occurred. Please select all options which apply.

I didn't know the people concerned - I saw it / heard about it through the media
I didn't know the people concerned, but I was told about it by someone who did know the people concerned
I had met at least one of the people once or twice
At least one of the people was a distant relative or acquaintance of mine
At least one of the people was a close relative or friend of mine
I was injured myself
Please indicate any experience you have (including through seeing/hearing about it on the media) of an accident(s) in which death occurred. Please select all options which apply to you.

I didn't know the people concerned - I saw it / heard about it through the media
I didn't know the people concerned, but I was told about it by someone who did know the people concerned
I had met at least one of the people once or twice
At least one of the people was a distant relative or acquaintance of mine
At least one of the people was a close relative or friend of mine
I was in the accident myself

In the above accident(s), what were considered to be the causes (please check all that apply)

Speed
Inattention
Alcohol or other drugs
Risk taking behaviour
Road Rage
Road Conditions
Other (Please Specify)

Please indicate any experience you have (including through seeing/hearing about it in the media) of someone having to go to court for any reason at all. Please select all options which apply.

I didn't know the people concerned - I saw it / heard about it through the media
I didn't know the people concerned, but I was told about it by someone who did know the people concerned
I had met at least one of the people once or twice
At least one of the people was a distant relative or acquaintance of mine
At least one of the people was a close relative or friend of mine
I have had to go court myself
Please indicate any experience you have (including through seeing/hearing about it in the media) of someone who has had to face other legal consequences for any reason at all. Please select all options which apply.

I didn't know the people concerned - I saw it / heard about it through the media
I didn't know the people concerned, but I was told about it by someone who did know the people concerned
I had met at least one of the people once or twice
At least one of the people was a distant relative or acquaintance of mine
At least one of the people was a close relative or friend of mine
I have faced legal consequences myself

How many years in total have you been in full-time employment (if you have never been in full-time employment, please type 0)?

How many years in total have you been in any type of employment (if you have never been employed, please type 0)?

Please indicate how many years in total you have been living independently (if you have never lived independently, please type 0)

Do you have children?
Yes  No

(If Yes, the following question was displayed)

Please indicate the age of your eldest child in years.

Section Break

Is there anything else you would like to tell us about?

Is there a significant event or events which occurred in your life which you believe has changed the decisions you make when in situations? If so, please tell us about it.
Legend for scales

sens  Sensation Seeking
zfut   Zimbardo Future Time Perspective (items marked – R were reverse coded)
zhed   Zimbardo Present Hedonistic Time Perspective
zfat   Zimbardo Present Fatalistic Time Perspective (not utilised in the current study)
### Appendix B

**Codebook for answers to qualititative question**

<table>
<thead>
<tr>
<th>Concept</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child</td>
<td>The experience of having children, or adopting children. Any mention of the word child, son, daughter, the phrase “being a mother/father”</td>
</tr>
<tr>
<td>Relationships</td>
<td>Negative relationship experiences, such as the breakup of relationships, the loss of a support figure for some reason.</td>
</tr>
<tr>
<td>Legal</td>
<td>Direct experience of the legal system. Any mention of “court”, “death penalty case”</td>
</tr>
<tr>
<td>Mental Health</td>
<td>Any mental illness such as “depression”, “anxiety”. Also any mention of drug use or drug abuse. Therapy is not included in this, as therapy can be sought for non-clinical issues.</td>
</tr>
<tr>
<td>Work</td>
<td>Seeing the consequences through the job that the person does. Any mention of the specific work the person does relating to the consequences – this may be people who work in the legal professions or in health.</td>
</tr>
<tr>
<td>Physical</td>
<td>Physical limitations on being able to engage in certain behaviours. Alcohol intolerance, not having a licence, etc.</td>
</tr>
<tr>
<td>Location</td>
<td>Location of living has affected in some way. Any mention of “living overseas”, “living in the country”, “moving countries”, etc.</td>
</tr>
<tr>
<td>Non Violent Death</td>
<td>Death which was of natural causes. Death of another specified as being “of natural causes” or some type of illness, OR the cause of death is not specified</td>
</tr>
<tr>
<td>Violent Death</td>
<td>The violent death of another. Death in which the cause was specified and was not of natural causes. Includes electrocution as well as murder, etc.</td>
</tr>
<tr>
<td>Others’ Illness</td>
<td>Illness of family member or friend</td>
</tr>
<tr>
<td>Others’ Injury</td>
<td>Injury of family member or friend</td>
</tr>
<tr>
<td>Concept</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Witness/Close Call</td>
<td>Witnessing an accident, or being in an accident in which no injuries were sustained. Alternatively, doing something which could have caused an accident but didn’t.</td>
</tr>
<tr>
<td>Own Illness</td>
<td>Mentioning illness of self, either in the past or present.</td>
</tr>
<tr>
<td>Everyday Stuff</td>
<td>Answers such as “everyday things”, “the general experience of living”</td>
</tr>
<tr>
<td>Financial</td>
<td>Mention of hardship, losing a job and mentioning financial losses, etc</td>
</tr>
<tr>
<td>Role Models</td>
<td>Role models mentioned included parents and driving instructors</td>
</tr>
<tr>
<td>Government</td>
<td>Government advertising</td>
</tr>
<tr>
<td>Learning, Faith,</td>
<td>Mention of reading, learning experiences (including “travel”), religious beliefs, therapy</td>
</tr>
<tr>
<td>Therapy</td>
<td></td>
</tr>
<tr>
<td>Abuse</td>
<td>Domestic abuse either as a child or as an adult in an abusive relationship.</td>
</tr>
<tr>
<td>Financial Loss</td>
<td>Mention of losing money gambling, which was a small amount but had taught the respondent a lesson.</td>
</tr>
</tbody>
</table>
Appendix C
Correlations reported for all four scenarios

Table C.1
*Pearson Correlations of Reported Likelihood of Driving after Drinking, Age, and Number of Positive and Negative Consequences*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Driving</th>
<th>Age</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>.09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>.06</td>
<td>-.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>-.37***</td>
<td>-.12*</td>
<td>.24***</td>
<td></td>
</tr>
</tbody>
</table>

|M| 2.47 | 36.69 | 0.08 | 9.02 |
|SD| 1.28 | 10.89 | 0.42 | 4.69 |

N = 308
* p < .05; ** p < .01; *** p < .001
*Note: Driving denotes reported likelihood of driving after a few drinks with friends; Positive denotes number of positive consequences selected as a result of this behaviour; Negative denotes number of negative consequences selected as a result of this behaviour

Table C.2
*Pearson Correlations of Reported Likelihood of Gambling with a Week’s Pay, Age, and Number of Positive and Negative Consequences*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Gambling</th>
<th>Age</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-.09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>.12*</td>
<td>-.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>-.03</td>
<td>-.05</td>
<td>.22***</td>
<td></td>
</tr>
</tbody>
</table>

|M| 1.20 | 36.69 | 1.42 | 2.54 |
|SD| 0.70 | 10.89 | 1.38 | 1.73 |

N = 308
* p < .05; ** p < .01; *** p < .001
*Note: Gambling denotes reported likelihood of gambling with a week’s pay; Positive denotes number of positive consequences selected as a result of this behaviour; Negative denotes number of negative consequences selected as a result of this behaviour
### Table C.3

**Pearson Correlations of Carrying a Package to Malaysia, Age, and Number of Positive and Negative Consequences**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Carrying</th>
<th>Age</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-.10</td>
<td>-.02</td>
<td>.13*</td>
<td>.45***</td>
</tr>
<tr>
<td>Positive</td>
<td>.13*</td>
<td>-.02</td>
<td>-.02</td>
<td>.45***</td>
</tr>
<tr>
<td>Negative</td>
<td>-.05</td>
<td>-.02</td>
<td>-.02</td>
<td>.45***</td>
</tr>
</tbody>
</table>

| M        | 1.17     | 36.69| 0.81     | 6.31     |
| SD       | 0.62     | 10.89| 1.03     | 4.37     |

*N = 308*

* * p < .05; ** p < .01; *** p < .001

*Note:* Carrying denotes reported likelihood of carrying a package from Australia to Malaysia; Positive denotes number of positive consequences selected as a result of this behaviour; Negative denotes number of negative consequences selected as a result of this behaviour.

### Table C.4

**Pearson Correlations of Reported Likelihood of Speeding Down an Open Highway, Age, and Number of Positive and Negative Consequences**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Speeding</th>
<th>Age</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-.16**</td>
<td>-.21***</td>
<td>-.05</td>
<td>.27***</td>
</tr>
<tr>
<td>Positive</td>
<td>.39***</td>
<td>-.21***</td>
<td>-.05</td>
<td>.27***</td>
</tr>
<tr>
<td>Negative</td>
<td>-.17**</td>
<td>-.05</td>
<td>.96</td>
<td>4.04</td>
</tr>
</tbody>
</table>

| M        | 2.22     | 36.69| 0.68     | 8.17     |
| SD       | 1.17     | 10.89| 0.96     | 4.04     |

*N = 308*

* * p < .05; ** p < .01; *** p < .001

*Note:* Speeding denotes reported likelihood of speeding down an open highway; Positive denotes number of positive consequences selected as a result of this behaviour; Negative denotes number of negative consequences selected as a result of this behaviour.