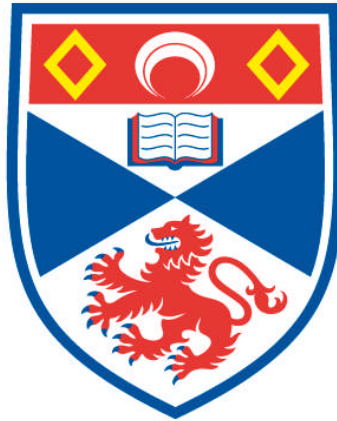


**DEVELOPMENTAL MECHANISMS INFLUENCING
DECISION-MAKING**

Paul R. Escalante-Mead

**A Thesis Submitted for the Degree of PhD
at the
University of St Andrews**



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Developmental Mechanisms Influencing Decision-Making

Paul R. Escalante-Mead

Submitted for the Degree of Doctor of Philosophy

University of St Andrews

September, 2008



February 2009

Paul R. Escalante-Mead

Developmental Mechanisms Influencing Decision Making

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ABSTRACT

The main aim of this thesis was to investigate decision making from a broad developmental perspective to clarify the role of the underlying mechanisms influencing it. Problem solving and cognitive inhibitory capacity were chartered initially through the use of hypothetical vignettes depicting socially relevant situations and through the use of the Stroop task, to tap into automatic inhibitory capacity. Initial assumptions that prefrontal cortical refinement would denote enhanced social problem ability were not confirmed. Experience emerged as distinct factor in problem solving/decision-making, with the youngest participants equally as effective in producing solutions to situations that they had the most experience in. A shift in development is observed with maturation denoting greater experience and this being applied directly to problem solving and decision-making situations. Education was identified as a possible contributory factor in decision-making and this was explored in a cross-cultural study that tapped into a non-schooled population. The results reinforced the centrality of experience in shaping decision-making.

Decision-making in regards to the use of experience was then looked at through real life decision-making situations, where adolescents were asked to provide their knowledge or experience of situations where risk was involved. Adolescents possessed the necessary knowledge to distinguish between optimal and sub-optimal decisions in terms of the consequences that risk behaviours carried with them. However, many still chose to engage in risky behaviours. This paradox could also be explained by actual experience, with the suggestion that positive experience in a peer group was serving as a

pool from which adolescents drew to make future decision-making. If risk behaviours were not experienced adversely, the likelihood of their repetition was high.

Taken together the findings suggest that adolescents are well equipped with the cognitive skills to make decisions. Compared to younger children, they have more experience of a greater range of situations from which to extrapolate responses from. They also have a great deal of knowledge and information about the negative consequences associated with a range of challenging situations and risk-taking behaviours. However, when faced with decisions in the social domain, the behaviour of friends and perceptions of what other people are doing are powerful influences on adolescent decisions.



Acknowledgements

I am overjoyed to be finishing with this segment of my studies. In first instance I would like to sincerely thank Dr Arlene Astell for her guidance throughout these years. She has a most wonderful way of looking at things with a positive spin. Thank you for your immense help and for seeing my work through to the end. Thank you to Dr Barbara Dritschel whose concern and motivation has always been reassuring. Indeed your advice has been key in getting to this point and I wish you all the best.

I would like to thank Dr Astell and the School of Psychology for having given me the opportunity to join this unique academic community. I would like to express my gratitude to The School of Psychology University of St Andrews and *The Russell Trust* for their financial help allowing for this work to be conducted. Joyce Lapere deserves a big thank you for all her help with the Hardship Fund and the May Wong Trust. I am truly grateful to all for having allowed this work to be researched. I would further like to thank all the participants and institutions on both hemispheres who gave of their time to be able to be part of this research. The 3rd year and 4th year Psychology researchers all deserve a special mention. This work is a reflection of your input and without your participation and interest this research would simply not have reached this stage. So many people have contributed along the way and I am indebted to them and thank them profusely. The list is too long to be included, but so many have enriched this thesis in their own particular way. Thank you.

I would like to thank Dr Blerina Kellezi for her support and friendship over these years. Thank you to Dr Botindari for her wonderful help in getting this work completed, gracias! I would have been lost otherwise!

My *mother* deserves a special mention of gratitude for having been the instigating force behind my work and being such a wonderful source of support. The many conversations we have had regarding the topic of my work and the input and suggestions provided surely make this thesis as much hers as mine. All my love to you and thank you for all your help!

Though you are not here in person anymore *dad*, you've been in my thoughts all along and certainly this work is dedicated to you. Thank you for looking over me.

To all events that have shaped my life, for the experiences I have gathered, and for the decisions I have made and will be making, may this thesis be a record of them all.

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CHAPTER 1

INTRODUCTION

Why do adolescents behave irrationally? Are they not old enough to know better?

The main aim of this thesis was to investigate adolescent decision-making from a broad developmental perspective with a view to better understanding a) the factors that influence it and b) the typical acquisition of mechanisms underlying it.

Overall adolescence is a “healthy” period, where young people are successfully making important choices on a quotidian basis (Rodham, Brewer, Mistral, Stallard, 2006). It is however a period when a number of healthy and unhealthy habits are developed, which may possibly last a lifetime (Heaven, 1996). For example it is reported that 91% of adult smokers started smoking in adolescence, and that the start of many negative health and social behaviours such as ab(using) alcohol or drugs peaked during adolescence (Hampl & Betts, 1999). This is not to suggest that adolescence is only a period of poor decision-making, it is definitely not. However, it is one where less than optimal choices (in terms of their negative repercussion) are taken more often than that of the rest of the population (Fischoff, 2008).

If the media is to be believed young people are out of control, spending their time binge drinking, using drugs, smoking, and getting pregnant. Examples of these behaviours are cited as evidence that the youth of today lack self-control and the ability to choose right from wrong (Plant & Miller, 2001). The reality is that some adolescents are engaging in these behaviours and others are not. What differentiates them? Explanations of development have frequently painted adolescents as lacking the ability to

make rational decisions regarding their behaviour. Inhibition has been identified as a potentially important mechanism that has a direct impact on the ability to make decisions (both hypothetical and real). Even though cognitive and prefrontal systems strengthen and become more sophisticated with maturation these changes may not be reflected in adolescent decision-making, with real life choices favouring riskier situations (Casey, Getz, & Galvan, 2008). This highlights a gap in understanding the interaction between the knowledge and ability possessed by adolescents and the operation of decision-making in the real world.

One explanation has suggested that adolescents make poor decisions due to a mistaken perception of invulnerability (Dolcini, et al., 1989). However, more recent studies suggest that adolescent misjudgements are more likely the result of inexperience rather than of a perception of personal invulnerability, irrational decision making or undeveloped cognitive abilities (Fischhoff, 2007, 2008; Rodham, Brewer, Mistral, & Stallard, 2006). Could it be simply that teenagers are inexperienced and hence make poorer choices?

Experience affects the organization of knowledge. Someone who is considered an expert has a high level of knowledge organized according to “highly sophisticated schemas” (Pretz, 2008). Someone who is experienced would reflect information that was acquired through their environment and would apply that knowledge directly to a similar pattern. A novice, conversely, would lack this rich information system and would work with any knowledge on a more superficial level (Pretz, 2008). No two situations are exactly alike, but information gathered from one field can be projected onto another, particularly in terms of the social realm.

In daily life we face a myriad of situations that require us to make decisions that shape both the immediate and long-term future. Many of these situations involve other people and such social decisions present some of the most challenging issues for us to deal with. Some of these issues are highlighted in childhood, such as social negotiations (e.g. asking another child if you can join in a game). In reaching a decision many social situations require us to take into account other people's feelings or their potential reactions.

Social problem solving skills are intrinsic to fostering healthy relationships between peers to maintain friendships and obtain social acceptance. Friendships are advantageous as they are described as pleasant and rewarding relationships that are worth preserving. Children and adolescents should therefore be highly motivated to resolve any conflicts with friends because of the reciprocally beneficial nature of these relationships (Hartup, 1992). Disagreeing friends are more likely than disagreeing acquaintances to step away from quarrels before they become more intense as well as making more concessions by accepting to continue playing or interacting together after the conflict is over (Hartup, Laursen, Stewart, & Eastenson, 1988). By middle to late childhood friends are more inclined than acquaintances to follow the rules (e.g. not cheating) while playing competitive games as well as more likely to respect the opinions, basic needs, and desires of their peers while arranging to resolve or settle a problem (Fonzi, Schneider, Tani, & Tomada, 1997).

These social problem solving skills serve to maintain the social harmony necessary for typical development of human relations and broad social acceptance, skills that are essential to cope and adapt to a wide range of social and at times stressful situations,

particularly as observed during the transition from childhood to adolescence and adolescence to adulthood (Morera, Maydeu-Olivares, Nygren, et al, 2006). Increased understanding of developmental factors that feed into decision-making (such as cognitive abilities and neurodevelopment) as well as social factors (such as social problem solving skills and peer relationships) are important for understanding adolescent behaviour, especially in respect of risk. In addition, this will strengthen the foundations for studying risky decision-making in adulthood by adding to knowledge about the acquisition of these behaviours when they first emerge.

1.1 Outline of the Thesis

The aim of this thesis is to explore adolescent decision-making with a view to further elucidating the relationship between factors relating to the process of decision-making and factors operating within the situations where decisions are made. In Chapter 2 the factors that are thought to play an influential role in shaping decision-making in childhood and adolescence are reviewed. In particular current understanding of the cognitive, biological, and socio-cultural factors at play are examined. This sets the scene for a review of decision-making in challenging social situations in Chapter 3. This starts with examination of the utility of hypothetical social problems as a mechanism for exploring social problem solving. The rest of the chapter briefly reviews key areas of socially challenging or risk-taking situations commonly faced by adolescents, including using drugs and sexual behaviour.

Chapter 4 is the first empirical chapter, which contains a study comparing social problem solving in children and adolescents. One of the key findings to emerge is that

experience appears to play a key role in moderating decision-making in children and adolescents. The aim of this study is to elucidate the developmental course of the relationship between self-regulation and problem solving by examining performance on a measure of cognitive inhibition (Stroop Colour Word Task) and a measure of social problem solving (modified Means-End Problem Solving (MEPS) task; Platt & Spivack, 1975). This study is replicated in Chapter 5 in a cross cultural setting to explore the effect of environmental factors, education as well culture, on social problem solving. To this end the findings from the adolescent Scottish population described in Chapter 4 are replicated with comparison to the performance of two groups of age-matched children and adolescents from Ecuador: one schooled and the other non-schooled. The findings from both studies using hypothetical problem situations surprisingly suggest that experience emerges as a key moderator in social problem solving, rather than self-inhibitory ability (which was originally the factor being studied).

Building on the surprising findings of Chapters 6 and 7 in regards to the important role that experience plays is the development of the largest study of the thesis, which was designed to explore how experience operates in adolescent decision-making in day to day life. A questionnaire was developed comprising a mixture of closed questions and vignettes on seven key areas highlighted in Chapter 3: *alcohol consumption, drug use, smoking, gambling, sexual behaviour, relationships* and *eating behaviour*. The questionnaire was distributed to 605 young people aged between 12-18 years. The data collected with the closed questions are explored in Chapter 6. Among other findings, this revealed the level of participation in the target behaviours and the role of alcohol consumption in decisions about other risk behaviours. The relative contribution of factors

such as formal knowledge, peer pressure and fear of authority to decision-making was elucidated by examination of the narrative responses to the vignettes in Chapter 7. These responses required the respondents to draw on their own knowledge or experience of similar real-life situations and highlighted the role of their actual experience. The findings from the questionnaire and the two earlier studies are summed up in Chapter 8 in respect of their contribution to furthering our understanding of adolescent decision-making.

CHAPTER 2

DECISION-MAKING

2.1. Definition of Decision-Making

Humans have an expansive intellectual capacity that allows the creation of novel solutions for an infinite number of complex social problems. Our ability to solve problems on the spot results from prefrontal neural plasticity and would not be possible if we could only imitate solutions that we had previously seen or encountered. Unlike a computer system, humans do not simply rely on embedded memory functions to project "what if" situations. Instead, we have a repertoire of strategies from which to choose what we think is the adequate way to approach a particular problem.

Decision-making can be regarded as an outcome of mental processes leading to the selection of a course of action among several alternatives. Decision-making refers to the process by which one makes a decision, a process shaped by ideas, beliefs and values. Decision strategies are drawn from theoretical and empirical work, performed largely independent of one another and at times with little coordination with each other in terms of terminology. Decision-making can be looked at through varying levels of specificity accompanied by equally varied terminology. Even at the most general level, there are decision-making models, approaches, and theories.

When discussing decision-making it is important to differentiate between three main models: normative, descriptive, and prescriptive. Normative theories define the supposed ideal decisions while descriptive theories attempt to characterise how people

actually make decisions in the real world, an attempt to describe reality. Prescriptive models more often take a practical approach, and measure optimality with respect to a balance of accuracy with the available resources such as time and processing capacity. These models work collaboratively as the actual decision-making process has to be considered in light of the preferred choices that should have been taken versus those actually taken, alongside other competing factors such as biology and environment.

2.1.1. Normative Decision Making Model – *Ideal Events* (Raifa, 1968; von Winterfeldt & Edwards, 1986)

The normative models for decision-making theory are necessary as a starting point for understanding the choices that a person within their full senses would make. In this regards, normative refers to the typical or normal procedures that would be embodied in the axioms of decision-making (Fischloff, 2008). These models have a strong resemblance in parts to the Social Problem Solving model of D’Zurilla & Goldfried (1971) and expanded by D’Zurilla and colleagues (D’Zurilla, Nezu, & Maydeu-Olivares, 2002; see section 3.2.1). The normative theory as interpreted by models by Raifa (1968) and von Winterfeldt & Edward’s (1986) specify the following steps for successful decision taking:

1. **Identify the possible options.** In the first instance the characteristics of all the options need to be surveyed in order to make a final choice on one of these options. This needs to be the first step in any decision process. For example, the option to drink alcohol or not drink alcohol simply has two alternatives, yes or no.

2. **Identify the possible consequences** that may follow from each of these options. In second place the different potential effects of the decision need to be considered. In most cases the consequences will vary from one option to another. In situations where the outcome would be identical, the probability of this outcome would still make decision making a meaningful process.
3. **Evaluate the desirability** of each of those consequences. In the third instance the possibility of whether these actions would carry any negative consequences along with them would be described as a risk behaviour. Risk is associated with all actions that we may take, but in ideal terms we do not want to cause harm to ourselves through decisions we have made.
4. **Assess the likelihood of those consequences** if the possibility of losses is greater than zero but less than one, then risk perception becomes an important part of the equation. What is the probability that this would happen?
5. **Combine previous stages** according to some “decision mechanism”. In the final instance is a summary of all of the above steps. In order for the best option to be identified all four initial steps are combined to gauge which of the viable options that have presented themselves would be the most appropriate. One definition of ‘rational’ behaviour that could then be derived from this theory is choosing the option that maximizes well being, given the decision maker’s actual knowledge (about consequences or values).

Normative analysis plays several roles in decision research. One of those roles is facilitating a precise definition of each decision against which people’s performance can be compared. That means identifying people’s goals, their options for achieving those

goals, and the events that determine the chances of each goal being achieved by each option (Fischhoff, 2008).

Normative analysis also helps to organise evidence. Any issue that decision makers could consider must be included as part of normative analysis. Normative analysis is also useful in keeping research from focusing too narrowly, as a comprehensive view must be kept at all times. For example, research on the decision to smoke can focus too heavily on risk factors such as health while neglecting other factors such as peer interaction and peer social pressure. Normative analysis serves as a reminder of the larger picture these mechanisms need to be considered upon (Bruine de Bruin, Parker, Fischhoff, 2007, Fischhoff, 2008).

2.1.2 Descriptive Model of Decision Making – *Actual Events*. (Fischhoff, 1998, 2008; Kahneman, Slovic, & Tversky, 1982).

In descriptive theory there is an attempt to characterise how people actually make decisions. The fact that there is a dichotomy in decision-making between normative and descriptive suggests that human decisions may not always be consistent or that there may be fault in some of its components.

The research that occurs under the tenants of descriptive theory focuses on how people actually identify alternate options, how possible consequences may in fact be identified, and how the desirability and likelihood of those consequences are estimated, as well as what decision rules were used in order to achieve the final choice.

Descriptive theory does not assume that people are rational, nor does it actually provide as a starting point that people must understand the tenants of reason to make a

choice. It can be argued that some decision-making is so simple that even casual analysis would lead to the appropriate choice. In other instances effective choices are made by trial and error. It cannot be assumed that people always want to engage in rational decision-making. People may prefer to ignore what they know in favour of pursuing their emotions or sticking to preset ideas about a situation.

Descriptive decision theory also assumes people do not always know what is best for them, or do not fully comprehend their situation. A child who goes for a walk away from the house unattended may not fully comprehend what sort of dangers he/she may be placing himself/herself in as he/she may not be fully cognisant of all the factors that may place them in eminent danger.

2.1.2. Prescriptive Model of Decision Making (Matheson & Matheson, 1998)

Prescriptive decision-making straddles both the normative and descriptive views. One prescriptive view is decision analysis, an attempt to aid people in making better decisions that conform to what we understand are the norms (see Normative Theory; Bell, Raifa, & Tversky, 1988).

This third branch of modern decision theory originated from decades of the application of classic views of logic that form the backbone of decision-making, and then comparing those to actual decision-making in the environment. Its' focus is on helping real individuals make better decisions. Decision analysis helps people to understand and explain their own objectives and values, search for options and evidence, and appreciate the implications that their actions may take

Normative analysis and descriptive analysis are perspectives that work in conjunction with each other in this third branch. Prescriptive Decision Theory uses the five-step model as described for normative decision making to analyse what people are actually doing to help them better understand how to get to what they should or could be doing.

2.2 Factors that Affect Decision-Making

Historically decision-making has been encapsulated within a cognitive framework, using probabilistic models of thought and characterizing choices made as the product of decision analyses. This perspective has directly shaped how decision-making capacities of children and adolescents have been studied. Though cognition plays a vital role in our ability to make decisions, it is also necessary to consider other factors that are playing an important role in moulding our decision making abilities. These factors include biological and physiological elements as well as environmental factors such as peer influence and schooling that combine to play a role in the mechanisms influencing our day-to-day decision-making.

The following section will establish decision-making in terms of the relative contribution of cognitive, biological and environmental components. This is not to suggest that these factors are the only ones at play, but certainly they are factors that need to be understood to chart the development of decision-making.

Cognitive factors are considered first as they have played the most influential role in shaping current understanding of decision-making competence. This is followed by examination of biological mechanisms that form a backdrop for all decision-making

though are not necessarily the immediate focus of this thesis. Finally factors within the environment that play an immediate role in day-to-day decision-making are explored.

2.3 Cognitive Influences on Decision Making

2.3.1. Judgments and Decision Making

Judgements are some of the basic cornerstones of decision-making. In simple terms, judgements underlie choices. In order to be able to understand the right choice, the normative theory necessitates the inputs of value and likelihood, which typically are judgements by decision makers. This view of decision making, where situations involve estimation of the probable costs and benefits of a given behaviour is known as the *classic* view in decision making. It is at times referred to as a Bayesian model, for in research Bayes' Theorem can be used to calculate how objective probabilities change with the introduction of new information and thus are used to evaluate human performance.

Typical human behaviour itself is not always consistent with the presupposition of rationality however (Kahnemann & Tversky, 1972). An example of this as demonstrated by Tversky and colleagues (1990) is that people do not always abide by the axiom of transitivity. This entails that although a person may judge $A > B$ and $B > C$, they may sometimes violate assumptions by suggesting that $C > A$ (Tversky et al., 1990).

Other studies have demonstrated that people can be inconsistent with their choices. For example in a gambling experiment they may be willing to pay more money to play a less preferred gamble, which defies logical judgement and in turn rational decision-making (Lichtenstein & Slovic, 1971). Though human judgement can be expected to follow typical assumptions in certain situations, a number of major works have found that

participants are not always consistent in their choices, and a lot of this susceptibility is due to how the choices and the risks involved in these choices may be framed (Tversky & Kahneman, 1981). Depending on how a certain option is framed, people prefer a certain choice when it is presented in terms of its potential gains, and prefer a risky option in terms of its potential losses (Kahneman & Tversky, 1984). A clear social example of this would be a teenager choosing to smoke even though smoking was harmful if choosing not to smoke meant not being able to join in a peer group.

In order to account for these inconsistencies, current research has been geared in terms of understanding these gaps. To further explain this, current cognitive theory has proposed a security-potential/aspiration theory, which assumes that people will automatically adjust their attention to the best and worst possible outcomes of a risky decision as a function of the probability of success (Lopes & Oden, 1999). It has been argued that people are dual processors (Reyna, 2004; Stanovich, 2004). In essence people are capable of focused, analytical, and judicious decisions, but at times rely on more automatic, intuitive, heuristic processes (Ormond et al, 1991). This is applicable to decision making in explaining why wrong decisions or those that involve risk may be taken, suggesting that humans will at times allow a more automatic cognitive system to take over, forfeiting the rational systems for more automatic processes.

2.3.2. Heuristics and Biases

Human judgement, as described above, is at times plagued with judgemental errors. Some of these errors can be attributed to a series of mental shortcuts referred to as heuristics. Kahneman and colleagues (1982) argue that these simple rules that the brain

implements quickly serve to deviate judgements from the norm. The impact that they have during decision-making are considered below in terms of the specific effects they have on decision-making mechanisms. Each of these heuristics may play a part in shaping the final decisions made by an individual allowing some understanding of decision-making as a whole.

Representative Heuristic (Tversky & Kahneman, 1973):

The representativeness heuristic is used to determine how likely it is that an event is part of a category based on how similar or typical the event is to the category itself. In a study of decision making, when this heuristic was applied, subjects were found to ignore information concerning prior probabilities of the hypotheses in order to quickly estimate the probability that a given instance is a member of a particular category (Tversky & Kahneman, 1973). For example, if the assumption was that a “typical” librarian sported heavy rimmed glasses, hair placed tidily in a bun, and was middle aged and someone fitting those attributes was spotted, many people might erroneously classify her as a librarian. People may hold a particular stereotype as to what a librarian might look like. Her employment may have nothing to do with a library or books, yet a quick mental assumption categorised her as such. This mental shortcut produces systematic errors, in this instance information was assumed that was not accurate, a less than optimal decision may have been based on this assumption.

Availability Heuristic (Kahneman et al., 1982):

The availability heuristic can be explained when people estimate the likelihood of an event or relative frequency by the ease with which those instances can be brought to mind. It is logical that events that occur more frequently or that are presented in our midst more frequently are the ones more quickly brought to mind. This is relevant in decision-making as more frequent events are typically easier to recall when making estimates of the likelihood of an event happening.

Likelihood is not the only factor that can shape these quick estimations. Recent events and emotionally salient events are easier to recollect (Kahneman et al, 1982). A recent brush with the law may, for example, heighten the awareness of the possibility of negative consequences of someone considering doing an illegal activity, such as underage drinking or gambling.

Overconfidence Heuristic (Harvey, 1997):

Over the past three decades it has been noted through research that people are afflicted with an over-confidence in their responses. Harvey (1997) established through laboratory-based experiments that people typically tend to assume that their choices are more often correct than the actual proportion of correct choices happens to be. In terms of development, this heuristic has been applied to adolescent decision-making, which is described as “underestimating the likelihood” of the negative outcomes of a given behaviour (Furby & Beyth-Marom, 1992). This is explained as an adolescent feeling of “invulnerability”, where choices are considered incapable of reaping any negative outcome. Finn and Bragg (1986) found that individuals in younger age groups saw their

own chance of being in an accident as less than that of their peers, while older participants saw their own chance to be roughly equal to that of their peers. The same study also found that adolescent and young adult drivers (18-24) estimated their chance of being in an accident less than that of 38-50 year-olds (Finn & Bragg, 1986). This suggested that older adolescents were more likely to view themselves as uniquely invulnerable, or uniquely overconfident. The literature is discrepant on this finding however. Woloshin and colleagues (1998) used a log linear scale to evaluate the assumed convention that adolescents had a unique sense of invulnerability. Adolescents did not rate themselves as invulnerable, with most responses mostly similar to those of adults, with sensibility pervading in terms of the measures on the scale (Fischhoff, 2008).

Fast and Frugal Heuristics (Gigerenzer and Goldstein, 1986):

Fast and frugal heuristics lead to quick decisions based simply on one piece of information without an attempt of integrating all knowledge provided by normative procedures, or the tenets of logic. These procedures are ecologically rational, fast enough to operate when time and knowledge might be limited and powerful enough that they can ultimately shape both good and bad decisions. In day-to-day interactions we are constantly making on the spot decisions, and the fast and frugal theory helps explain how some of these decisions can be made with a limited amount of information. This heuristic has been hard to demonstrate outside an experimental setting, but its validity is meant to lie in real life interactions where decision-making is not afforded the luxury of an expansive time frame, particularly when navigating social realms.

2.3.3 Summary

Judgements in decisions have been the mode of study in terms of cognition. The value and likelihood of a situation occurring must be considered in order to be able to evaluate whether to implement a decision. Human behaviour cannot be solely studied in this fashion, as humans are not always rational thinkers. Inconsistencies in choice are frequent and hence many logical assumptions do not seem to apply to quotidian decision-making. To explain these gaps, dual processing has been proposed suggesting that automatic systems at times override the logical, rational systems. These automatic systems are referred to as heuristics, and are a series of identified mental shortcuts used that deviate from rational thinking. In order to make quick and hopefully successful estimations when making decisions, humans are prone to rely on stereotypes, information that is most recent or readily available, over-estimate their correct responses, and make on the spot calculations that forego stored information for immediacy.

2.3.4. Gender and Cognition

In general, there are relatively few studies that have explored gender differences in decision-making. Most of the research has been based on adult samples with little study of developmental sex differences. In early development (infancy to 8 years of age), boys are reported to make a greater number of decisions that may place them into mischief or at risk for conflict with parents compared to their female counterparts (Prior, Smart, Sanson, & Oberklaid, 2005). These cognitive differences overall are seen as slight (as opposed to pronounced), and perhaps these are trends that with the advent of time might diminish in the overall scheme.

Keltikangas-Jarvinen & Terav (1996) found that in terms of decision making as observed in samples in Finland and Estonia, females preferred a more pro-social strategy than boys. Participants in this study were presented with a hypothetical situation in which “either your friend or enemy is repeatedly teased by your classmates” and asked what they would do (p. 718). They noted a pro-social attitude if students would stand up for the victim and would tell the teasers to stop teasing. In other words, the emotions of the victim would be considered and he/she would be supported.

Some studies have suggested that females in general might be more willing to endorse more choices involving dependency and need for approval (Koopmans, Sanderman, Timmerman, & Emmelkamp, 1994). For example, females have also been noted to score higher on cognitive schemas such as self-sacrifice, and defectiveness/shame. These schemas have been associated with deficits in decision-making (Wellburn, Coristine, Dagg, Pontefract, and Jordan, 2002). The fore-mentioned schemas have been also been associated with depression, which is more readily observed in females than in males (Rosenblatt and Block, 2001). Murphy et al. (2001) noted that in healthy subjects, emotion guided reason facilitates decision-making, whereas in depression neuropsychological deficits in attention, memory, and executive all appear to play a crucial role in creating aberrant decision-making.

Additionally, studies with children and adolescents suggest that males (boys) hold beliefs that involve the acceptance of aggression to a larger degree than females (Huesmann & Guerra, 1997). D’Zurilla, Maydeu-Olivares, & Kant (1998) found that in developing effective or adaptive coping responses to problematic situations males scored higher on impulsivity than did females. Additionally, Calvete & Cardeñoso (2005)

reported that males scored higher on justification and judgments pertaining to violent beliefs and impulsivity in their decision-making, whereas females did not display the same attributes. Females on the other hand demonstrated value on prosocial activities and did not endorse violent means to an end to problem solving (Maydeu-Olivares, et al, 2000).

2.3.5 Self Regulation/Inhibition

Self-regulatory competence, a so-called ‘individual difference’ variable, has been linked to decision-making ability (Magar et al, 2008), Self-regulation may shape the propensity to make incorrect decisions or decisions that place us in adverse or risky situations (Steinberg 2004, 2005). Self regulation can generally be defined as the ability to control, modify, and adapt one’s emotions, impulses, or desires (Murtagh & Todd, 2004). In this sense it is synonymous with inhibition.

To date there has been little investigation of the development of self-regulatory competence along with its neural constructs across the life span and the changes and relationship that exist between them (Williams, Ponesse, Schachar, Logan, & Tannock, 1999). However, a relationship between self-regulation and decision-making is suggested by evidence from developmental disorders that include poor decision-making and impulsivity.

Children with conduct impairments display a wide range of rule-violating behaviours, from whining, swearing, and temper tantrums to severe vandalism, theft, and assault (McMahon & Estes, 1997, Nigg, 2000), decisions that alienate them from peers

and put them at risk. Conduct disorders have been linked to an under-active self-regulation/inhibitory system (Berlin & Bohlin, 2002).

Impulsivity is a feature of Attention Deficit - Hyperactivity Disorder (ADHD) such that children with ADHD appear unable to bridle their immediate reactions or ‘think before they act’ (behavioural inhibition failure, DSM-IV, 1994). These children exhibit age-inappropriate behaviours in the two general categories of inattention and hyperactivity-impulsivity (American Psychiatric Association [APA], 1994). In addition, they may lack the ability to concentrate on relevant stimuli and not be distracted by noise in the environment (cognitive inhibition failure; Elliot, 2003). Li, Chang, and Lin (2003) suggested that the mechanism that supervises inhibition is not fully developed in children with ADHD although these disabilities become less pronounced with maturation (Gest, 1997, Harnishfeger, 1995). The examples of ADHD and conduct disorder suggest a clear linkage between self-regulation and decision-making, with both cases highlighting poor decision-making as the consequence of poor inhibitory control.

Self-regulation can be further broken down into two sub-categories: *emotion regulation* and *cognitive regulation* (aka *executive functions*). The regulation of emotion relates to the control of affect, drive, and motivation (Banfield, Wyland, Macrae, Munte, & Heatherton, 2004). Comparatively, cognitive regulation relates to the control of thoughts and actions that are directly responsible for the planning and execution of behaviour (Banfield et al, 2004). It is important to explain the distinctions that exist between them.

Cognitive Self-Regulation

Poor cognitive regulation has also been found to impair the ability to make hypothetical decisions (Magar et al., 2008). Failures of executive functions such as planning and inhibition are all considered key factors in increasing the likelihood of poor choices or risk behaviour in decision-making (Banfield et al., 2004).

The Stroop task is a classic example of a measure that can be used to gauge cognitive inhibitory ability by measuring the inhibition of pre-potent responses. Subjects are instructed to attempt to name the colour of the ink of a word, which in itself is a colour name. Inhibition is measured by subtracting the performance on the second trial where colours and colour names are matched randomly, to a first trial where participants are simply asked to read out the colour words quickly and accurately. Potenza et al (2003), in an fMRI study looking at the function of the ventromedial prefrontal cortex in inhibition, used the Stroop paradigm to test attention and response inhibition in a group of male gamblers to assess competence in decision-making. Compulsive gambling has been linked with deficits in decision-making ability (Wood and Griffiths, 2002). It was observed that gamblers, though sharing neural commonalities with healthy subjects, differed in brain regions associated with impulse control. An association was made with prefrontal cortical deficits and decision-making capacity.

Emotional Self-Regulation

Affect plays an important part in self-regulation that in turn immediately influences decision-making (Séguin, Arsenault, & Tremblay, 2007). Though this thesis will not study emotional factors exclusively, it is very important to note that emotions have an impact upon self regulation, which in turn has an influence on decision-making overall.

Cotemporary approaches to the subject stress that impulsivity could be seen as an inability to inhibit prepotent responses while attempting to enact secondary responses (Rothbart & Bates, 1998). The logic that exists behind it is that if there is a deficit in the regulation of emotion then this would also be observed in regulation skills directly feeding into decision-making. Decision-making can occur under conditions where arousal may be high and thus emotional processes may play a distinct role in the mechanisms underlying choices that are made. This is referred to as “hot” decision making. The opposite occurs in a situation that is “cool” – where decision-making is rational and controlled when periods of arousal may be low (Dahl, 2004, Séguin et al.2007). In both instances, it is clear that decision-making does not occur in a void, and immediate surroundings whether through peer groups or via the environment itself have an effect on our emotional states. Depending on where on the emotional spectrum we lie, decision-making would be affected directly because of it. Cooper, Agocha, & Powers (1999) used a series of sophisticated path analysis to account for the relative contributions of affective expectancies , emotional regulation, impulsivity, and extroversion to account for the levels of risk taking behaviour in participants. They have noted that affective expectancies and emotion play a significant (an estimated 40% variance in alcohol use for example) percentage in taking making less than optimal decisions.

Decision-making is often requisite during periods of high arousal. Humans are commonly faced with social situations such as a disagreement with a friend or a parent, or make social choices in high arousal environments such as when drinking, gambling, or when faced with choices of a sexual nature. The tendency to experience intense emotions is likely to overwhelm more measured evaluations and perceptions of risk, with

impairments in executive functions (inhibition) or memory resulting in a poorer ability to weigh up the competing risks and benefits associated with decision-making in real life situations (Magar et al, 2008).

It is important to note that emotional development studies have noted that with maturation emotions tend to play a less salient role in poor decision-making (risk taking). The findings are applicable to developments in decision-making that occur relatively early (i.e. childhood) and later (i.e between adolescence and adulthood). The literature is still unclear, however, on how to interpret these findings, other than demonstrating a connection between affect and impulse control. It is acknowledged that affect and emotion play a role in decision-making, but exploring these factors directly is not within the scope of this work. These factors are considered and discussed as possible contributing factors, but are not directly analysed.

2.3.6 Cognitive Development – Paradox in Decision-Making

Late childhood to middle adolescence is an important period in the development of decision-making skills, as it is for all domains related to cognition (Keating, 1990). During the early years in adolescence the ability to make successful decisions should evolve and by the age of 15-years, most adolescents are making decisions in ways that are structurally similar to those observed in adulthood (Mann, Harmoni, & Power, 1989).

The process of maturation from juvenile thought to adult thought during early to middle adolescence should bring with it a substantial increase in the competence on different cognitive processes that make tasks associated with sound decision-making more readily accessible. The main changes are the ability to create possibilities out of

new and fresh combinations of ideas, to identify a wide range of risks and benefits, to be able to predict the success of implementing alternative strategies, as well as being able to measure the correctness of information from sources that may play an influential part (Grisso & Vierling, 1978; Kaser-Boyd, Adelman & Taylor, 1985; Mann et al, 1989). Consistent with this growth in capacity we would expect both a strengthening and sophistication of the factors that bring about sound decision-making. However, this is not necessarily the case, with adolescents often engaging in sub-optimal choice behaviour (Casey, Getz, & Galvan, 2008) such as driving under the influence of alcohol or drugs, unprotected sexual behaviour exposing them to sexually transmitted infections (STI) and pregnancy, drug consumption, and gambling to name but a few risk-associated behaviours. Individual real life situations where decision-making occurs are discussed in detail in the following chapter (Chapter 3, Section 3.3.).

A number of neurobiological hypotheses have been postulated to explain why decision-making in adolescence is associated with so many deficits. Most of these shortcomings are relatively transitory in nature and are resolved by the beginning of adulthood, with few long-term repercussions (Steinberg & Morris, 2001). In the next section biological and neurological factors that can play a role in decision-making need to be considered in terms of theory. It needs to be made clear that biological factors (other than age and sex) are beyond the scope of this dissertation. This dissertation will be looking at cognitive inhibition, problem solving, and decision-making from a non-biological standpoint. However, in order to have a full understanding of what is occurring in development it is necessary to understand the biological implications of maturation as observed through puberty and maturation into early adulthood.

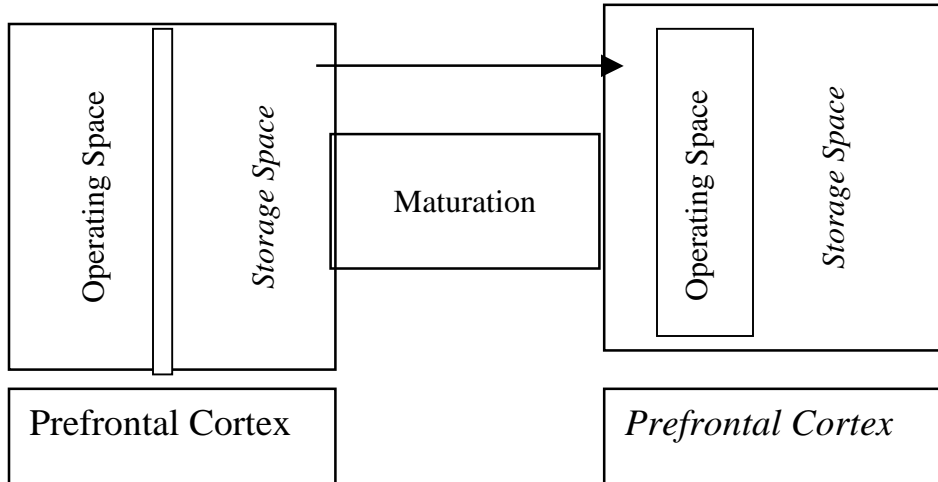
2.4. Biological and Neurological Influences on Decision Making

2.4.1 Neurocognitive development – Prefrontal Cortex

Cognitive development from late childhood to late adolescence is associated with a greater progression in the efficiency of inhibition. This is grounded in the refinement of frontal and fronto-temporal lobes (Steinberg & Morris, 2001). Although neurocognitive development is not within the scope of this dissertation, some awareness of its contribution is necessary to fully understand the development of decision-making.

One way to understand the development of inhibition within the prefrontal area is to think of the prefrontal cortex abstractly as a box. This box would then be divided into an ‘operating space’ and a ‘storage space’ (Figure 2.1. Milliken & Tipper, 1998). The operating space would execute the inhibitory commands, while the storage space would be the centre from where environmental cues are stored and rated in regards to their importance and urgency. The total amount of space to be used remains constant, but with maturation more storage space would become available as the operating space becomes more efficient at processing incoming and outgoing information. Cognitive and behavioural functions would improve with age and maturation and greater capacity would become available.

Figure 2.1: Simplified diagram of change in operating space versus storage space with maturation to explain efficiency of inhibition (Milliken & Tipper, 1998)



With the elimination of an overabundance of synapses and strengthening of relevant connections with development and experience the prefrontal cortex becomes less susceptible to interference from extraneous environmental cues. These changes are commonly measured by tasks that tap behavioural and cognitive inhibition, such as the Go/no-go task, and the Wisconsin Card Sorting Task respectively (Sweeney, Kmiec & Kupfer, 2000). As a child’s neurological system matures, inhibitory processing becomes increasingly efficient contributing to selective attention and the ability to maintain information that is task irrelevant outside of working memory (Bjorklund & Harnishfeger, 1990). This in turn allows decision making to become more fluid.

Casey, Getz, & Galvan (2008) noted that the change from uninhibited to inhibited status is most salient in the first 18 years of human life, with a linear increase from childhood to adulthood. Thatcher (1991,1992) described three growth periods in cognitive maturation, the first between 0-2, second at 7-9 years, with a final spurt in late

adolescence (16-19 years). Several studies have noted the improvement of inhibition during these three developmental periods. Livesey and Morgan (1991) determined through their variants of the Go/no-go task and their pre-school equivalent of the Wisconsin Card Sort Task that inhibition does improve with age and practice in children as young as three. Carver, Livesey, and Charles, (2001) also found that the ability to withhold a response improved with age, a key factor in decision-making. A modified version of the Go/no-go task (suitable for use with young children) was administered to mid-primary school children (7-9 years old) and a standard version of the task to adults, revealing significant age differences in their ability to inhibit responses (Carver et al., 2001). Tamm, Menon, and Reiss (2002) found evidence of differences in executive processes (inhibition in particular) occurring in the prefrontal cortex during performance of a Go/no-go task designed as an fMRI paradigm. In this study, 19 typically developing children and adults (8-19 years old) performed a Go/no-go task while behavioural and fMRI data were collected. A correlation between activation and age was seen in the left middle/superior frontal gyri, suggesting that as participants grew older they used their prefrontal cortex more “effectively” than younger participants. No relationship between accuracy and age emerged, but the ability to more quickly inhibit responses improved significantly with age. Bunge et al (2002) found differences in brain activation between children ages 8-12 and adults related to two forms of cognitive control: interference suppression and response inhibition, with children being more susceptible to interference and less able to inhibit. These studies have elegantly supported the claim that there are significant changes in inhibitory capacity occurring between childhood and mid to late adolescence in terms of frontal cortical circuitry. Consistent with this growth in capacity

we would expect both a strengthening and elaboration of the factors that elucidate sound decision-making in adolescence, yet adolescence also sees with it a higher occurrence of “unintentional injuries and violence, alcohol, drug abuse, unintended pregnancies, and sexually transmitted diseases.” These behaviours are not consistent with the notion of refinement with maturation in brain mechanisms that facilitate optimal decision-making. (Casey, Getz, & Galvan, 2008).

As our understanding of prefrontal systems does not provide a biologically conclusive understanding of decision-making in adolescence, Casey, Getz, & Galvan (2008) have proposed the conceptualisation of a different mechanism underlying the non-linear changes that occur in decision-making behaviour. The description follows directly in the next section.

2.4.2 Reward Neurocircuitry (Dopamine)

The previous sections established that cognitive control and prefrontal areas both develop and strengthen with age. If immaturity in both these areas were observable, then children should look remarkably similar or somewhat worse in terms of decision-making than adolescents. One biological area, which has not been completely understood in terms of its impact on decision-making is the limbic system. The limbic system develops far earlier than prefrontal control regions do. According to Casey et al.’s model (2008), the individual should be more influenced by a fully mature limbic system than by an immature prefrontal area. Comparatively, children have a more balanced situation than adolescents in terms of limbic and prefrontal development, as both would be developing at an equal rate. For adults, the limbic and prefrontal areas would both be fully mature,

with the imbalance only presenting itself during adolescence. This perspective can provide a basis to understand the non-linear shifts in decision-making and behaviour across all regions.

Dopamenergic activity between childhood and adolescence changes markedly during the time of puberty. There is evidence (Martin et al., 2002) that the increase in sensation-seeking that occurs in adolescence as opposed to earlier periods in maturation correlates more with pubertal maturation than with chronological age. No evidence exists directly associating changes in decision making and thinking to pubertal maturation, or to organizational sex differences that may occur from puberty. Schulz & Sisk (2006) suggest that organizational sex hormones have less of an impact as maturation occurs. Those who mature earlier may be at a heightened risk for poor decision making because there is a longer time gap between the maturation of dopaminergic systems and the full maturation of the frontal cortex.

In a recent study adolescents were asked to take part in a task where peer acceptance and rejection were manipulated in an experimental setting (Nelson et al., 2007). This revealed a greater amount of fMRI activation when participants were exposed to paradigms of peer acceptance (versus peer rejection) in brain regions that have been associated with reward stimuli (Nelson, et al., 2007). It may be plausible to suggest (Waraczynski, 2006) that at least in adolescence social acceptance (which will be discussed as an influential factor in decision-making later in this chapter) might be processed in ways similar to other rewards. Being accepted into a peer group would activate brain circuitry related to feelings of pleasure and satisfaction, thus explaining an adolescent need to belong to a group and hence suggesting that decisions that are made

would be biased towards group inclusion. This is a nod towards earlier discussion on the role that affect played in decision –making. Decisions are not made in an environmental void, and emotional factors may play an influential role upon the actual final choice that is being made.

2.4.3 Biological sex differences

Sex differences may play an indirect role in decision-making. Specifically these may be apparent in the connection between hormones and general decision-making behaviour and in terms of evolutionary mechanisms responsible for gender effects.

Boyer (2006) has drawn connections between the biological foundations of sensation-seeking, healthy adolescent biological development, and the occurrence of poorer decision-making as observed through reckless and risky behaviours (Arnett, 1995, 1996). Specifically changes in sex hormones (i.e. testosterone) are related to rises in risk-taking behaviours through a sensation construct. Elevated levels of testosterone have been linked with violence and aggression in general, both in men and in women (van Honk, et al., 2004) This suggests that there might be a particular personality type influenced by changes in testosterone that could be characterised as having a regular preference for outcomes that are stimulating (this can also be seen under the guise of emotional regulation and self control). This might explain why a riskier decision maker would choose the more dangerous choice when a safer, more logical choice could have been made. Androgenic hormones double in females and increase 10 to 20 times in males (van Honk, et al., 2004). This discrepancy in hormones has been used as yet another plausible indirect explanation for the variance that can be observed between males and

females in terms of the choices that they are making either through hypothetical situations or real life scenarios.

Cumulatively, these changes in chemicals (varying from one gender to the other) can be taken as part of a larger explanation of why males and females may be making different decisions based on biology alone. As mentioned above, there is no simple direct link between sex and decision-making. The chemical differences that are noted between males and females all may play an important part in the ultimate decision-making process, but none have been found to directly explain decision-making.

2.5. Environmental Influences on Decision Making

This section will chart the influence that the external environment has on the decision-making process. The previous section focused on internal cognitive and biological factors, while this section is concerned with external factors that play an influential role in everyday situations. The influence of peers has been already been discussed indirectly in terms of biological and cognitive factors occurring in adolescence, and this is explored further. This is followed by consideration of the effects of education and culture and finally examination of the influence of family on decision-making processes.

2.5.1 Peer Influence

It is favourable for humans to maintain active bonds of friendship, or close-knit peer relations, with “social equals” (Lewis & Rosenblum, 1975), as these can provide support and security during childhood and even more importantly during adolescence (Steinberg, 2008). To cultivate these relations, it is necessary to be able to engage in social interactions and make effective decisions. Failure to implement these skills may

lead to general social maladjustment. The ability to make decisions is a key skill in childhood and adolescence. A general deficiency in maintaining and creating peer relationships has been clearly associated with poorer social problem-solving (Asarnow & Callan, 1985; Feldman, & Dodge, 1987; Lochman & Lampron, 1986). Furthermore, children's success or failure in being accepted by peers is determined in part by their skill in social problem-solving (Burks, Laird, Dodge, Petit & Bates, 1999; Dodge & Price, 1994). Importantly, poor problem-solving and decision-making are associated with suicidal ideation (Sadowski & Kelley, 1993).

Gettinger et al. (1994) suggested that examining children's peer interactions from a social-cognitive perspective could yield a large sum of information about the development of decision-making capacities. This perspective presupposes reciprocity between children's beliefs about friendship and their interactions with friends. How one thinks about friends or other children has a direct effect on perceived choices and ultimately the actions one takes. If children view their actions as a process of give-and-take, i.e. as a function of reciprocity, they should be more likely to take the friend's perspective into account when resolving conflicts (Gettinger et al., 1994). In other words, what is suggested is that the ability of one person to sense the state of mind of another and to see the world through another person's perspective is important for effective social development.

Children who analyse their social failures as being beyond their control are less likely to search for alternate strategies compared with children who attribute their social relations to their own efforts (Gettinger et al., 1994). This in turn is reflected in deficits in decision-making. Goetz and Dweck (1980) found that children who viewed their social

attributes as fixed entities or non adaptable (i.e. “I am just not much fun,” “Other kids don’t like me”) were likely to withdraw or persevere in the face of perceived rejection. Contrary to this, children who viewed their social attributes as something they could mould (“If they know me they will play with me”) were likely to spend more effort attempting alternative strategies to establish friendships and work within social situations.

Socially competent individuals are able to plan a step-by-step sequence to achieve a goal (Spivack, Platt, & Shure, 1976). This social problem-solving skill, which in turn is an intrinsic part of decision-making, includes recognition of potential obstacles that could interfere with reaching that goal, and appreciation that it takes time to solve a problem. To make a new friend, for example, a skilled planner might engage in considering a range of strategies. For example, one might go about thinking how to become friends with the new student in class and devise a sequenced plan of steps to achieve the desired goal (i.e. talking to the new boy during break; asking him if he wants to join in the game of football being played; suggesting that they can stay after school to play together) instead of simply thinking “I must talk to the new boy”, as a poor planner who focuses on only one, isolated solution at a time, would do.

In 2006, Obradović and his colleagues looked at nearly 200 participants in a longitudinal study drawn from a group of potentially risky decision makers, as assessed by the Minnesota Longitudinal Study of Parents and Children (Egeland and Brunquell, 1979) a prospective study of children developmentally at-risk due to the low socio-economic status of their families. The longitudinal study spanning over 30 years followed people looking at their social competence, with risky decisions being one subset. The results demonstrated the stability of social competence over four different age periods. It

was found that social competence was stable from early to middle childhood, but that as children entered adolescence greater inter-individual differences began appearing in relations with peers. As children enter adolescence their social world becomes harder to navigate as experiences with peers and relationships unfold a greater number of decision-making situations. Social developmental research has addressed the influence of peers on child and adolescent decision making, particularly in terms of decisions that are risky.

Developmental research has demonstrated that as children get older, they tend to spend less time with adults and more time with similar-age peers (Ellis, Rogoff, & Cromer, 1981). It is widely accepted that peers influence one another in their decision-making. Prinstein, Boergers, and Spirito (2001) demonstrated that those who engaged in behaviours that were deemed risky (e.g. drinking, alcohol, smoking cigarettes, drug use) were more likely to have friends who engaged in the same behaviour.

Gardner and Steinberg (2005) looked at adolescent (13-16 years), young adult (18 – 22 years) and adult (24+ years) participants playing a computerized game. The adolescent participants who played together were more likely than any of the other groups to make riskier decisions during the game. Participants would choose the riskier options in the specially designed interactive video game. These studies suggest that the presence of peers may facilitate or serve as a catalyst for riskier decisions. This does not go unchallenged, however. Kandel (1996) used an algebraic model to demonstrate statistically that the influence of peers was overrated by studies placing overemphasis on peer relations and not weighting other factors appropriately. When all factors were accounted for, the ensuing model did not predict that peers had as high an influence as the literature in general had judged.

The influence of peers on decision-making does not have to be negative. Brown & Klute (2003) noted that over the course of adolescence, friendships change and become closer, with a greater amount of intimacy shared, with more revealing of information, and more support with age. The immediate influence of individual friendships is sometimes overestimated. Individual friends are also part of larger social cliques, and in these larger groupings peer influence could exert a different and perhaps stronger influence (Brown, 2004)

One environment where peer influence is initially consolidated is within an education setting. Children of similar ages are all brought together artificially in a single environment. Intuitively it makes sense that this environment would also play a distinct role in the shaping of peer dynamics and decision-making.

2.5.2 Education Influence / Culture

School is an institution that allows children to develop higher-order concepts that can serve as a foundation for future life skills. Basic decision-making skills are modelled or taught as part of the general school curriculum, concepts and techniques that hold considerable influence in day-to-day real-life problems. Maths and science problem solving applications can be applied to more general realms. Many aspects of schooling encourage children to draw upon the common factors that situations may share with each other and encourage that they are utilised in future problem solving situations. This provides children with a powerful set of skills that are applicable to a variety of real life social settings. Ventura et al., (2008), in a study looking at the effect of literacy on adults, found that those that were western schooled were significantly different on the Frame-

Line test from those who did not receive schooling or those who were only semi-schooled.

These findings suggest that schooling may provide a culturally independent means through reading to understand the local environment (i.e newspapers, textbooks). Those who are not schooled would not have this advantage. Reading can be one of the most direct ways to engage beliefs, ideology, and to learn social problem-solving techniques – through modelled examples as observed in text, script, and printed media. For example, a comic strip in a local newspaper models behaviour for those who can actually read the running commentary, a child's book models day-to-day social engagement between children. According to Fiske and colleagues (1998), schooling raises cultural independence through the explicit instruction and practice of logical reasoning and critical thinking. Simply phrased, schooling provides students with the tools to resolve their own decision-making situations in a unique fashion, possibly separate from general cultural guidelines on certain situations. Other cross cultural studies have found that children who have been to school in places as culturally diverse as Morocco, the Yucatan province in Mexico, and Liberia do better on various tests of free recall than their unschooled counterparts (Cole et al., 1971; Wagner, 1974, 1978), corroborating the idea that schooling is a factor that plays a crucial role in the development of cognitive skills that in turn can be applied to decision-making and problem-solving.

Religion may also contribute to the influence of education and culture on the development of decision-making by children and adolescents. Sinha, Cnaan, & Gelles (2007) observed from a random sample of 11-18 year-olds in the United States, that most youths have ascertained information about religion from a parent or caretaker. This study

indicated the importance some young people attach to religion and revealed that religion appeared to have a mediating effect on risk-taking behaviour. Specifically teenagers who saw themselves as religious consistently reported fewer risk decisions in the areas of smoking, alcohol use, truancy, sexual activity, marijuana use, and depression (Sinha et al., 2007). This study illustrates the potential interaction of family and culture on decisions young people make about risky behaviour.

Cultural differences, including religiosity, may play an important role in how children and adolescents navigate their own individual environs, but schooling appears to be a factor that above all seems to have an important impact on how this information is processed. Schooling provides a framework for understanding the world that is significantly different to that experienced by those who are not exposed to systematic instruction through formal education. Education may be the mediator of both culture and experience (Fiske, et al., 1998).

Exploration of the role of formal education suggests that in and of itself it does not prevent adolescents making poor decisions (Steinberg, 2007). For example, most systematic research indicates that even the best health education programmes are far more successful at changing individual's knowledge than actually altering their decision-making (Steinberg, 2004; 2007). In the United States, tax payers may be unaware that over one billion dollars every year is spent on educating teenagers within school settings about possible detrimental factors involved in making decisions that involve risk in terms of health, sex, drug, and driver's education (Centre for Diseases Control, 2007). However, these initiatives appear to have had little impact on adolescent decisions regarding these behaviours (Steinberg, 2004; 2005). Reyna & Farley (2006) pointed out

that adolescents are able to reason and understand risk behaviours in which they engage. Education has had a significant impact on educating adolescents about the consequences of making decisions in terms of lifestyle choices that could place them in danger. However, the availability or provision of information does not appear to be sufficient to prevent adolescents making risky decisions. Information may not be processed or may be ignored, overlooked, or discarded during decision-making because of the strength of other factors, such as peer pressure or emotion state, in force at the time.

2.5.3 Parenting

Most research concerning social development and decision-making have looked at the relationship that exists between the parent and a child, with an argument that no relationship has been scrutinised as intensely. One approach at looking at how parenting influences day-to-day decision-making is by looking at attachment, as proposed by Ainsworth (1969, 1985). Ainsworth looked at behaviour patterns between child and caregiver and devised a scale measuring the attachment patterns that were observed. The patterns described were securely attached, avoidant attached, ambivalently attached, and disorganised attached. For purposes of survival, an infant would be more likely to secure itself to adults who are sensitive and responsive in social interactions. It is suggested that the better the responsiveness and stimulation in early life the stronger the attachment developed, an attachment that would be reflected in early development through to adulthood (Ainsworth, 1985). A securely attached individual could more likely become a self-confident, social responsive adult because of early nurturance (Ainsworth, 1985). Allen and colleagues (2002) extrapolated from this theory to suggest that insecurely

attached adolescents, and those prone to poor relational functioning tended to display a greater amount of poor decision-making. The assumption made, is that the more strongly *attached* one is, the better cognitive skills such as problem and decision-making would be. It is a very simplistic model, to say the least.

More recently interest has turned to parental surveillance strategies to explain differences in decision-making. This refers to parents' knowledge and awareness of their child's whereabouts, who their child could be spending time with, and ultimately what their child is doing (Laird, Pettit, Dodge, Dodge, & Bates, 2003). It is assumed by this study that parents take on a detective like stance, checking in on their offspring to ensure that good conduct is observed even when children or adolescents are unaware that they are observed. For example, if Susan stated that she would be going to a sleep over at Hannah's house, a mother/father could call Hannah's house and confirm this is the case. If children have parents who are more adept at surveillance, more often seen in authoritarian parents, then it may follow that a child may be more cognisant of parental influence and monitor their own decision making to fit an ideal standard of behaviour at all times. In the scenario cited earlier, Susan may know that her parents would check up on her, and thus she would modify her decision-making accordingly. This sets up a parent-effect *model*, where a child or an adolescent will monitor their decision making because they are aware of parental knowledge of their behaviour.

Statin & Kerr (2000) argued that the way parents obtain information may not derive from direct surveillance techniques but rather is the product of the parent-child relationship. A relationship that is more open, in which the child feels comfortable enough to self-disclose their own choices to a parent, is likely to yield greater parental

awareness of their child's decision-making. This sets up a child-effect model where children actively disclose information to parents about their decision-making in their day-to-day lives and thus are more likely to regulate their decision-making accordingly. Whether it is because they realise parents will "check up" on them or whether it is because the parent-child bond is strong enough that children feel free to disclose their actions, in either of the two cases decision-making is influenced directly by parents.

2.6 Summary

Decision-making is the cornerstone of human behaviour. From an early age we are faced with decisions to be taken, from the mundane, such as choosing what to have for lunch, to the life changing, such as choosing a degree subject or having children. Decision-making is a complex process influenced by many factors. First, decision-making is a cognitive process, reliant on a range of cognitive skills such as memory and self-regulation, and emotion. Second, decision-making is influenced by biological factors, especially during childhood and adolescence where neuronal and structural factors play a part. Third decision-making is affected by environmental factors including the influence of peers, parents and schools. These factors, altogether, have an immediate influence on decision-making.

Decision-making is achieved through these factors acting together, but to understand the process requires an appreciation of the context in which the decision is being made. Differing contexts (such as calm or emotionally charged setting) may result in different decisions being made even if all other factors stay the same. For example, in a social education class on smoking a pupil may say that they have decided that they will

never smoke. However, at a party with their friends this same pupil may decide to smoke. The context, the setting, the emotional tone at the time of the decision making process all play a vital role in shaping the final outcome made and the success of the actual decision-making process.

Decisions can be discussed in an abstract, scientific manner as they have been up to now, but the reality is that decisions are made in real life and not in an academic vacuum, making real life decision-making harder to study. The ensuing chapter seeks to present 7 distinct areas where the decision-making process plays a crucial role in day-to-day social navigating. Risky decision-making can place a person in immediate danger and have life long ensuing consequences. The following chapter focuses on seven distinct areas where decision-making is known to be leading to negative repercussions. It does not imply that these are the only adolescent behaviours, but does note these are seven areas where less than optimal decision-making has been observed.

CHAPTER 3

REAL LIFE DECISION-MAKING

3.1 Introduction

The previous chapter discussed factors affecting decision-making in terms of theoretical approaches and existing evidence. This can be viewed as the ‘basic science’ of decision-making. Decision-making is not confined to an experimental laboratory but is a real world phenomena and as such real life decision-making should be considered in terms of real world activities.

Daily life is full of situations that require us to make decisions that shape both the immediate and long-term future. Many of these situations involve other people and such social decisions present some of the most challenging issues for us to deal with. Often we have to take other people’s feelings or potential reactions into account in reaching a decision. Social problem solving presents the opportunity to explore the operation of decision-making in practice with a view to untangling the relative contributions of various factors. Social problem solving can be thought of as the immediate precursor to decision-making, and an intrinsic component in how a person will take a decision.

3.2. Social Problem Solving – Foundation for Decision-making

Social problem solving refers to the process of solving problems encountered in daily life (D’Zurilla & Maydeu-Olivares, 1995). In this context “social” refers to any

problem solving that plays a factor in our ability to adapt to a constantly evolving environment and to be able to function within this environment (see D’Zurilla, Nezu & Maydeu-Olivares, 2004). The social environment comprises both *intra*- and *inter*personal problem situations. Intrapersonal refers to self-based, inward problem solving such as resolving a moral dilemma, whereas interpersonal problems refer to conflict situations between individuals, such as an argument with a friend.

Social problem solving can then be defined as the ability to interpret real-life problem situations by utilizing past experience in order to generate effective solutions so as to be able to put these into action by making a decision. As such it ensues that problem-solving is an adaptive process helping to meet personal and environmental demands (D’Zurilla and Godfried, 1971).

3.2.1 Social Problem Solving Model

D’Zurilla and Godfried (1971) proposed a five-stage model of social problem solving. Stage 1 is a general **orientation** to the problem itself, i.e. the problem has to be established. Stage 2 is the **formulation** of the problem, i.e. defining the problem at hand. Stage 3 sees the **generation** of alternative strategies to solve the problem. Stage 4 is **selection**, i.e. a decision is made to choose one of the strategies generated in Stage 3. Finally, Stage 5 is **evaluation** of the decision-making, i.e. after a decision has been made the actual solution is then reviewed in terms of whether it was successful or not.

Problem solving skills comprise: a) problem definition and formulation, b) generation of alternatives, c) decision-making, and d) solution-implementation. Problem definition and formulation involve collecting the information about a problem situation in

order to understand its make up to set goals for solving the problem. Generation of alternatives refers to the production of as many solutions as possible in order to maximise the likelihood of generating an effective solution. Decision-making refers to the evaluation of the advantages and disadvantages of each solution and the subsequent selection of the most effective solution from a series of alternative solutions. Solution implementation and verification refers to the actions carried out to solve the problematic situation.

The stage model of social problem solving was recently revised and simplified by D’Zurilla, et al. (2004). The revised model contains three major components and they are as follows: 1) problem, 2) problem solving, and 3) solution. It is important to underscore that problem solving involves cognitive and behavioural components. Resolution of the problem (problem solving) is a cognitive process while implementation of this solution (making the decision and implementing this decision) is behavioural. Though both are part of the same schema, they consist of two separate functions and are categorised separately by the literature – even though they work in conjunction.

The problem solving function involves specifying the problematic situation and generating several possible alternatives to that specific situation. This process is aimed at either changing the problematic situation itself or ameliorating emotional stress, or both. Secondly, a problem (or problematic situation) refers to any real life situation in which a response is needed in order to change it to a more adaptive level. However, no solutions are immediately available as a more conscious and effortful activity is required to deal with the difficulties in the problematic situation. Additionally, the solution refers to a coping response, which is specific to that problematic situation.

A successful solution to a social problem will decrease the negative impact brought by the problem and increase the maximum positive influence to both sides in an interpersonal situation (D’Zurilla et al., 2004). In basic terms, one is the actual concept for resolving a real-life problem situation and the other is the actual implementation of the concept along with the repercussions of its application. For example, deciding that in order to make new friends when moving to a new school it would be good to join the chess club denotes step-wise thinking toward resolving a problem. This is not the only way, that someone can make friends. The actual decision to join the chess club, the implementation of the decision, and the success rate of making friends are separate to the original problem solving. In practical terms, joining the chess club may not lead to any friendships, and thus would not be a successful implementation of the original problem solving. This would be considered to be a less than optimal decision as it was unsuccessful, and suggests that a new social problem solving strategy be thought of in its place.

3.2.2 Measurements of Social Problem Solving Ability

One of the most commonly used measurements of social problem solving is the Means Ends Problem Solving task (MEPS; Platt & Spivack, 1974). This measure was developed to explore the way people, particularly adults, approach hypothetical problems based on real-world situations. The theoretical background and psychometric properties of the MEPS are considered below.

Means-Ends Problem Solving Procedures (Platt and Spivack, 1974)

The MEPS is a social problem solving task that involves means-ends thinking. Means-ends thinking refers to the process of achieving a successful or desired outcome (the ‘end’) along with the steps involved in reaching this outcome (the ‘means’). As described by the authors Platt and Spivack (1975) means-end thinking has three components: “a) the ability to conceptualise the steps or the “relevant means” which are necessary to achieve the goal, b) the ability to anticipate the potential difficulties during the problem-solving process, c) the ability to appreciate that a successful problem-solving process takes time (D’Zurilla & Maydeu-Olivares, 1995, p 442).”

In the MEPS participants are presented with the beginning and end of a scenario involving a problematic social situation. The beginning contains the problem (e.g. an argument with a friend) and the end contains the desired outcome (e.g. the argument is resolved amicably). Participants are asked to explain how they would proceed from the problem to the outcome – i.e. to provide a solution, or a ‘means’ to achieving the stated ‘end’ (House & Scott, 1996).

MEPS responses are usually scored in two ways – number of means and effectiveness. Number of means refers to the number of relevant mean steps in constructing a solution to the hypothetical social problem. This provides a quantitative measure of performance. Butler and Meichenbaum (1981) suggested that assessing the quality of the MEPS solutions may be more useful than just counting the steps, especially when trying to understand differences in problem solving between groups, e.g. between children and adolescent participants.

Effectiveness refers to a “problem solving strategy that both maximizes the positive and minimizes negative short and long-term consequences, both personally and socially

(see Marx et al., 1992, p. 80). This is scored on a 7-point scale rating how successful the problem solving strategy was in achieving the desired goal. The least successful would get a 1 or a 0.

MEPS Procedure Limitations

The MEPS has been critiqued with the focus almost exclusively fallen on the external validity of the task (House & Scott, 1996). Some of the problem situations are regarded as being unrealistic in terms of personal experience, such as stealing a diamond. As a result of these concerns, the four problem situations with the greatest ecological validity have been the ones typically been used in research (e.g., being treated unfairly by a teacher/boss, having a disagreement with parent's/a partner) and these same questions were used in this work. The final area in which the MEPS has attracted criticism is that it assesses the ability to construct a plan to solve a hypothetical problem in the absence of the normal emotional processing associated with solving social problems. Thus, it is argued that it is a measure of imaginative thinking as opposed to what it is supposedly measuring, problem solving (House and Scott, 1996).

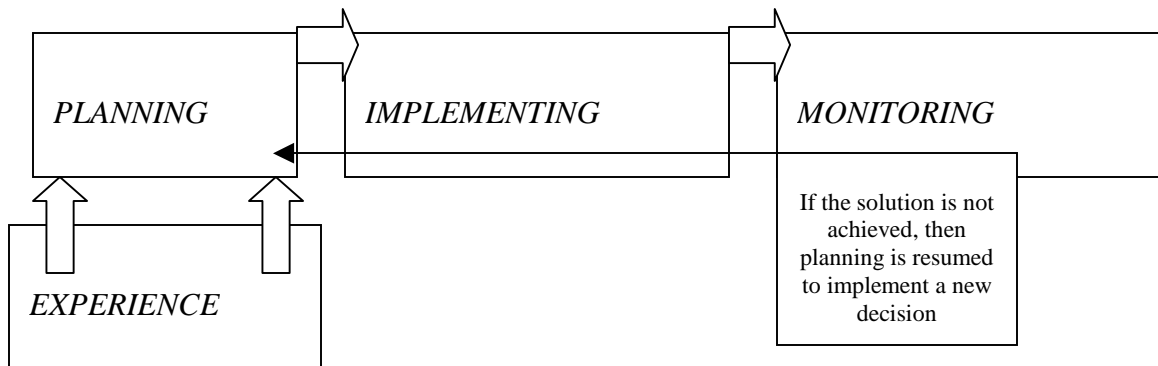
3.2.4 Social Problem Solving and Cognitive Inhibition

D'Zurilla, Maydeu-Olivares, and Kant (1998) studied age and gender differences in social problem solving in a sample of young adults, middle aged adults, and older people and concluded that social problem solving ability increases from young adulthood to middle-age and then decreases thereafter. Berg, Klaczynski, Calderone, and Strough (1994), however, found no difference in the effectiveness of the strategies chosen between younger adults and elderly adults. Typical development of social problem

solving ability has only been charted between young adolescents, middle-aged adults, and elderly individuals (Crone, Vendel, van der Molen, 2003; D’Zurilla, Maydeu-Olivares, & Kant, 1998) and has not been systematically compared between children and adolescents.

One reason why there may be developmental differences in social problem solving is due to differences in cognitive inhibition (part of executive functioning). Executive functions directly mediate social problem solving by allowing the necessary actions taken to resolve a problem to be handled in a ‘conscious, rational, effortful’ and purposeful fashion (D’Zurilla, et al. 2004). Shallice (1988) and Shallice and Burgess (1991) outlined in some detail how executive functions play a role in problem solving and from this model many of our views on the use of experience have been extrapolated. In their framework central executive functioning is described in terms of a supervisory attentional system (See Figure 3.1). There are three key stages in problem-solving which involve the supervisory attentional system. The initial planning stage is one where the goal is to devise a solution to a problem. The second stage involves the processes required to implement the plan and the third stage involves the monitoring of progress towards meeting the goals, so that plans can be modified if a solution does not present itself. Episodic retrieval plays a key role in the planning stage. The argument put forth suggests that discovering solutions to open-ended, unstructured problems can be facilitated by recalling previous examples of problem solving either identical or similar to the problem at hand (e.g., Dritschel, Kogan, Burton, & Goddard, 1998).

Figure 3.1 Shallice and Burgess (1991) Supervisory Attention Model



The capacity to problem solve is necessary for effective social interactions. There is evidence that those who are less able to solve social problems have more difficulties in social situations. For example, youngsters judged to be less well socially adjusted gave fewer solutions or means-to-an-end when tested with the MEPS (Platt & Spivack, 1972). Additionally, behaviourally disordered adolescents are less able to provide effective problem solving responses in reaching goals in hypothetical problem situations (Beveridge & Goh, 1987).

Social interactions may be hindered if inappropriate actions within ones environment are not stopped through one's own volition (Greening, 1997). These unbridled actions are representative of a failure of inhibitory mechanisms. For example, Greening (1997) found that adolescents with a history of stealing had deficits in problem solving abilities (means-ends) compared to adolescents who had not stolen. Adolescents and adults with a range of social maladjustments thought to reflect poor inhibition or self-regulation, have also been found deficient in means-ends skills, highlighting the link between inhibition and social problem solving (Platt & Spivack, 1976).

3.3. Decision-making situations

There are growing concerns that some of the current behaviours displayed by adolescents is placing them at a greater risk than the general population, with more negative outcomes for teenagers reported than for any other age group (Steinberg, 2007). The World Health Organisations emphasises that children and adolescents have special health related risks, which can affect health and well being into early adulthood. For example, it is estimated that up to 70% of deaths are due to decision-making trends started during adolescence (WHO, 1998). The number of adolescents involved in risky decision-making is notably very high, and it is important to be able to study decision-making in these areas to unravel some of the mechanisms shaping these behaviours. It would be simplistic to suggest any observed behaviours could be explained solely by the influence of one factor. This work will attempt to clarify which factors may be shaping behaviours with less than optimal backgrounds by attempting to understand the decision-making process behind them. It is acknowledged that behaviours are complex and not all factors will be uncovered, but the aim of this work is to identify some of the broad trend shaping decision-making mechanisms.

Adolescence in general is considered a time of life where decision-making and particularly risk decisions are at a high water mark. It is natural to focus on the decision-making capacity of a population that provides a normative sample of people for whom decisions and risk taking is a preoccupation of daily life. It is not artificial or simplistic to study these behaviours in order to understand the decision-making processes shaping them. It is a necessary step to provide the pieces of the puzzle that will one day allow for a fuller understanding of this phenomenon. It is eminent to be able to understand where

in day-to-day life children and adolescents (many but not all!) are making decisions that may have a detrimental impact on their well-being and to understand the development of these mechanisms shaping decision-making along with typical maturation.

The continuation of this chapter is concerned with identifying distinct areas where decision-making occurs in real life domains, and where less than optimal decision-making can unfold a series of negative consequences. Some of the most salient factors shaping decision-making for each of these behaviours will be discussed. The seven distinct real life realms to be explored are: Alcohol consumption, Cigarette Smoking, Drug Use, Gambling, Sexual Behaviour, Eating Behaviour, and Friendships/Relationships.

3.3.1. Alcohol (To Drink – Yes or No?)

The United Kingdom, like most countries in the Western world, is considered to be a “drinking society” (Kloep et al. 2001). Sharp and Lowe (1989) described drinking amongst young people as an intrinsic part of the socialization process from childhood to adulthood in a bid to seek social acceptance and emulate adult behaviour. Drinking small amounts of alcohol can be a pleasant social activity for most people and it should be emphasized that the majority of people, including adolescents, who drink, engage in the temperate use of alcohol and are likely to continue to do so (Deluca, ed, 1981).

Alcohol consumption is considered to be more normative than cigarette smoking, with more young children likely to try alcohol before cigarettes (Andrews et al, 2003). Drinking alcohol under the age of 18 is illegal in the United Kingdom. Thus drinking constitutes a poor decision as it directly breaks legal statutes. However, alcohol is readily

available to teenagers by direct purchase (though illegal in most places), with Balding (1997) suggesting that one-quarter of British teenagers had purchased alcohol from a supermarket and 10% percent had bought alcohol in a pub. In addition, adults purchase some alcohol consumed by children and adolescents for them although there are no official figures on how much this accounts for.

The quantity of alcohol consumed by adolescents and emerging adults is one factor of concern. Drinking alcohol to excess is a severely dangerous choice that presents great danger to both immediate and long-term health. Binge drinking, which is defined as drinking more than four legal units of alcohol in any one sitting, leads to an increased risk of injury and accidents and is directly associated with poor decision-making (Patrick & Maggs, 2008). Excess consumption of alcohol can be associated with a series of further problems such as verbal and physical quarrels, unprotected sex, driving under the influence, and losing valuable possessions (such as mobile phones) among others (Nelson et al., 2007). Individuals who engage in one type of risk behaviour are more likely to be involved in other risk behaviours. This holds true for adults (Desai, Maciejewski, Pantalon, & Potenza 2006), children (Kendzor, Copeland, Stewart, Businelle, & Williamson, 2007) and adolescents (Nimishura, Goebert, Ramisetty-Mikler, & Caetano, 2005; Gruber, DiClemente, Anderson, & Lodico, 1996; Coffey et al., 2003).

Drinking is also associated directly with a number of other problems because of lowered inhibition and loss of control from intoxication; for example, individuals who visit pubs and wine bars were twice as likely to be victims of crime (Kershaw, Nicholas, & Walker, 2008). Delk and Meilman (1996) found that 53.2% of students surveyed, because of the consumption of alcohol, had done something they later regretted.

In Britain, there are growing concerns that young adults and emerging adults are engaging in inordinately great amounts of binge drinking, placing themselves in physical peril. It is hard to establish the prevalence of binge drinkers due to differences in time frames of measurement. In his review of prevalence studies in 2002, Gill found that the range of prevalence of binge drinkers amongst students ranged between 14%-64%, while prevalence of f heavy drinkers was 4%- 16%.

Coleman & Cater (2005) examined the link that exists between excess alcohol consumption and risky sexual practises, defined as having sex without a condom or sexual behaviour that was later regretted. They found alcohol consumption was used as an “excuse for sexual behaviour” and decreased inhibition and appropriate decision-making capacity. Alcohol was also linked to loss of memory, impaired decision-making, and truncated judgement and thinking (Coleman & Cater, 2005).

Males are more often influenced by the expectancies of alcohol intake than females (Lundahl et al., 1997; Patrick & Maggs, 2008). Specifically, males reported higher incidences of global feelings of power, aggression, arousal, and relaxation whereas females reported lower effects of global positive effects. Those who rated drinking as more positive would be more inclined to plan heavy drinking in the future (O’Connor, Fite, Nowlin, & Colder, 2007).

The choice to drink or not to drink is one that is usually made in a social situation. Scheier and Botvin (1997) found that the effect of friends’ alcohol attitudes is influential in deciding whether to drink. However, this decision is also influenced by knowledge of ill health effects associated with consumption. It is unclear whether one of these factors

mediates the other or whether they interact with each other or with additional, unspecified factors (Kloep et al., 2001).

3.3.2 Smoking (To Smoke – Yes or No?)

Like alcohol consumption, cigarette smoking is also considered to be a risky behaviour (Jessor & Jessor, 1997) and less than optimal decision. Smoking is of great public significance and concern as it is the single largest preventable factor in premature death in the United States, as cited by the Health and Human Services (1994). In 1987, lung cancer surpassed breast cancer as the leading cause of cancer death among women in the North American continent (Centres for Disease Control and Prevention, 1993). Smoking is also associated with further health problems. For example, research showed that smoking is associated with weight loss for both boys and girls and with higher rates of gum disease (Copeland et al., 2007).

The prevalence of regular smokers amongst pupils (aged 11-15) in the United Kingdom was found to be on average about 10 % (11% for girls and 8% for boys). However, boys were more likely to have tried smoking a cigarette before the age of 11 (Higgins, 1998).

There are a number of factors associated with the decision to smoke. Copeland et al. (2007) found that among 7 - to 12-year-olds, having had a peer who smoked and the availability of cigarettes were determining factors for future consumption. One of the most consistent factors affecting the decision to smoke is parental smoking habit. Adolescents are more likely to smoke if their parents had been smokers or were currently smokers, even if parents had stopped smoking after the child was born (Otten et al., 2007; Ribeiro, Jennen-Steinmetz, Schmidt, & Becker, 2008). There is also a clear relationship

between permissive attitudes towards smoking as observed in parental and sibling smoking and the subsequent choice in children and adolescents to smoke.

Kobus (2003) found that peer influence is even more important than parental in terms of smoking behaviour, as a friend smoking or perceived to be smoking were both equally likely to promote smoking in a peer group (Merikangas, 2003). Gilmore et al (2002) and Freeman, Brucks, and Wallendorf (2005) studied 9 –12 year-olds and found that older children held more positive beliefs about smoking than did younger children. The positive beliefs were related directly to the views that smoking brings with it enhanced social standing, with it being seen as “cool” to smoke, views directly promoted by their peers. Children understood the long-term effects of smoking but they were ignored in responses favouring the short-term benefits such as enhanced social rewards (Freeman, et al., 2005). Chassin, Presson and Sherman (2001) also found that adolescents were more willing to overlook negative consequences of smoking by making the decision to smoke in order to be accepted by a social peer group. The same study also demonstrated that as children and adolescents had not experienced or observed any of the immediate negative impacts of cigarette smoking (as most of them occur in adulthood), then there are no negative experiences to bring into the decision-making equation (Chassin et al., 2001).

Risk behaviours like smoking have been found to be consistent across cultures with trends increasing faster amongst girls (Osaki et al., 2006). This growing tendency has been confirmed by local studies (e.g. most recent SALSUS, 2006) and American studies (Department of Health and Human Services, 2008). This movement is not observed in earlier childhood studies, but becomes pronounced in studies charting adolescence. Some

suggestions explaining this growing trend in females include differences in olfactory smoke stimuli receptors which are enhanced in females (Sorensen & Pechacek, 1986) and concerns about weight gain, with cigarettes seen as a way to keep weight off. More females smoking could also be explained by the higher prevalence of depression and anxiety among women in increasingly more demanding social environs, as many smokers use tobacco to manage their mood (Le Houezec, 1998).

Tobacco consumption is a growing concern for the British Government as adolescent consumption of cigarettes has not fallen in line with falling consumption observed in adults. The mechanisms leading to cigarette smoking in childhood and adolescence need to be better informed in order to fully gauge what factors are playing the most influential roles in the decision to smoke. Some of these factors have been discussed above, but there is still not a clear understanding of how they play a role in the large scheme of risk taking during this life time period.

3.3.4 Drug Taking (To Take Drugs? – Yes or No)

The decision to use drugs is a further risky behaviour adopted by young people at a considerable level. Home Office statistics show that 21.3% of young people aged between 16-24 had used illicit drugs in the years 2007-2008 (Kershaw, Nicholas, & Walker, 2008). United States Department of Health and Human Services (2003) report that about half (51%) of American teenagers had tried at least one illicit drug by the time they finished high school. In 2003 an estimated 19.5 million Americans aged 12 years or older were current users of an illicit drug. This estimate represents 8.2% of the US population. Just over 17% of first year high school students reported using inhalant drugs

at least once in the same 2003 study. Inhalant drugs are particularly dangerous for the nervous system and have been known to cause death.

Marijuana is the drug (not including alcohol and cigarettes) most widely used by young people. It is derived from the Indian hemp plant *Cannabis Sativa* with its earliest use recorded back to 2737 BC - prompting controversy even in ancient times (Grinspoon, 1969). The subjective highs obtained from marijuana usage are variable and dependent on the dosage. Regular usage has been linked with decision-making capacity, with difficulties in concentration and remembering of thoughts or ideas reported (Vadhan et al., 2007). More potent strains of marijuana now exist on the market, and these strains have a more powerful hallucinogenic effect that may (Curran et al, 2002) impair sound decision-making, and if further combined with alcohol may lead to a disruption in the clear ability to make sound decisions (particularly in high arousal situations or “hot” situations as noted in Chapter 2).

Like smoking and drinking, drug taking is often associated with positive expectancies of its use and actual experiences with its consumption. Strong beliefs about the benefits of drug taking mediate the consumption of the drug itself. As children mature from early to middle adolescence (11-15 years of age) the expected costs (negative result expectations/experience) associated with drug abuse decline, and the expected benefits (positive result expectations/experience) increase (O'Connor, Fite, Nowlin, & Colder, 2007).

A Dutch study investigating the role of drug consumption in health risk behaviour (use of prescription and non prescription drugs) and decision-making (Tobi et al., 2003) found that girls were found twice as likely to use both types of drugs. Socio-economic

status was associated with non-prescription drugs. More males were found to take non-prescription drugs than females. The amount of drugs taken within the last fortnight also had an immediate impact on the decision to take a drug or not, with a better experience reported to influence whether an action would be taken again.

As with alcohol consumption and cigarette smoking, parents can influence drug taking. The factors that influence decision-making in respect of drug taking are not always consistent or conclusive in the literature. Baker, Thallberg & Morrison (1988) found that family had a very limited impact on adolescents' decisions in certain life domains such as drug taking. However, it is possible that familial influence on adolescent behaviours does vary with the quality of the attachment between the adolescent and parents (Turner, Irwin, Tschann, & Millstein, 1993). Kandel & Andrews (1987) found that closeness to parents is highly related to lower drug use and to choosing friends who are non-users.

Drug consumption can have serious consequences on decision-making processes. Most of the research conducted on the effect that drugs may have on choice making has been done on adults, with relatively little understanding of the mechanisms at play in late childhood and adolescence in terms of the factors influencing drug consumption and the effects that they may have on day to day decisions.

3.3.5 Gambling (To Gamble – Yes or No?)

Gambling has become part of British culture since the UK National Lottery was introduced in 1994 followed closely by Lottery “Instants” (i.e. scratch-cards) in March 1995. This particular form of gambling has been glamorised through its own dedicated

television show and advertisements, reaching a very large audience both adult and under-16. Several studies have indicated that a large number of under-aged people (below 16 in the UK) are buying National Lottery Tickets and Scratch cards for themselves although it is illegal to do so (Wood & Griffiths, 2004). Buying scratch cards does not appear to be affecting adolescents on a general level, however the reasoning behind gambling and the association of gambling with other risk behaviour remains to be explored.

Gupta, Deverevenky, and Ellenbogen (2006) found evidence that risk behaviours such as gambling may be linked to impulsivity. For example, pathological gamblers exhibit fewer self-regulatory behaviours, higher impulsivity, and higher risk taking than non-pathological gamblers. Many of their personality traits were similar to those of adolescents exhibiting antisocial behaviour (Gupta et al., 2006).

Studies have demonstrated that people who engage in gambling may also engage in further problematic behaviours such as lying and stealing or may face legal problems because of their decisions to continue gambling (Gupta & Derevensky, 2000). In a study of 14 - 25 year-olds, Moore and Ohtsuka (1999), found that young gamblers were more likely to believe that gambling would provide money they needed and that they could find the way of winning.

There is evidence that gambling may be influenced directly by peers, specifically time spent with peers. Wood & Griffiths (2004) found that scratch-card playing was commonly conducted with peers rather than parents with the suggestion that it was part of the normal socialization process. An element of personal choice was involved as well, with players noting that they could choose their own numbers, hence having an element of control over the gambling process. Underage players also tend to recall the experience

that other family members have won varying amounts on the Lottery, citing it as one reason why they would gamble themselves, as there is a positive expectancy that they could win as well.

Some explanation for why children and adolescents engage in gambling have been noted in the above, yet by no means is this a full account of the mechanisms shaping gambling nor is there a full understanding of what all these factors might be.

3.3.6 Sexual Behaviour (To Have Sex – Yes or No?/ To Use a Condom – Yes or No?)

Among the many developmental events that characterise puberty and the onset of adolescence, none is more dramatic than the changes associated with sexual development. Physical changes require mental adjustments and lead to a changing self image, into that of a sexual being.

Males are more likely than females to report having had sexual intercourse, and older students are more likely to say they have than younger ones (Oman et al., 2002). By age 15, an estimated 33% of boys and 25% of girls report having engaged in sexual intercourse, whereas by the late teens (ages 18/19), 86% of boys and 80% of girls have reported experience with sexual activity. Members of minority ethnic groups report having sexual intercourse earlier than Caucasian adolescents (Oman et al., 2002).

The actual act of coitus is not considered risky if both participants are willing and if they use some form of protection against sexually transmitted infections or pregnancy outside of a monogamous relationship. Risky sexual activities are those behaviours which increase the risk of sexually transmitted infections or unwanted pregnancy, like having multiple partners or unprotected sexual intercourse and if/or regret is expressed

afterwards (Fergusson et al., 1996). Studies suggest that boys are less likely than girls to report using contraception, and the younger people are also the less likely they are to practise contraceptive use (Johnson et al, 1994; West et al., 1993).

There are a number of influences that can be seen as preventing the early start of sexual activity as well as preventing risky sexual activities such as not wearing a condom. Factors such as drug and alcohol use, and problems at school all play an influential role in the decision to have sex or not (Fergusson et al., 1996; Lohman & Billings, 2008). Widman et al. (2006) found that open communication about contraception use among adolescent dating couples ended up in a higher likelihood of using a condom than if no discussion took place prior to engaging in sex. Prior negative experiences with condom use also played an influential role on whether condoms would be used in future sexual relations. Rafaelli and Crockett (2003) suggested that those initiating in sexual relations earlier and not wearing a condom were also more likely to have difficulties in self regulation.

Another reason adolescents may engage in risky behaviours is their underestimation of the risks that results from such behaviour. For example, in a study of female adolescents who were diagnosed with a sexually transmitted infection, a very high proportion of them believed to be at a very little risk to contract the infection (Ethier et al., 2003). Pickett and colleagues (2006) found once an adolescent chooses to engage in sexual behaviour, there is little influence of the environment on the decision even if there is a very supportive environment in place. Other evidence suggests that adolescents are less reluctant to be involved in high-risk behaviour (like anal intercourse) when their friends are perceived to take high risks too (Yu et al., 2007). For example, Keller and

colleagues (1996) found that adolescents who had friends who did not use condoms were more likely to not use condoms themselves.

Wong (1999) argues that the social pressure being experienced by adolescents is reinforced by the media (e.g. television shows such as *Hollyoaks*). The media conveys certain messages about teenage sexual behaviour and can encourage risk-taking behaviour through the impression that these are commonplace. This view was furthered by findings showing that peer pressure and their own understanding of acceptable behaviour (e.g. having a boyfriend by a certain age) was associated with increased sexual relations among teenage girls (Zwane et al., 2004). Taken together these findings suggest that adolescent decision-making about sexual relations is influenced by their understanding of societal constructs of the issue.

Another reason adolescents cite for not using protection when having sexual intercourse is the association of condom use with being sick (and thus hiding a Sexual Transmitted Infection; Zwane et al., 2004). In other words, asking a sexual partner to wear a condom brought with it an underlying assumption that they were diseased. The rated sexual attractiveness of the partner also played a role in whether a request to wear protection was made (Zwane et al., 2004).

Family and peer influences and experiences, as with alcohol, cigarettes, drugs and gambling, also have an effect on the likelihood of involvement in risky sexual behaviour (Raffaelli & Crockett, 2003). Rommer et al. (1999) identified the role of family relations in mediating risky sexual behaviour. The authors found that African American children of ages 9-17 who experienced higher parental control and higher communication

concerning sexual behaviour were less likely to engage in risky sexual behaviour such as pre-adolescence sex or not using a condom.

3.3.7 Eating Behaviour (To Diet or not to Diet? To Eat Healthily or Not to Eat Healthily?)

During adolescence, unhealthy weight control practises and other disordered eating patterns are most prevalent (Neumark-Sztainer et al., 1993). These unhealthy views on weight and patterns of eating are considered of risk as they can set up life long disturbances in eating behaviour. Though concerns about weight and unhealthy eating are not considered an eating disorder per se, they can certainly set up antecedents for developing such behaviours. Kotler et al. (2001) in a longitudinal study over 17 years, found that the presence of an eating disorder in childhood and early adolescence was associated with an increased risk for experiencing eating disorders in adulthood. Eating disorders have been shown to affect both adolescents and children (le Grange & Loeb, 2007; le Grange et al., 2005; Agras et al., 2007) with some evidence showing that such disorders decrease by the end of adolescence (Lewinsohn et al., 2000).

A number of studies have shown that females are at much higher risk for developing eating disorders than their male counterparts both in childhood and adolescence (Kotler et al., 2001; Lewinsohn et al., 2000, Patton et al., 2008).

Among factors that increased the likelihood of later eating disorders are eating conflicts, struggles with food, and unpleasant meal experiences in early childhood (Kotler et al., 2001), higher levels of family dysfunction (McDermott et al., 2002), parental attitudes towards body weight (Agras et al., 2007), and high levels of perfectionism

(Wilksch et al., 2008). In addition sexual orientation has been related to the likelihood of developing eating disorders; with heterosexual boys and girls being at higher risk (Austin et al., 2004). Being sexually abused during childhood was one experience that also increased the risk among 10-15 year old females to feel unhappy with one's weight (desire thinner bodies), and make the decision to pursue dieting behaviour (Wonderlich, et al., 2000). Eating disorders were also higher among those adolescents that perceived that there was a higher pressure exerted on them by mothers, media and peers (Peterson et al., 2007) to remain thinner.

It is important to understand and investigate the mechanisms that may lead to eating disorders among children and adolescents in order to help prevent damaging behaviours being exhibited and carried on later on in life (le Grange et al., 2005; Agras et al., 2007; Patton et al., 2008). Understanding dieting behaviour and understanding whether a teenager eats healthily or not will allow for a baseline understanding of eating patterns.

3.3.8 Friendships, and Relationships (Do I please my friends? Yes or No? Do I please my parents? Yes or No? Do I please my boyfriend/girlfriend? Yes or No?)

As much as socialising and having friends is part of typical maturation, so is the influence that family and peers may have on taking part in all of the risk behaviours discussed so far. Family life sets up many of the key social skills that children and adolescents will be learning and applying in future relationships. The exposure that children have to social behaviours in their family plays a distinct role in the development of peer relations (Shortt, Capaldi, Dishion, et al., 2003). Simmons et al. (1991) found that

in families where there are parental inconsistencies in discipline, inadequate monitoring, and lack of modelling of positive social skills, children and adolescents learn to use “coercive” and “aggressive strategies” in their day to day socialising and in their general problem solving and decision-making skills.

Significant changes occur during adolescence in interactions and relationships with both parents and with peers. Typically there is a gradual shift from spending time with family to spending time with peers. Friends are a potent influence on the development of adolescent behaviour, particularly regarding situations where decision-making occurs. The effects that peers have on poor decision-making such as smoking cigarettes, using drugs, and having unprotected sexual intercourse with multiple partners has attracted much research. Danner and Steuber (2004) noted that one of the best predictors of an adolescent’s behaviour was their own prior behaviour. However, adolescents were from two to five times more likely to be engaging in a variety of risky behaviours if a friend of the same sex was engaging in a similar behaviour earlier. This peer influence was observable not only in negative behaviours such as risk behaviours, but also in more positive behaviours such as providing support mechanisms for other friends.

Peer acceptance is of great importance during childhood and particularly during adolescence. Successfully resolving conflicts often requires that the two parties in dispute develop novel alternatives to a situation, consider new perspectives, and entertain fresh outlooks on a situation in order to be able to finally resume friendship. Social conflict has been found to produce rigid thinking (Carnevale & Probst, 1998), which entails restrictions in judgement and an inability to consider alternative perspectives. The

importance of relationships is of utmost importance to the decision-making capacities observed during childhood and adolescence.

Poorer experiences with problem solving and decision-making in peer situations and experiences with family relationships all play an influential role in shaping future romantic relationships (Carnevale & Probst, 1998). Throughout the middle-childhood and preadolescent years, boys tend to be more involved with gangs than do girls. However, girls tend to have more intimate, individual interpersonal relationships than boys even at these ages. These peer relationships are initially segregated to members of the same sex. As maturation continues, and males and females move away from more narcissistic preoccupations and sexuality blossoms, boys and girls begin to pay more attention to each other. Kuperminc and Allen (2001) found that adolescent social skills were directly related to the quality of relationships. A major cognitive advancement in adolescence is the ability to observe and evaluate one's own behaviour in relation to those around one (i.e. social problem solving skills). The less refined and evolved this ability, the lower the quality of social and personal relationships that developed.

3.4 Summary and Research Overview

From evidence considered in this chapter and through theoretical evidence from the literature in the previous chapter, the importance of and efficacy of decision-making have been identified. Decision-making in day-to-day situations is disproportionately higher for later childhood and adolescence than for any other age group. The mechanisms influencing decision-making are varied and their individual and combined role is yet to be understood, underscoring the need for further research in this particular field. There

are a series of factors that may play a role in decision-making and problem solving. This work will focus in part on the role that experience may play on decision-making, as studied through hypothetical problem solving and a study of real life risk situations.

Day-to-day decisions are in part influenced by two mechanisms. The first is *problem solving*, part of the cognitive repertoire that leads to decision-making. It encompasses the work of choosing issues in the environment that are of immediate importance and setting goals, finding or designing suitable courses of action, and evaluating and choosing among alternative actions. *Decision-making* then is the following step, where evaluating and choosing from these courses of action leads to making a choice. The choice is made from the set of alternatives that are presented or that are salient to the decision-maker.

Cognitive factors certainly may play an extensive role in fashioning problem solving and decision-making processes. Human judgement is not always reliable, with several heuristics known to affect decision-making with quick inferences having to be made from our environment and our experience. In certain situations, people have been observed to be overconfident in their choices assuming their reasoning is more likely correct and less fallible, allowing for a greater margin of error. Daily social interactions occur in limited time frames where problem solving and decision-making are required instantly, with efficiency and accuracy suffering in these conditions.

Self-regulation is another cognitive factor identified in playing an important role in problem solving and decision-making. Poor self-regulation is associated with a variety of developmental disorders, consistently being noted as a factor possibly leading to risk taking behaviour. Self-regulation or cognitive regulation develops over the lifespan, with

abilities reaching adult-like levels by mid adolescence. Even with maturation and a refinement in neurocortical systems, optimal decision-making is elusive in adolescence with a high water mark for poor decision-making observed through engagement in risk behaviours, denoting poor problem solving or decision-making. More work is needed to disentangle and further explore the role executive functions play in problem solving and decision-making, and by extension what encourages or discourages adolescent risk taking.

Peers can contribute to riskier choices based on the understanding and expectation of the attitudes of the social group. Personal expectations and social profit from peers both play a distinctly powerful role in decision-making, with the further examination of the role of friendship possibly yielding a large sum of information about the mechanisms involved in decision-making.

Family and environmental factors also seem to be two clearly influential factors in decision-making. Experiences garnered during development within the family unit serve to mould future social interaction and decision-making, with environmental factors such as systematic instruction (e.g. formal education) laying a distinct foundation for problem solving and decision-making and providing a unique experience in and of its own.

The manifestations of developmental processes in social problem solving are explored in the next chapter, looking at self-regulatory control and problem solving skill concurrently. The MEPS is used to tease out differences in social problem solving between primary and secondary school-aged children, providing an insight into the performance and effectiveness of these two age groups in regards to these social skills. Self-regulatory control is observed via the implementation of the Stroop task, which is

used to provide insight into cognitive effects associated with inhibitory control. Vocabulary skill and typical development will be measured. In this study children as young as six-years-old will demonstrate equally effective problem solving skills as adolescents, a unique finding as viewed within the literature. Experience will surface as a key factor that needs to be explored, and by which the ensuing chapter will further explore.

The second empirical chapter, Chapter 5, will build on earlier findings in the previous chapter that surprisingly show that experience appears to be a key factor in shaping problem solving ability. These findings suggest that schooling be looked at in terms of whether it shapes experience in problem solving. Earlier findings on self-regulatory control and social problem skills on a schooled and a non-schooled population will be conducted in Ecuador. Primary and secondary school-aged children's social problem solving skills will be charted using the MEPS test. As both literate and illiterate populations are going to be studied, the Stroop Colour-Word interference task would not be an appropriate measure, so the Animal Stroop Task developed specifically for non-literate populations to test cognitive inhibition will be used. Vocabulary skill will also be measured as well. The effect of schooling on problem solving will be looked at through a modified version of the MEPS task, a measure of cognitive inhibition, Animal Stroop, and a measure of vocabulary to ascertain typical development, TVIP.

Experience emerges as the running thread that builds throughout this work. In Chapter 6, the mechanisms underlying real decision-making will be looked at via a questionnaire study on a secondary school-aged population (12-18). Real life decisions will be looked at quantitatively in this chapter to explore seven different areas where real

life decision-making occurs establishing patterns of risk in decision-making. Results will be compared with those of the SALSUS (2004) to determine whether the behaviours charted are typical of a Scottish population. Inferences will be made on the results in aims of unpacking the underlying mechanisms shaping adolescent behaviour in particular to their actual experience in real life decision-making. These descriptive patterns of risk will then be contrasted against an experience-based account of the reasoning behind these behaviours in the following chapter.

Chapter 7 will look at real life decision-making through an adolescent perspective as charted importantly through their own knowledge and experience of seven key areas, the same key areas explored in the previous chapter. This will allow for a running comparison between actual reported behaviour and the factors (experience included) that teenagers suggest influence their decision-making. Vignettes encompassing seven different areas where real life decision-making occurs will be used to extrapolate the problem solving and decision-making mechanisms used. The study will attempt to broadly address the most salient factors shaping problem solving and decision-making in day-to-day adolescent environs, with a particular emphasis on the role experience may play on decision-making behaviour. Limitations on findings are acknowledged, with an understanding that only broad trends may be extrapolated from a very complex set of data.

The final chapter will consolidate the novel findings of the four empirical chapters charting the progression of this thesis and the development of experience as a key factor in the mechanisms that shape decision-making. The exciting findings on experience will

be fit within a general model explaining some of the most influential factors shaping decision –making as derived from this body of work.

Chapter 4

Development of Social Problem Solving and Cognitive Inhibition

4.1. Introduction

Social problem-solving is the self-directed cognitive behavioural process by which effective solutions for everyday, real-life problems (i.e making friends) are discovered (D’Zurilla, Nezu, & Maydeu-Olivares, 2005). The ability to solve social problems is a *key* skill for child and adolescent interpersonal relationships where deficits are linked to less effective adult social adaptation. (Feldman, Mc Clasky & Dodge, 1985; Lochman & Lampron, 1986; Hartup, 1992; Burks, Laird, Dodge, Petit & Bates, 1999; Malik, Balda, & Punia, 2006).

A modified Means End Problem-Solving Procedure (MEPS; Platt & Spivak, 1975) is a measure of social problem-solving and a well validated method of studying children’s and adolescent’s social problem-solving ability. The general pattern of results in studies using the MEPS suggests a developmental trend of increasing competence with the progression of age. Older children are able to encode and interpret information in the social realm more accurately and generate more appropriate and effective responses to social situations when they are presented with them (Dodge & Price, 1994; Mayeux & Cillesen, 2003). An interesting study by Feldman and Dodge (1987), utilising adapted social information processing measures (similar to the MEPS), demonstrated that this developmental trend of generating better solutions was no longer apparent when social status was comprised (children neglected or rejected). Older children were more likely to

attribute hostile intent in conflict situation to their peers as well as rating aggressive responses (in conflict, teasing situations) as generally effective.

Dodge, Murray, and Buschbaum (1984) suggested that possible errors in problem-solving could be a result of a possible developmental lag, where rejected or aggressive children may resemble their younger peers instead of processing social information at an adequate developmental level. The study could not compare any developmental trends however, as younger and older participants were not included. This trend had been identified in earlier literature as a Piagetian lag (Chandler, 1973). Dodge and Price replicated these results found by Dodge, Murray, and Buschbaum (1984) in early school-aged participants.

Developmental differences in social problem solving may be linked to differences in executive functioning. Executive skills allow a problem to be handled in a 'conscious, rational, effortful' and purposeful fashion (D'Zurilla, Nezu, & Maydeu-Olivares, 2004). Inhibition (self regulation) is an executive function that could play an important role in social problem solving (Barkley, 1997). Inhibition is a cognitive process that allows us to delay or to prevent heavily reinforced responses, allowing us to modify prior well learned responses when alternative responses are demanded of us (Wright, Waterman, Prescott, & Murdoch-Eaton, 2003). A disruption in goal directed behaviour, with deficits in inhibition, would prevent successful planning and implementation of social problem solving (Schachar & Logan, 1990). If the basic structures necessary to implement appropriate social problem schemas are not in place, it is logical that this could have a knock on effect in the skills necessary to establish and to maintain friendships and social contact (Greening, 1997; McMurrin, Blair, & Egan, 2002). Despite the importance of

inhibitory control in theories of child development, an understanding of the relationship between inhibition (self regulation) and problem-solving ability (social cognition) has not been clarified (Salthouse, 2005; Savitz & Jansen, 2003; Barkley, 1997; 2008).

As the child's neurological system matures, inhibitory processing should become increasingly more efficient, contributing to more selective attention, maintaining information that is task irrelevant outside of working memory (Bjorklund & Harnishfeger, 1990; Shallice, 1988). Pfeifer, Goldsmith, Davidson, and Rickman (2002) noted that the gradual change from uninhibited to inhibited status is most salient in the first 18 years of human life. Increasing affect and behaviour regulation have been identified with the gradual development of inhibitory control (Carver, Livesey, & Charles, 2001; Denckla, 1995; Diamond & Taylor, 1996; Kochanska & Radkeyarrow, 1992; Livesey & Morgan, 1991; Tamm, Menon, & Reiss, 2002). Though behavioural characteristics of dis-inhibition are well recognised, measurable cognitive correlates of these behavioural changes are less well identified (Wright, Waterman, Prescott, & Murdoch-Eaton, 2003).

Shallice (1988) and Shallice and Burgess (1991) have outlined in some detail how executive functions may play a role in problem solving. In their framework central executive functioning is described in terms of a supervisory attentional system. There are three key stages in problem solving which involve the supervisory attentional system. First, there is a planning stage where the goal is to devise a solution to a problem. The second stage involves the processes required to implement the plan and the third stage involves the monitoring of progress in order to achieve the desired response, and if it wasn't successful implement a new strategy. Episodic retrieval plays a key role in the

planning stage. The argument is that finding solutions to open-ended, unstructured problems can be facilitated by recalling previous examples of solving either identical or similar problems. In other words, previous examples already in memory banks could be extrapolated to solve a novel situation by comparing it to previous (See Figure 4.1) (Dritschel, Kogan, Burton & Goddard, 1998).

Ross (1984) lent support to this notion by finding that ‘reminding’ the memory of earlier learning episodes had an effect on the subsequent learning of a cognitive skill. To further this, Seifert (1994) also postulated that retrieving past performances on many reasoning tasks could improve the performance of these tasks. These studies highlight that at least in adults, as suggested by the general tenants of social cognition, experience may play a role in how we adapt our environmental cues into successful resolutions to social problems at hand. A break down in the retrieval of similar or identical experiences, possibly through undeveloped inhibition, may explain a failure in the application of social problem solving. The link is still tenuous, however, and applies only to adult populations. One aim of the present study is to indirectly examine the role of experience in influencing children’s and adolescent’s problem-solving performance. Drummond et al. (2006) found that older children are more capable of retrieving specific memories than their younger counterparts. Therefore adolescents may have a more detailed database from which to create solutions to social problems and hence produce better social problem-solving solutions.

4.1.2 Aims of Study

The research examining developmental changes as associated with social problem solving has not addressed possible mechanisms that may underlie developmental differences in Social Problem-Solving. Inhibition has been identified as being a potentially important mechanism in the social problem-solving process. The aim of the present study is therefore to examine the relationship between social problem performance and inhibition as measured by performance on the Stroop, and how this relationship changes developmentally. We hypothesise that younger children will be poorer at solving social problem-solving than their older counterparts due to having poorer inhibitory control and also being less able to retrieve relevant experiences than their older counterparts. We will use the Child Behaviour Checklist in order to control for any non-typical developmental patterns that may influence the typical acquisition of problem solving and that could potentially skew any ensuing results.

4.2. Method

4.2.1. Participants

One hundred and two typically developing children and adolescents were recruited from local primary and secondary schools. Fifty-one typically developing Caucasian children (24 females / 27 males) aged 6 to 9 years (M : 7.47 years) and fifty-one Caucasian adolescents (24 females / 27 males) aged 15 to 16 years of age (M : 15.50 years) who were enrolled in local primary and secondary schools in Scotland took part. Participant's typical development was established based on their placement in

mainstream local primary and secondary schools and through verification of educational progress as well as their charting within typical development on the CBCL.

4.2.2 Measures

4.2.2.1 British Picture Vocabulary Scale – Second Edition – (Dunn, Dunn, Whetton, & Burley, 1997)

The full version of the *BPVS-II* was administered to all participants. It is a widely used standardised picture-based test of receptive vocabulary for ages 3 to 15 years 8 months. It does not require any reading or writing. This measure was used to measure verbal capacity. The dependent measure is the ability to identify one picture out of four pictures, which matches the spoken description.

Chronological age and verbal proficiency were used to define the starting position for the participant. Participants were advised to make a reasonable guess if they did not identify the word that was presented. Testing continued forward until 8 or more errors out of 12 were made, establishing the ceiling set. Raw scores were obtained by subtracting total number of errors from the ceiling set (12-168). Raw scores were then transformed into normative scores for analysis.

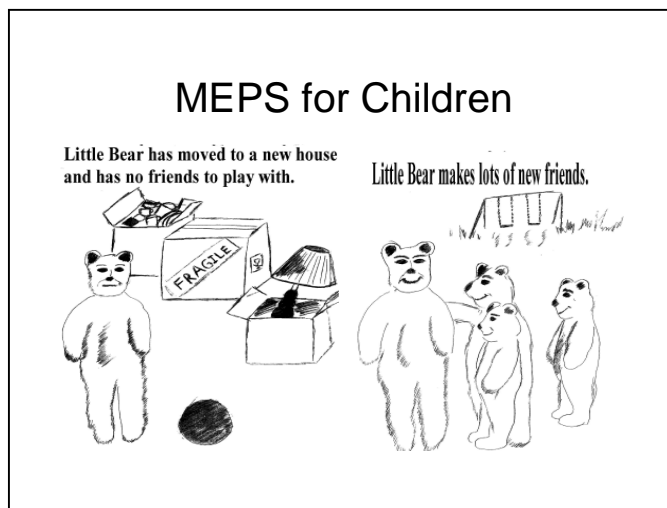
4.2.2.2. *MEPS Task, Modified* (Platt & Spivack, 1975): Adolescent Version and Child Version of the MEPS

The adolescent and child social problem-solving tasks were modifications of the original Means end problem solving (MEPS) task developed by Platt and Spivack (1975). The original MEPS consisted of 10 hypothetical problem vignettes describing a social

problem (arguing with partner) and a positive solution to the problem. The problems are presented in the third person. The task is to describe the steps required to reach the positive solution. In the present study two distinct versions of this hypothetical social problem-solving task were developed, one for teenagers and one for children. In the version for teenagers, the protagonists in the original stories were called John or Sue and were interchangeable based on the participant's gender. For example, a male participant would have John as a protagonist and a female participant would have Sue as a protagonist. A direct example follows: 'John/Sue has moved house and has no friends. John/Sue wants to have friends.' The story ends when 'John/Sue has many friends. Begin where John/Sue has moved and is looking for friends.' The adolescent participant is asked to fill in the missing section with the appropriate response to resolve the problem at hand, hence providing the means to reach the ends.

Vignettes differed for children as the written stories were presented in pictorial format to ensure comprehension of the scenarios as well as providing children with a more familiar context, i.e. picture books. It is essential that children could understand the question at hand, and the literacy level of children differed from each other. The characters of Sue/John were replaced by that of a small bear. Some of the language in the stories was modified to be accessible to novice readers, but the essence of the stories remained unchanged at all times. Please see the figure below for an example of a pictorial vignette.

Figure 4.1: Problem: Little Bear has moved to a new house and has no friends to play with. Resolution: Little Bear has lots of friends. (The full set of vignettes can be seen in Appendix 1).



MEPS solutions were marked on the following dimensions. Two of these methods are traditionally associated with the MEPS. The third measure was created in response to a clear trend observed during interviews. Participants redefined the introduction of the story in order to make it more accessible to them.

Relevant Means: a quantitative measure describing the number of discrete steps that allow a participant to move towards the goal. A score is produced for each scenario (see Platt and Spivack, 1975). The percentage of interrater reliability was .90%.

Effectiveness: a qualitative measure assessing the effectiveness of a solution on a 7-point scale (1 = not at all effective, to 7 = very effective) adapted from suggestions by

Butler and Meichenbaum (1981) and by a rating used by Marx et al. (1992). A score is derived for each scenario. The percentage of interrater reliability was 0.85%.

Redefining Problem: a qualitative measure devised by the researcher for this study assessing whether participants recapitulated the problem in their own terms or based on their experience, and then provided an explanation for why the social situation had arisen based on their reworking of the question itself. Answers were marked with a 1 or 0 depending on the presence or absence of the redefinition of the problem. For example, a seven-year-old male said the following:

Well, ah, well he moved away. They lived in Glasgow. He moved away to America. They were bored of playing with each other. They asked their mum for new trainers and stuff like that. He did move back to Glasgow. They then were friends again (7 year –old, Male)

The story was rephrased to fit a particular context that was unique to the participant, and that did not necessarily follow the general story laid with a young bear as the protagonist.

4.2.2.3. Stroop Task (Stroop, 1935)

The Stroop Colour-Word Interference Test (Trennery, Crosson, DeBoe, & Leber, 1989) was used. It is based on the idea that it takes longer to read a word when the colour of the ink is incompatible with the collection of letters that its specifies (Lezak, 1995). The delay is a product of the individual having to inhibit automatic responses when presented with conflicting information (Grodzinsky & Diamond, 1992). In the control condition participants were initially required to read a list of words printed in different

colours. The time taken to read these words was used as the measure of performance. Upon completion of this initial task, the interference condition of the Stroop task was then given wherein participants are asked to name the colour of the ink the words were printed in. Time was used as a measure of performance; the number of errors was also recorded.

4.2.2.4. Child Behaviour Checklist (CBCL, Achenbach, 1991)

The standard version of the Child Behaviour Checklist (CBCL) (4-18 years of age) was administered. The CBCL is a widely used instrument for assessing child and adolescent emotional and behavioural competencies. Parent reports are obtained on the amount and quality of their children's participation in sports, hobbies, games, activities, jobs, chores, and friendships as well as how well the child gets along with others, and school functioning.

All questionnaires were coded in order to maintain confidentiality. If parents were present along with their children, they were asked to complete the questionnaire in a separate room while their child was being tested. Parents rated if a behaviour was "not at all," "sometimes," or "often" true of their child. A total score of social functioning was derived; lower scores indicated poorer functioning. The 118 behavioural items, scored on a three-step response scale (0-2), produced a total score that range between the theoretical limits of 0 and 240.

4.2.3. Procedure

Participants and their parents were informed of the study by letter, accompanied by a consent form and the CBCL checklist for parents. Willing participants were then interviewed in their homes or in an interview room at their school. All responses were given verbally and audio-taped, and later transcribed. All participants were tested individually. All participants initially completed the BPVS, as this was the lengthiest of the three tasks.

The MEPS was then administered after the BPVS. Participants were asked to produce the ideal strategy to solve the social dilemmas and achieve successful resolutions to the vignettes. The task was administered verbally in order to deflect any problems with reading comprehension. Children were presented with pictorial vignettes of the social dilemmas and asked to outline how the character “Little Bear” would resolve the situation. The pictorial format was chosen so to ground the concept of problem resolution and planning in a format accessible to younger participants. Adolescents were asked to outline how one of two characters, John or Sue, would resolve the situation. They were asked to delineate the most appropriate steps for a successful resolution of the problem.

The Stroop Task was then administered. Children and adolescents were initially tested with a set of flashcards to gauge colour recognition and reading ability. Timing was measured both during the control and experimental portions as was accuracy. The difference in timing between both sections was utilised as the measure compared between groups. Accuracy was not manipulated for comparison purposes.

Finally, the CBCL questionnaire was mailed to parents who were not physically present to complete it, and those who were present filled out the form in a contiguous room in the waiting room of the School of Psychology.

4.3 Results

4.3.1 Stroop Task, BPVS, and Child Behaviour Checklist

The following table presents some of the most salient findings for the Stroop task, BPVS and the Child Behaviour Checklist.

Table 4.1: Means of Scores for Timing and Error on Stroop Task, British Picture Vocabulary Standardised Scores, & Child Behaviour Checklist: Children and Adolescents

<i>Score Mean and Standard Deviation</i>	Children (6,7, 8 & 9 years of age) N = 51	Adolescents (15 & 16 years of age) N =51
Stroop Time in Seconds	217.9 (69.3)	114** (22.1)
Stroop Errors	7.9 (6.1)	3.5** (4.8)
BPVS Score	106.4 (11.7)	112* (20.2)
CBCL	20.3 (15)	15.1 (10.7)
*p = < .05 ** p = < .01		

4.3.1.1 Stroop Time

An independent sample t-test comparing younger and older participants on their Stroop timing results, revealed that the older participants were significantly quicker than younger ones, $t_{(100)} = -4.06$, $p < .01$. The presence of an inverse correlation between participant age and timing of cognitive inhibition, ($\rho = -.712$, $p < .01$) [Spearman R was used as a non-parametric equivalent of the Pearson R as a more stringent test due to differences in group size] further stresses that as participants mature their responses are quicker and more efficient, initially suggesting typical acquisition of this executive skill. An additional negative relation was found between vocabulary capacity (BPVS) and cognitive inhibitory responses, ($\rho = -.635$, $p < .01$) suggesting a link between more advanced verbal skills. A quicker performance on the Stroop task occurred across both groups as they matured; as vocabulary skills are refined Stroop performance is faster and more accurate. The number of strategy responses produced (means) on the MEPS were negatively correlated with speed on the Stroop task, ($\rho = -.239$, $p < .05$) indicating a relationship between cognitive inhibition and the production of means towards a solution, linking inhibition with problem-solving ability.

4.3.1.2 Stroop Errors

A independent sample t-test revealed that older participants were more efficient in their inhibition of cognitive behaviours than younger participants, $t_{(100)} = -2.5$, $p < .05$. As observed for speed, the error scores were also inversely correlated both with age, ($\rho = -.394$, $p < .01$) and vocabulary measures ($\rho = -.375$, $p < .05$). In other words, older

and more verbally skilled participants made fewer errors of inhibition on this task, reinforcing the above finding that verbal refinement and cognitive skills may follow typical maturation of cortical circuitry (Anderson, 2001).

4.3.2 MEPS

4.3.2.1 Scored Means, Effectiveness, and Redefined Problems

Table 4.2: Comparison of Means, Effectiveness, and Redefinition of Story for both Children and Adolescents.

<i>Score Mean and Standard Deviation</i>	<i>Children (6,7, 8 & 9 years of age) N = 51</i>	<i>Adolescents (15 & 16 years of age) N =51</i>
Story 1 (Mean)	2.5 (1.4)	3.4 (1.6)
Story 1 (Effectiveness)	3.6 (1.2)	3.9 (1.3)
Story 1 (Redefining Problem)	33%**	8%
Story 2 (Mean)	1.9 (1.2)	3.1 (1.6)**
Story 2 (Effectiveness)	3.3 (1.33)	4 (1.4)*
Story 2 (Redefining Problem)	45%**	6%
Story 3 (Mean)	2.2 (1.8)	3.3 (1.7)**
Story 3 (Effectiveness)	3.4 (1.3)	4.1 (1.5)*
Story 3 (Redefining Problem)	39%*	10%
Story 4 (Mean)	2.25 (1.9)	2.5 (1.5)
Story 4 (Effectiveness)	3.5	3.5 (1.3)
Story 4 (Redefining Problem)	45%*	25%
All Means of Stories (Mean)	2.2 (3.4)	3.1 (1.2)
All Means of Stories (Effectiveness)	3.4 (1.19)	3.8 (.9)
All Means of Stories (Redefining Problem)	40.5%**	12.25%
* p < .05 **p < .01		

Participant groups (child and adolescent) were compared on the total number of scored means that were produced as well as on the effectiveness of their responses. An ANOVA (F-test for analyses of variance) demonstrated that adolescent participants and children did not differ in the number of scored means that were produced, $F(1,96) = 2.92$, $p > .05$ when the number of means was observed as an overall number (all means averaged together or overall). The same result held true when the effectiveness of the responses were compared overall, $F(1,96) = .98$, $p > .05$. Post Hoc analysis on individual stories clarifies this relationship. Adolescents were more adept on the two stories dealing with conflict resolution with figures of authority, producing a greater number of means and more effective resolutions for these two vignettes, Stories 2 & 3 (Table 4.2). Adolescents and children were equally adept at resolving situations on stories that require making friendships and negotiating interpersonal problems, situations that commonly present themselves during early childhood.

The use of experience in resolving problems is further underlined by how children will more consistently redefine the MEPS problem than their adolescent counterparts ($t = 3.14$ (100), $p < .05$).

A positive correlation between the overall number of means for the MEPS stories and age ($\rho = .362$, $p < .01$) [Spearman R was used as a non-parametric equivalent of the Pearson R as a more stringent test due to differences in group size] suggest typical maturation in the ability to resolve social problems is present. However, this typical acquisition is only present for the stories dealing with making and maintaining friendships. The number of strategy responses produced was also strongly correlated with the effectiveness of the strategies themselves ($\rho = .782$, $p < .01$) suggesting that both

quantitative and qualitative aspects of social problem solving are intrinsically connected. Furthermore, there was a negative correlation with both speed ($\rho = -.239, p < .05$) and accuracy ($\rho = -.226, p < .05$) on the Stroop Task, a measure of cognitive inhibition. The larger the number of means produced the quicker and more accurate participants were on the Stroop Task. The Stroop task was used as the sole measure of executive functioning in this experiment, with limitations to this acknowledged.

4. Discussion

The present research suggests new and surprising information about the nature of social cognition in childhood and adolescence. Unexpectedly adolescent social problem ability did not appear to follow the expected typical pattern of refined problem solving abilities with development. Adolescent social problem ability was only more effective on stories dealing with parental conflict and conflict resolution in the classroom, areas where adolescents would have greater experience. Experience may be bolstering effectiveness in problem resolution as suggested by our results and by current studies (Pretz, 2008). Typically developing children (as verified by the CBCL and BPVS) were equally as effective as adolescents in problem solving in situations requiring making friendships, suggesting this is a more ecologically important mechanism to be acquired in the course of development. This implies that a 6-year-old and a 16-year-old can be equally as competent in problem resolution in areas where both have experience of the problem (i.e. friendship).

The initial aims of this study were to study inhibition as one possible mechanism influencing social problem solving in children and adolescents. The Stroop results

observed were straightforward and demonstrated a typical linear pattern of acquisition of inhibitory skills, with older participants more successfully avoiding errors and more quickly completing the task. It did appear that superior inhibition and a larger number of means or the steps necessary for a resolution were positively linked. However, no relationship with the effectiveness of the resolutions was given which suggested that there was yet another factor which could account for these changes. Experience was the factor that was then focused upon, not having been the initial focus of the study.

Results on the MEPS task are the ones that suggested that experience may be an important factor that should be considered. On the surface, both groups appeared equal on both means produced and the effectiveness of their resolutions. However, a closer inspection of social problem solving performance by individual story strongly suggested that the use of experience gathered in daily social interactions plays an important role in problem-solving capacity as opposed to just a steady progress in maturation of brain circuitry.

Support for the role experience may play in problem solving comes from the finding that younger participants introduce a further step to resolve the social dilemma they are presented with. Younger participants redefine the problem to fit a situation they were familiar with, utilising their own understanding as a foundation for reworking the problem at hand. Adolescent participants extrapolate solutions from a larger database of experiences, and hence do not reformulate the question for themselves (Goddard, Dritschel, & Burton 1996).

The findings on experience add to the understanding of daily interactions in the social realm, particularly during early phases of development. This study uniquely

compares social problem solving and inhibitory capacities between two key maturational epochs, development between middle childhood and mid-adolescence. Age differences in these abilities have been studied in young adults, middle-aged adults, and elderly individuals (D’Zurilla, Maydeu-Olivares, & Kant, 1988; Lazarus, 1996), but have not clarified whether these changes are related to developmental processes or contextual factors (Rich & Bonner, 2004).

The data obtained for the number of means to a goal, contained in the solutions, and effectiveness of these solutions for the MEPS is of particular interest in addressing some of the key issues this study reviews. Previous studies comparing means to a goal for the MEPS in children (6,7,8,9,10, and 11-years of age) have not demonstrated a robust relationship with child social and developmental adjustment and behaviour (Kendall and Fischler, 1984). Our results demonstrate that when viewed globally (a sum of all four stories) older participants do not produce more means and are not more effective problem-solvers. This would bolster Casey, Getz, and Galvan’s (2008) view that typical maturation does not support an understanding of the non-linear changes that occur in problem solving and decision-making in the transition from childhood to adolescence. Though prefrontal refinement does occur as noted through typical patterns of maturation in the Stroop Task, problem solving does not appear to match this linear progression with children and adults apparently performing on the same level.

When social problem-solving efficacy is viewed as a function of each individual MEPS story, however, adolescents and children are no longer both as consistently effective. Adolescents exhibit a significant advantage in efficacy in stories that require a resolution in parental conflict or a resolution of a dilemma within the classroom. The

results suggest that children only provide equally effective resolutions in stories that pertain to making friendships or retaining friendships. The sample responses (Appendix 1) demonstrate effective problem solving by a younger participant without relying on extensive means to achieving a goal. These results imply that children as young as six-years of age are already competent in solving social dilemmas particularly in situations involving friendships.

Due to the importance of making friendships early in life, the role of experience in these situations may translate into how these hypothetical social situations are resolved. Real-life experience appears to be applied in resolving these conflicts. Adolescents will have greater life experience in conflict resolution with authority by virtue of the nature of this life period, and thus may present an advantage in stories that would tap this experience. Adolescents as a whole are seeking to establish themselves as independent thinkers, leading to greater conflict with figures of authority (Graber, Petersen, & Brooks-Gunn, 1996).

An additional explanation for this unexpected finding is that the ability to resolve hypothetical social situations is connected to retrieval of specific events (Goddard, Dritschel, & Burton, 1998, 2001). Adolescents perform more effectively on the two stories they possess more real-life experience in – disputes with parents and teachers. It is likely that children will have fewer real life situations from which to model this particular type of conflicting situation with adults outside of parental authority. Adolescence brings with it a period of dissonance in relationships with figures of authority. The benefit of having taken part in a situation of conflict with a figure of authority is that when asked to

then resolve a hypothetical situation the recall of a personal experience can produce a richer and more detailed response (Pasupathi, 2001).

Experience may further play a role in the separate approaches children and adolescents take when resolving a hypothetical situation. When children are presented with the initial conflict situation, they apply their own personal experience of a similar situation in order to provide a resolution for the social vignette. The youngest participants provide an alternative explanation for why the conflict has arisen and proceed to answer the scenario based on their interpretation of the situation. This is consistent with the notion of retrieval of specific events as described by Goddard, Dritschel, & Burton (1997, 2001). Adolescents, alternatively, appear to rely on a standardised repertoire of experiences upon which to extrapolate their response from. The use of experience could possibly be at work moderating how both groups approach the planning of their resolutions, which suggests deviation from the notion that typical maturation is responsible for the differences we observe between children and adolescents. The link that we are presenting with experience may be tenuous, but it certainly is important in how we perceive problem-solving and eventual decision making between these two groups.

Casey, Getz, and Galvan (2008) posit that there are no significant correlations between problem solving and decision-making capacity and the refinement of prefrontal systems. Our results suggest that improvement in strategy response may not necessarily be a function of greater connectivity to the frontal lobes as mirrored in superior cognitive inhibition but that experience may play a stronger mediating factor.

Support for the notion of typical development as a factor moderating differences between children and adolescents cannot be discounted entirely, and exists in the relationship between speed and accuracy in the Stroop task. Adolescents are more effective and accurate in measures of cognitive inhibition than their younger counterparts. As participants mature their speed and accuracy improves. Older participants commit fewer errors and take less time than their younger counterparts. Participants who have better verbal skills are also quicker and more precise on the Stroop task and produce a higher number of means. It must be noted, though, that these results may be a product of improved intelligence quotas (Wechsler, 1987; Pellegrini, 1985) explained by an overall enhancement in cortical connectivity throughout the brain.

The present research suggests new information about the nature of social cognition in childhood and adolescence, acknowledging that there are limitations to the heavy emphasis experience has been given in our results. From this study we assume that there is a typical refinement in prefrontal cortical connectivity as observed through superior speed and accuracy on the Stroop Task. Unexpectedly, however, adolescents social problem ability is only more effective on stories dealing with parental conflict and conflict resolution in the classroom suggesting that experience, as suggested by Pretz (2008), may bolster effectiveness in problem resolution. Children are equally as effective as adolescents in problem solving in situations requiring making friendships, suggesting this is a more ecologically important mechanism to be acquired in the course of development.

The following chapter will be looking to replicate some of the surprising findings obtained in this study, particularly those obtained for experience. Once again, there will

be a focus on the problem solving mechanisms that are employed in day-to-day social situations. One factor that was not explored in this study and will take centre of attention in the following is education, a factor that can be seen as an experience that shapes social problem solving ability. One method to look at the role that education plays is to look at problem solving in a matched schooled and non-schooled population. A cross-cultural study was conducted in a nation where pockets of illiteracy are still high, allowing for the further exploration of the mechanisms shaping social problem solving and decision-making.

The study following in the next cross cultural chapter is methodologically similar to one in this chapter (Chapter 4), except the focus has now shifted from studying inhibition as a key factor in social problem solving to attempting to see how education and day to day experiences in a rural and urban setting can also have an effects on the mechanisms shaping social problem solving.

Chapter 5

Social Problem Solving and Culture Differences

The literature on experience (Goddard et al., 1996) establishes that adults draw from their own understanding of the world to apply to every day life tasks. Our first empirical chapter demonstrated that children as young as six years of age have the ability to be equally efficient in their ability to solve problems when they have experience to draw upon. Our study serves to add to the understanding of how this information can be uploaded into the conceptual software that is our problem solving ability, adding to our understanding of how problem solving fits into our decision-making mechanisms. We have demonstrated that both adults and children have this capacity, and replicated our own findings describing that experience may play a key role in social cognition. Social problem solving is a critical skill in development as it is necessary for the successful navigation and integration of our social environs. The way children and adolescents interpret, react to, and solve social situations is critical to how peers will perceive them. A general deficiency in maintaining and creating peer relationships has been clearly associated with poorer problem solving (Asarnow & Callan, 1955; Feldman, McClaskey & Dodge, 1985; Lochman & Lampron, 1986; Greening, 1997, Mayeux & Cillesen, 2003; Pellegrini & Roseth, 2006).

The tenants of social problem solving suggest that we may use our general experience in application of the development of resolutions to real life problems (Bodenhausen, McCrae, & Hugenberg, 2003). Studies in adults point to experience playing an important role in how we utilise and implement our learning experiences into

successful resolutions in daily social situations (Dritschel, Kogan, Burton, & Goddard, 1998; Goddard, L., Dritschel & Burton, 1996). Ross (1984) postulated that when memory systems were prompted by 'reminding' them of earlier learning episodes it had a direct effect on the subsequent learning of new cognitive skills. Seifert et al. (1994) bolstered the claim by noting that retrieval of past performances on many reasoning tasks can improve the performance of these tasks. These studies highlight the possible role experience plays in how we interact with our environs when asked to function successfully in daily social situations. One factor that may play an important role in the way we learn to implement solutions to real world dilemmas is the culture that we are exposed to.

Nisbett, Peng, Choi and Norenzayan (2001) posit that cultural experience can have a direct effect on individual social problem solving. They suggest that members of different cultures (with pronounced differences, i.e. eastern vs. western) socialise from birth into different worldviews, and habits of thought which reflect directly on their cognitive processes and social strategies. Socio-cultural research increasingly points to the importance of understanding the social organization of learning interactions (Rogoff, 1998; Wenger, 1998).

Cross cultural studies have highlighted one particular agent that seems to hold a pivotal role in shaping and guiding social problem solving itself, schooling. Chavagay (2008, 2002) studied traditional indigenous organisation of social problem solving in Mayan culture in Central America. They found that being exposed to western style schooling had a direct effect on interactions with children, particularly when placed in a situation where problems had to be resolved. Mayan mothers with little formal Western

schooling organised their interactions in a shared, multiparty structure where emphasis was on observation, participation, and learning to work co-operatively within home and community. On the other hand, Mayan mothers, who attended 6 to 9 years of school, organised their interactions in a format that resembled those utilised in Western practices, where an adult directs children's roles and responsibilities and the impetus is in forming independent, self motivated thinkers. Fathers also displayed a marked difference depending on the amount of school they were exposed to (Chavagay, 2008). When asked to participate in a puzzle-building exercise with their children, fathers divided tasks in a more explicit, directed fashion (a western, school-based fashion) the longer they had been exposed to school themselves. Explicit division of labour is seen as a western problem-solving skill, and one that in this case appears to be directly related to modelling that may have occurred within a formal school format. This work is unique within the America's, and his studies have not been directly replicated within other Indigenous American groups such as those descendant from Incan or pre-Incan cultures.

Gleitman (2002) also notes that schooling allows children to develop higher-order concepts that can serve as a foundation for yet further skills. In other words, basic problem solving skills are modelled or taught as part of the general school curriculum. These concepts and techniques hold considerable influence in day-to-day real life problem-solving. Maths and Science problem solving applications can be applied in other realms. Many aspects of schooling encourage children to draw upon the common factors that situations may share with each other and allow students to operate at a more abstract level. This provides children with a powerful set of skills that are applicable to a variety of real life social settings. Ventura et al., (2008) found that those who were schooled in a

western fashion were significantly different (with no implication that they are superior) from those who did not receive schooling or those who were only semi-schooled. They suggest that schooling may provide a culturally independent bias through reading (i.e. textbooks, newspapers). Those who are not schooled would not possess these skills. Reading can be one of the most direct ways to engage beliefs, ideology, and to learn social problem solving techniques. According to Fiske and colleagues (1998), schooling raises cultural independence through the explicit instruction and practice of logical reasoning and critical thinking. In other words, schooling provides students with the tools to resolve their own problem situations in a unique fashion, possibly separate from general cultural guidelines on certain situations. Other cross cultural studies also have found that schooled children in places as culturally diverse as Morocco, the Yucatán province in Mexico, and Liberia do better on various tests of free recall than their unschooled counterparts (Cole et al., 1971; Wagner, 1974, 1978), corroborating the idea that schooling is a factor that plays a crucial role in problem solving skill. Schooling can even be considered an experience in and of itself.

Schooling provides children with a framework that is significantly different from those not exposed to systematic instruction. The cultural differences themselves may play a factor in how children and adolescents navigate their own individual environs, but schooling appears to be a factor that above all seems to have an important impact on how this information is processed. Culture in and of itself may provide unique insight into differences in problem solving, but if as Fiske et al., (1998) suggest, culture and experience is mediated by education, then our focus should be aimed at understanding the role that schooling may play in social problem solving.

A cross-cultural study that includes societies different from those of industrialised countries may provide an appropriate arena in which to study schooled versus non-schooled populations. In third world countries, wealth differences between rural and urban sectors have had a marked effect on the level of literacy of their inhabitants. South American countries, particularly those influenced by Incan culture, can provide an appropriate arena where such contrasts can be observed. Cultural characteristics vary from those of the Anglo-American culture (Posada, Jacobs, Richmond, Carbonell, Alzate, Bustamente, & Quiceno, 2002), particularly in family structure in indigenous culture. The Andean region is far more sociocentric (as opposed to individualistic as in Anglo-Saxon families) and serves as an important source of social contact and support (Leydendecker, et al., 1997; Martin & Colbert, 1997). Interdependence is more often stressed than independence in all aspects of social functioning. This social structure is very similar to that observed by Chavagay (2008) and Chavagay and Rogoff (2002) in Mayan cultures. Though Mayan and Incan cultures are not immediately related to each other, they share more commonalities than any other culture found within the entire Meso-American region. Evidence exists of pre-Columbian contact between Mayan community groups and Ecuadorian social groups in terms of early trade routes, textile design, production techniques, and of shared cultural knowledge (Berdan, & Anawalt, 1992).

Chang (1998) has noted that there is a serious limitation in the area of cross cultural research where there has been an abandonment in examining cultural differences or schooling differences in social problem-solving ability. With cross-cultural databases being “absurdly small” (van Ijzendoorn & Sagi, 1999), there is an obvious need to understand how culture, experience, and in particular schooling, plays a role in the

development of social problem-solving skills that enable those in any given particular community to be successful in all their daily social interactions.

5.1 Aims

Given these limitations and concerns, the purpose of the present study was to a) replicate the findings of our initial study based in a western population (Fife, Scotland), b) study both schooled and non-schooled populations in order to understand the role that education may play in the development of social problem-solving skills; c) study these effects developmentally both in children and adolescence, and d) assess if there is a universal link in problem-solving between two disparate cultures. Ecuador was chosen as an appropriate country due to its small size and high percentage of illiteracy that allowed for direct access to non-schooled populations.

Based on our previous findings in Chapter 4, we may expect to find a pronounced difference between rural and urban participants in verbal ability as an observable difference between non-schooled and schooled groups. We hope to replicate not finding any difference in EFFECTIVENESS of responses in the MEPS, though in terms of the MEANS proposed to resolve the hypothetical problems in the vignettes we may expect differences merely on the type of responses given, but possibly finding an effect because of vocabulary differences.

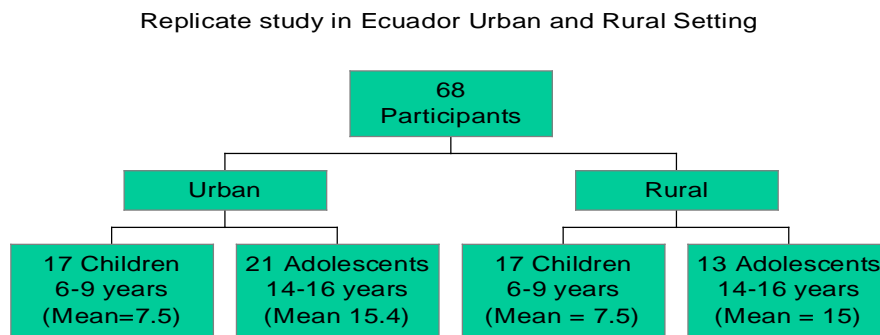
5.2 Method

5.2.1 Participants

Overall 68 participants were recruited in both urban and rural areas in Ecuador. A total of 38 typically developing children and adolescents were recruited from local

primary and secondary schools in the capital city, Quito. A total of 30 children and adolescents were recruited from two rural, Andean communities in the Provinces of Pichincha and Ibarra in Ecuador. Thirty-four Indigenous and Hispanic children (17 females / 17 males) aged 6 to 10 years (M : 7.5 years) and 34 Indigenous and Hispanic adolescents (17 females / 17 males) aged 14 to 16 years of age (M : 15 years) took part. (See Figure 5.1)

Figure 5.1 – Participant Distribution – Urban & Rural (Schooled vs Non-Schooled)



5.2.2 Participant Background Urban Setting - Quito

Quito is the capital city of Ecuador with roughly 2 million inhabitants located geographically on the slopes of the Pichincha volcano and lying 5 kilometres north of the Equatorial line. It sits nestled within the Andean mountains in a topographic basin. Socio-culturally it bears the mark of colonization by Spanish settlers leaving an ethnically mixed (Mestizo) population predominantly of the Catholic faith. In Quito the ruling class is predominantly of Spanish descent (Criollos), maintaining a higher social status than those with greater amount of indigenous blood (Gerlach, 2003; Sayer, 2004; Selverston-Scher, 2001)

Schooling is mandatory for all children within the city, though this mandate is not enforced universally for those in lower social castes. Schooling at the time of this study was run only in Spanish and the Ministry of Ecuadorian Education developed the curriculum. In the city of Quito, 2.5% of men and 3.6% of women were illiterate, with no schooling to their name. All participants from Quito in this study had received schooling from Kindergarten (Playgroup). Participants in Quito were all native Spanish speakers. All schooled participants in this study had at least one parent working a full time job to serve as a rough measure of socio-economic standing. In contrast however, according to the 2001 census (CEDATOS, Ecuadorian Ministry of Employment) only 42.7% of the population were employed.

5.2.3 Participant Background - Rural Setting – Pichincha and Ibarra

Rural participants were sourced from both the provinces of Pichincha and Ibarra, which lie in the northern Andean corridor of Ecuador closest to Colombia. Both these provinces are contiguous to each other and are connected by the same mountain ranges, making them geographically and culturally similar to each other. Socio-culturally rural participants were mostly indigenous with a scant amount bearing Mestizo heritage (Indigenous and Spanish Colonial) (Lucas, 2001; Hess, 1997).

In the province of Pichincha 16.3% of men and 20.3% of women were illiterate, with no formal education to their name (2001, Census). Participants from the province of Pichincha were recruited in the region of *San Miguel de los Bancos*. Only 35.3% (CEDATOS, 2001) of the entire adult population was employed in this particular area,

serving as a crude measure of socio-economic standing. Participants in this region knew both Kichwa and Spanish.

Ibarra is mostly rural with small urban enclaves. Functional illiteracy can reach 50% in this province (CEDATOS, 2001). Rural participants from this province were functionally illiterate. Participants all lived in a rural setting near the small town of Otavalo, and only 35.1% (CEDATOS, 2001) of all the population in this region was employed at the time this study was run. Most of the rural participants in this study worked in large agricultural estates, akin to large feudal estates within Medieval Europe. Participants in this area knew both Kichwa and Spanish.

Western style schooling (originating with Spanish colonization) in rural areas was considered until recently (Crain, 1990) alien to local traditions and in many rural communities it was shunned because of its early association with Catholic missionary work.

5.2.4 Measures

Our measures were chosen based on prior work on social problem solving conducted on a western population in Scotland (See Chapter 4, Methods). The measures have been described in full in Chapter 4. This study sought to replicate the findings of the original study conducted in Fife, Scotland, so methodologically speaking the same or equal measures were used for both studies. The rural Andean population is not similar to the Scottish population in that in first instance they are culturally distinct, in second place there are language differences (Spanish & Kichwa are spoken), and finally there is a large level of illiteracy in Andean rural populations. Three of the measures had to be adjusted

in order to satisfy the needs of the population being studied. The Stroop Task and BPVS are two measures that were replaced by more culturally specific measures because of literacy and language differences. The Child Behaviour Checklist (CBCL) – as used in Chapter 4 – could not be distributed in rural illiterate communities. The CBCL requires reading comprehension. It was important this measure was not dropped as it provided a measure of comparison between urban populations in Ecuador and Scotland. The TVIP (Peabody in Spanish) served as a rough guide of typical development in rural illiterate communities as no equivalent of the CBCL exists for non-literate populations (aside from Intelligence Quota tests such as the Wechsler Adult Intelligence Scale [WAIS] (1955) which were not adequate for this study).

5.2.4.1 TVIP- Dunn, L. M., Padilla, E. R., Lugo, D. E., & Dunn, L. M. (1986). Test de Vocabulario en Imagenes Peabody: TVIP: Adaptacion Hispanoamericana (Peabody Picture Vocabulary Test: PPVT: Hispanic-American Adaptation). Circle Pines, MN: American Guidance Service (AGS), Inc.

The full version of the *TVIP* (Peabody in Spanish) was administered to all participants. It is a widely used, standardised picture-based measure of receptive vocabulary for ages 2 years 6 months to 17 years 11 months. It does not require any reading or writing, only simple responses to picture cards as participants point to one out of four pictures which matches the spoken label. It was used to measure participant verbal capacity. It may be used as a screening test of scholastic aptitude when Spanish is one of the languages of the home and community and when Spanish is the language of instruction.

To mark this test, chronological age and verbal proficiency were used to define the basal start for the participant. Participants were advised to make a reasonable guess if they did not identify the word that was presented. Testing continued forward until 8 or more errors out of 12 were made, establishing the ceiling set. Raw scores were obtained by subtracting total number of errors from the ceiling set (12-168). Raw scores were then transformed into normative scores for analysis.

5.2.4.2 Adapted Means Ends Problem Solving Task (Platt & Spivack, 1975):

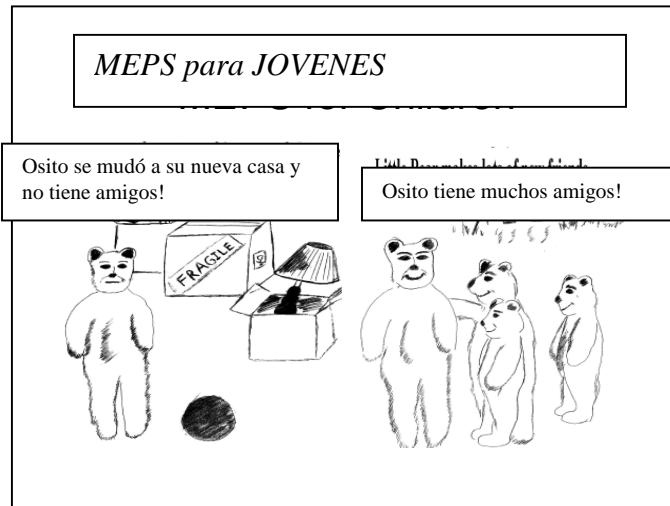
The MEPS is a popular measure of means-ends thinking. Four adapted hypothetical vignettes on interpersonal social interaction from the MEPS task (used in our earlier study, see Chapter 4.2.2.2) were presented in addition to two further stories modelled on the original MEPS format (Platt & Spivack, 1975). The six stories consisted of an introductory portion where the need or goal of the protagonist was stated and a resolution where the protagonist successfully satisfies the need or fulfils the goal. How the problem is resolved is left ambiguous in order for participants to provide the most appropriate resolution to the social dilemma. The protagonists in the original stories were John or Sue and were interchangeable, based on the participant's gender. In Spanish the names were changed to 'Juan' and 'Susana.' An example would read as follows in English: John/Sue has moved house and has no friends. John/Sue wants to have friends. The story ends when John/Sue has many friends. Begin where John/Sue has moved and is looking for friends.'

Vignettes differed for children as the written stories were presented in pictorial format to ensure comprehension of the scenarios as well as providing children with a

more familiar, and universal context, i.e. picture books (in urban settings). The protagonists, Sue/John, were replaced by that of a small cuddly bear, as it occurred in the English version. Little bear in Spanish translates to 'osito'. Children in both hemispheres are familiar with stuffed animals as toys. Anthropomorphising animal figures was considered ethically sounder (Ethics Committee of the University of St Andrews) than using human figures, as bear figures are not representative of one culture per se or have distinctly ethnic features. Some of the language in the vignettes was also modified to be accessible to novice readers or to those with more basic vocabulary skills, but the stories remained unchanged. (See Figure 5.2.)

The task was administered verbally in order to deflect any problems with reading comprehension.

Figure 5.2: Problem: Little Bear has moved to a new house and has no friends to play with. Resolution: Little Bear has lots of friends. (English Translation)



The same four basic vignettes used in Chapter 4 were utilised again, with the following modification: instead of talking about having a disagreement with a teacher, the word teacher was replaced by the word “mentor” – which in Spanish also translates into “mentor.” As non-schooled participants would not be in contact with a teacher, it was inappropriate to ask participants to react to a situation with a teacher. It was agreed that a “mentor” would fit a more universal billing for someone who has transmitted information or who has taught someone a skill.

Two extra stories, which were piloted in Spanish, in Ecuador itself (Holsti’s Method, .81), were added in order to ensure that the MEPS task was not necessarily Euro-centric and that it would cater to a wider population, with varying experiences. The Ethics Committee of the University of St Andrews approved the addition of the two following stories. The first story reflected the large emigration that was occurring both in

rural Ecuador as well as in urban centres due to economic downturns in the country's economy (CEDATOS, 2004).

5: Problem: John's/Sue's best friend has moved away. They will not see each other again and John/Sue is upset. (Spanish translation – Escalante-Mead)
Resolution: John/Sue stops being upset.

and

6: Problem: Michael/Mary has received a gift. His/Her friend Paul/Paula likes the gift and steals it. (Spanish translation – Escalante-Mead)
Resolution: Paul/Paula returns the gift that was taken.

The second story reflected the original set of ten MEPS stories devised by Platt & Spivack (1974), but instead of discussing theft at a jewellery store it was agreed that a more universally tangible scenario would be created. Theft is a phenomenon that has been registered universally, however gemstones and the stealing of gemstones is not a universally understood situation. The theft of a gift or a personal possession was a situation that would be universally understood within this region of the world.

The translations of the vignettes were made from English into Spanish by the primary researcher, and were then checked for consistency in Spanish by a native Spanish speaker (Psychology Department, University of San Francisco de Quito) following the steps suggested methodological steps by Bracken and Barona (1991). Each item was checked to ensure that the meaning and gist of the vignettes remained unchanged. The vignettes for both urban and city groups both contained the same Spanish translation. Universal Spanish (that could transcend cultural barriers) was used with use of any local colloquialisms ensuring consistency in the administration of the stories themselves.

MEPS solutions were marked in the same manner as they were in Chapter 4, looking at Relevant Means, Effectiveness, and Redefining the Problem. Please refer to Chapter 4.2.2.2 for a thorough description.

The interrater reliability (internal consistency between two researchers) was conducted on 50% of the total stories. As it is not possible to establish a priori the total number of decisions to be made by the coders, the Holsti's method was used ($2m/n_1+n_2$), where the only information required is the number of coding decisions on which both coders agree (m), and the number of coding decisions made by each coder (n_1 and n_2) (Rourke, Anderson, Garrison, & Archer, 1999; Neuendorf, 2002) The overall percentage of agreement was 0.91%. This number was deemed sufficiently high for purposes of analysis

5.2.4.3 Animal Stroop Task (Wright, Waterman, Prescott, & Murdoch-Eaton, 2003)

It is a robust computer task developed as a measure of cognitive inhibitory functioning with validity across a broad age range, 3 to 16 years. Both cognitive and behavioural features of inhibition were addressed within this one task. Inhibitory control was assessed with pictures (farm yard animals) replacing words. The task assumed that a child can easily name pictures of animals such as a duck or sheep. In this case, children name these creatures in an automatic fashion, akin to the automatic reading measured by its classic Stroop counterpart. In this modified Stroop task, participants looked at pictures where the head of the animal had been swapped with another animal. The participant gave the name for the "body" of the animal. Because the face of the animal picture is so prominent, participants find it difficult to ignore. Therefore, just as with the coloured

word version of the Stroop task, participants had to inhibit the response based on the face in order to correctly name the body of the animal. The task was developed specifically for use with children and particularly for those who do not have solid reading skills or are not yet literate.

As a pre-test to the Animal-Stroop task participants were shown pictures of the four prototype farm-yard animals and were asked to name them. If participants were unable to name these, they were not included in the task itself, as automatic recall of the pictures could not be guaranteed. All children except one in the study were able to do this without difficulty.

A portable laptop computer (Toshiba Satellite 100 Series) was equipped with software required for the presentation of the images and recording of response times. A microphone was placed round the participant's head to record response time.

A series of warm up trials were presented initially. Children were told that pictures would be presented on the screen and they would be required to name them as quickly as they could. A series of vehicle pictures were used to elicit a 'rapid response' from the participant. Each block was composed of 36 trials and was either the matching set (Set A) or the compromising incongruent set (Set B), compromising incongruent face/body images. Images were presented in ABAB fashion or BABA fashion and were counterbalanced between participants.

The accuracy of children's naming was coded in real time on separate forms (uniquely created for this task). The microphone recorded response time for each participant. When an articulation error was produced regarding the incorrect name of an animal (e.g. shh...cow) this was noted manually for each participant. A z-score was

produced by the Animal Stroop software package for each individual participant based on individual participant input.

5.2.4.4. Child Behaviour Checklist (CBCL, Achenbach, 1991) (urban areas only)

The standard version of the Child Behaviour Checklist (CBCL) (4-18 years of age) was administered only to urban participants. Please refer to section 4.2.2.4 for a fuller description of this task. The CBCL is a widely used instrument for assessing child and adolescent emotional and behavioural competencies, and requires literacy skills to read and answer the questions. There was no culturally specific measure that illiterate parents could use to assess the development of their children. To maintain methodological parity with the study conducted in Scotland, the CBCL was used with urban participants only. All material was translated into Spanish by the experimenter.

5.3 Procedure

5.3.1 Recruitment

5.3.1.1 Ethical Approval

Prior to commencing any study within Ecuador, ethical approval for this study was given by the University of St Andrews for this study, as a replication of the study in Chapter 4, with the added dimension of cross cultural study as well as a focus on schooled versus non-schooled populations. An amendment was made to the original study and approved by the Ethics Boards of the School of Psychology of the University of St Andrews.

In Ecuador, approval to conduct a study within two private co-educational schools (School 1 & 2) and a government school (School 3) was applied for to the Ministry of Education. The University of San Francisco, Quito and Universidad Central sponsored this study within the country. The Ecuadorian government gave approval to conduct this study both in public and private schools, as well as a general blanket approval to conduct our study in rural population groups. A copy of the measures was sent for initial approval to the Central University of Ecuador (Universidad Central del Ecuador - Appendix 2). Approval within individual schools had to be applied for separately to the headmaster in each individual school.

5.3.2 Recruitment Urban

Three distinct schools were targetted for this study in order to obtain the most varied sample of participants. Two schools were privately run (School 1 & School 2) and School 3 was a government school that subsidised the cost of schooling for most students. School 1 catered to students ranging within middle to lower economic standings, and School 2 was an international school that catered to a solidly middle class group. Participants and their parents in urban areas were informed of the study by a letter distributed within the school as well as by word of mouth. Letters sent to all members of the schools were accompanied by a consent form and the CBCL checklist for parents. Parents and students who consented to take part in the study contacted the primary researcher via telephone, and interviews were set up within the school grounds or within their homes.

5.3.3. Recruitment Rural

In rural areas a general approval from a village elder or leader was obtained prior to addressing anyone who was part of the village structure. It served to establish the general intent and purpose of the study. At least one visit to the area occurred prior to obtaining oral consent from the head of family to have their children participate in a study. The initial visit served to establish the general credentials of the researcher within the community, as well as satisfying any queries or questions that may be raised by an outsider's presence. Most villagers lead very isolated lives from urban centres, and the presence of an outsider who was not ethnically similar to the population bringing in an electronic instrument was certainly seen as extraneous. It was important that all prospective participants felt comfortable or at least could visually recognise the researcher prior to consenting to participating in a study.

Participant recruitment occurred through word of mouth and in practical terms involved an initial family interview/meeting where the general purpose of the study was orally relayed to both parents and children. Parents were given the option of declining consent for their children of non-consenting age to participate and it was made clear that they and their children could withdraw from the study at any point. Children whose parents declined their child's participation were not approached to take part in the study again and it was clear that there was no form of penalty for not participating. Parents and children were encouraged to see/hear sample questions or mock runs of the study done in order for them to garner a general feel for the sort of tasks that would be given as most of the material could be unfamiliar to them.

As part of the consent process the following information was relayed to potential participants: a) the purpose(s) of the study, b) the anticipated consequences of the research, c) the identity of the funding body or sponsor, d) how the data would be used and stored, and e) anonymity of participants, with a general explanation on how their identities would not be revealed to anyone other than the primary researchers. It was also highlighted that there was no financial gain to be obtained from taking part in the study, as this was seen as unethical.

Children and adolescents (of consenting and non-consenting [yet assenting] age) who had permission to participate were approached by the researcher, and were asked if they were interested in participating in the study. All participants had to provide verbal assent prior to taking part in the study. If they declined, they were not asked again. It was rare to find anyone declining to participate, and most participants wanted to take part in the study itself, in part due to the novelty factor involved.

5.3.4 Task Presentation TVIP, MEPS, Animal Stroop Task

Consenting and assenting participants were interviewed in a location where general distractions were kept to a minimum. Assent or consent to participate was confirmed initially before continuing. Responses were obtained verbally and audio-taped and simultaneously noted, with responses transcribed onto an electronic format at a later date. All participants were aware that they could terminate their participation at any time without repercussions and testing did not begin until participants were fully at ease. All participants were tested individually. In both rural and urban settings testing was done on a Toshiba Satellite computer (battery power was relied upon in rural areas as there were

no electrical mains). In rural areas, studies were only conducted during the daytime as the limited electrical supply meant that night hours would have provided insufficient lighting. This was not an impediment in urban areas.

All participants initially completed the TVIP, as this was the lengthiest of the three tasks. Participants were then asked to resolve the hypothetical vignettes on the adapted version of the MEPS stories. Participants were encouraged to produce the ideal strategy to solve the social dilemma for each story to achieve a successful resolution. Children were presented with pictorial vignettes of the social dilemmas and asked to outline how the character “Osito” would resolve the situation. Adolescents were asked to outline how either of the characters, “Juan” or “Susana”, would resolve the situation. They were asked to list the most appropriate steps for a successful resolution of the problem. The Animal Stroop Task was then given following the MEPS task. The MEPS and the Animal Stroop Task were counterbalanced between participants so that no one task was favoured by the order of presentation. The CBCL was given only to urban parents. The measure was given to parents directly if they were present or mailed to them with a return envelope if they were not. The findings are discussed in detail in the following section.

5.4 Results

5.4.1 MEPS

Children and adolescents (both urban and rural together) did NOT differ from each other on the number of means that they produced as verified by an analysis of variance (ANOVA) ($F(1,64) = .524, p = .472$). Individual t-tests were performed comparing the number of means produced between children and adolescents, demonstrating no

statistical differences between them (Table 5.1). In objective terms, it means that a six year-old participant and a sixteen-year old both provided a similar number of means when asked to resolve a hypothetical problem situation.

These results replicate those observed in our initial study, where children and adolescents did not differ from each other in the number of means that they provided when asked to resolve a real life hypothetical problem.

Urban and rural participants WERE different in terms of the number of means that they produced ($F(1,64) = 6.703, p = .012$). Urban participants appear to produce more steps to solve a problem than their rural counterparts, which is a unique finding in itself.

Table 5.1 Observed Means between Urban Children and Adolescents and Rural Children and Adolescents.

** $p < .01$	Rural Children	Urban Children	Rural Adolescents	Urban Adolescents
Means	Mean (SD): 1.35 (.35) Range: .5 –1.83	Mean (SD): 1.33 (.54) Range: .17- 2.33	Mean (SD): 1.09 (.47) Range: .33 - 2	Mean (SD): 1.79 (.66) Range: .83 –3.67
Effectiveness	Mean (SD): 3 (.62) Range: 2 – 4.17	Mean (SD): 2.94 (.82) Range: .67 – 4.17	Mean (SD): 2.65 (.83) Range: .83 – 4.1	Mean (SD): 3.68 (.80) Range: 2.33 –5.17
Animal Stroop	Mean (SD): .61 (1.63) Range: -2.02 – 3.92	Mean (SD): .54 (1.28) Range: -2.67 – 1.71	Mean (SD): .94 (1.22) Range: -.03- 4.26	Mean (SD): .74 (.61) Range: -.22 – 2.24
TVIP	Mean (SD): 98.47 (35.28) Range: 90 -145	Mean (SD): 120.70** Range: 91 – 145	Mean (SD): 117.77 (24.8) Range: .66 -140	Mean (SD): 129.90 (5.90)** Range: 121-145

5.4.2 MEPS – Effectiveness

In terms of how effective the solutions were, NO statistical differences were found between children and adolescents (both rural and urban together) ($F(1,64) = .455, p = .503$). As no differences were found, it can be inferred that the youngest and oldest of participants both can provide solutions that are equally as successful in solving a problem situation. Individual t-tests comparing children and adolescents on their effectiveness further corroborate the null difference finding (See Table 5.1).

There was, however, an observed difference between rural and urban groups on the effectiveness of their responses ($F(1,64) = 8.139, p = .006$), suggesting that rural participants perform differently than their urban counterparts. Post Hoc analysis of the

responses (student t-tests, two-tailed) suggests that these differences lie in the type of strategies that are utilised in the decision-making process and are presented below.

5.4.3 Post Hoc Examination – Thematic Analysis of MEPS Responses

Post Hoc analysis was conducted to break down the difference of the responses of urban participants and rural participants into their core components. Thematic analysis was used to categorize the responses. A total of four distinct themes were found and they are as follows: Action Responses, Reasoning Responses, Conscience/Guilt Response, and Violent Responses.

Table 5.2 – Percent inter-coder Reliability on Four Categories

Categories MEPS Response	Percentage of Agreement
Action	95%
Reasoning	98%
Conscience/Guilt	88%
Violence	100%

Table 5.3 – Post Hoc Analysis on Four Categories on Rural and Urban Participants

<i>Categories</i>	Rural Children	Urban Children	Rural Adolescents	Urban Adolescents
Action	1.6 (1.2) *	.65 (1.9)	.69 (.94)*	.42 (.74)
Reason	.64 (.93)	.76 (.75)*	.76 (.72)	2.4 (1.3)*
Conscience	.11 (.33)	.29 (.58)	.61 (1.1.)	.57 (.81)
Violence	.88 (.99)**	0 (0)	.46 (.87)**	.09 (.43)
* p < .05 ** p < .01				

5.4.3.1 Action Responses

Responses in this category presented “action” as the conduit to achieve a solution. Emphasis fell on the use of a physical response as the primary mechanism for reaching the desired social outcome. In the example below, “playing” was used as an appeasement tool that encouraged friends to ignore their differences and once again be on good terms with each other (See Table 5.3).

They don't treat each other well. They don't play. They fight a lot. They play again and then they become happy. (Rural, Female, 8 years - old)

Rural participants statistically produced MORE of these responses than their urban peers ($t = 2.40$, $df = 28$, $p = .023$, *two tailed*). Urban participants did not use this problem solving strategy as readily to solve the hypothetical problems.

5.4.3.2 Reasoning Responses

In direct contrast to the previous category, there was a significant trend among urban participants for utilising MORE verbal logic and verbal appeasement (reasoning) as a way to resolve the problem, ($t = -4.678$, $df = 36$, $p = .000$, *two tailed*). Instead of employing movement or action, or a set of physical responses to achieve the desired goal, words were the medium used to provide an appropriate solution (See Table 5.3). An example follows:

They made amends, because they had fought because a friend had played a prank on them. They both realised it was a lie after asking other friends about it and then they got back together again (City, Female, 9years-old)

5.4.3.3 Conscience/Guilt Responses

Many of the responses denoted that one's "conscience" was the main factor in how they made and modelled their decisions (See Table 5.3). The feeling of guilt was prevalent in these responses, suggesting that it was relied upon heavily in order to focus the desired solution. The two groups DID NOT DIFFER in how often they presented this influencing factor in their decision making ($t = -.390$, $df = 36$, $p = .246$). An example follows:

There is a weight on his conscience. He feels guilty. He finds it all of a sudden. He prefers to keep friendships (City, Male, 14 years-old).

or

We have to follow the road of good. This is what God teaches us. (Rural, Male, 8 years-old).

5.4.3.4 Violent Responses

Rural participants utilised MORE violence as a means to resolve a conflict situation ($t = -1.804$, $df = 28$, $p = .05$, two tailed). Participants in rural areas endorsed the use of violence as a means for resolving a problem situation (See Table 5.3). The use of “violence” is not the same as the use of “action.” In this case “violence” is described as incurring physical harm or pain in order to solve the situation. An example follows:

They got angry [parents] because she was going to the woods and they hit her with a whip. (Rural, Female, 8 years-old).

5.4.4. TVIP

Children and adolescents differed in terms of their vocabulary ability ($F(1, 64) = 6.88$, $p = .011$). There is a clear, typical developmental progression with older participants being MORE fluent and comfortable with a larger vocabulary than the younger participants.

Rural and urban participants also differed from each other in terms of their verbal abilities, ($F(1,64) = 10$, $p = .002$). Urban participants had MORE verbal skills as measured via the TVIP than their urban counterparts (Table 5.1). This strongly suggests that urban participants possess or command a broader span of vocabulary than their rural

counterparts, a difference most probably influenced directly by schooling, and that was expected.

5.4.5 Animal Stroop

There was NOT a significant difference between urban and rural participants on this measure ($F(1,64) = .931, p = .338$). This suggests that both rural and urban participants performed equally well at this task. It would be logical for a developmental trend to be observed in this instance, with greater cortical maturation prefrontal connectivity reflected in faster and more accurate responses on this Stroop-like measure. This would not be observed.

5.4.6 Child Behaviour Checklist

The Child Behaviour Checklist was administered only to the urban population. All participants fell within a normal range. The normal range is a T score <65 , borderline is from 65 to 69, and the clinical range is ≥ 70 . All participants in an urban setting fell comfortably below the 65 cut off range. Rural participants were assessed using the TVIP as a rough standard baseline for typical development. All rural participants were considered to be typically developing with all raw scores above 65.

5.5 Discussion

This study provides a unique insight into some of the factors shaping social problem solving in a non-western culture. Schooling appears to provide a distinct pool of skills that are directly reflected in day-to-day problem solving. Our results strongly

suggest that western style schooling is an experience that models social behaviour from an early age. Schooling in and of itself provides an experience that shapes day-to-day interactions to the extent that schooled and non-schooled children and adolescents differed in their problem solving strategies. Developmentally, our findings suggest that children and adolescents in urban settings (hence schooled from an early age) appear to perform more like their Scottish counterparts in tasks measuring problem solving ability, addressing some of the key findings in our earlier studies.

Our participants (urban) were all developmentally normal as ascertained by the CBCL. The CBCL results only apply to the schooled populations, but are important in comparing Scottish urban and Ecuadorian urban groups. Our results suggest that our results for the urban population are not a product of any deviations in the population's social abilities. As predicted, the TPVS results demonstrated all participants were working within expected vocabulary ranges and that as they matured participants improved their command of the language. Our schooled and non-schooled groups differed in the breadth of recognition of vocabulary words. As urban participants have had formal linguistic training and have been exposed to a wide range of vocabulary through reading, it is logical and was predicted that such a difference would be found (Norenzayan & Nisbett, 2000). Rural participants were functional in their Spanish language skills, indeed often speaking an additional language, yet their application of the language was distinct from how urban participants employed it. This could possibly be seen as a limitation to the observed results. The fact that rural participants all fared typically in the TPVS had to be accepted as a substitute measure for typical development

as the CBCL could not be run in rural areas because it would have been methodologically impossible to do so.

One difference that emerged between the two distinct groups studied (urban and rural) was that urban participants produced more means than their rural counterparts when providing solutions to the hypothetical vignettes in the MEPS task. In other words, urban participants could identify a greater number of steps for resolving the social situation at hand. There could be an association between the command of the language itself and using language as a tool to express social reasoning rather than through a more corporeal demonstration. Schooling models our ability to use language as a reasoning tool (Belzil, 2007), and may play a factor in the ability to phrase these steps into words. Montie, Xiang, and Schweinhart (2006) have suggested that cognitive performance in children can be directly affected by the instructor's language ability and by the structured activities that children are exposed to in a schooled setting.

Urban and rural participants also differed from each other in terms of how effective their solutions were, yet this is no indication that rural participants are less well versed in navigating a social environment than their urban counterparts. It is in a more detailed analysis of the responses themselves that a striking difference can be observed in the manner that some of these situations are resolved.

Urban participants are more likely to employ verbal tactics when planning and making their decisions on how to resolve a real life social problem. Urban participants appear to draw solutions that utilise words as a means to rectify a situation that is at odds. Their decision-making relies on implementing a verbal strategy rather than an action

strategy. Rural counterparts on the other hand offer resolutions where a more active, involved approach is used to gain favour or to make amends.

In some cases, rural participants may suggest violence or physical force to end the discord or the troubled social situation. Urban and rural participants appear to extrapolate solutions from a different database though no more important database of experiences, and hence formulate solutions and implement decisions that are most viable in the context in which they are working. It appears that at this point, experience gathered in daily social interactions as modelled in a pedagogic setting may be playing an important role in planning and decision making processes. Understanding daily interactions in the social realm, particularly understanding the influence of formal instruction in school and the experience that participants may have gathered, suggest factors that are being used in human cognition to make decisions in hypothetical real-life settings. This understanding could then be applied to real world scenarios. It is in essence the experience that is being gathered that is being applied in the immediate environment. It makes clear sense that the experience gathered in a rural setting would be more appropriate to navigate that particular environs. Reciprocally, experiences gathered in an urban setting would not be entirely suited in a rural environment.

Our finding that urban and rural participants resolve their situations using differing techniques are akin to those of Norenzayan et al (2002) and Kolinsky et al (1987) who agree that pedagogical practises might be at the origin of cultural differences in cognitive orientation. Ventura (2008) and Chavagay and Rogoff (2008, 2002) also suggest that western schooling practise can shape how we approach different problem-solving tasks within our daily life. Schooling appears to provide a structuring system that is unique in

terms of focus on verbal skills. Students are directly taught to suppress their physical actions and to instead use words to reason through a troubled social situation, such as a fall out with a friend. According to Bulwer-Lytton, “the pen is mightier than the sword.” Participants in schooled settings have been taught the use of verbal techniques over the use of physical techniques, and it appears that this provides a pool of reference from which to draw upon. In other words, schooled participants and non-schooled participants are both drawing upon their own experience in order to solve the social situations that crop up in their daily lives. The reason they are doing so in a different fashion, is that their actual experiences are different. Their problem solving and their decision-making are both shaped accordingly.

The literature on experience (Goddard et al., 1996) establishes that adults draw from their own understanding of the world to apply to every day life tasks, particularly those with an executive function attached to them. Our study reinforces our understanding of how this information can be uploaded into the conceptual software that is our problem solving abilities. We have demonstrated that both adults and children have this capacity, and replicated our own findings describing that experience may play a key role in social cognition. This finding is key as it serves to set up our next studies where experience is observed in adolescent real life decision-making.

Cultural factors may be playing a far greater role in the modelling of the responses. Culture as observed through parenting practises and through social structures may be producing the discrepancies observed, and this must be acknowledged. Most modern cities resemble each other in the world, with western influences playing a bigger part in the media and society structure. This is certainly a limitation that has to be considered as

part of the overall set of results observed. Culture has been shown to influence the way people comprehend their physical environment as well as their social environment, particularly in East Asian cultures (Ventura et al, 2008). However, there does appear to be certain elements of problem solving and decision-making that are universal. The use of experience is one such element that will be further explored in real life decision-making in the two continuing empirical chapters.

Urban and rural participants did not differ in their inhibitory abilities. Our previous study had initially focused on the Stroop as our measure of cognitive inhibitory ability. Developmentally, we did not find typical maturational patterns where speed was increased and error responses were reduced in a Stroop like measure (the Animal Stroop). Anecdotally, participants found this task too easy, even though the measure (Wright, Waterman, Prescott, & Murdoch-Eaton, 2003) has been replicated and validated for participants between the ages of 3 to 16-years of age. One possible suggestion would be to ensure that the same measure of cognitive inhibition be used in both studies. A measure such as the Go-no-Go task is developmentally sound and does not require literacy. As this study grew organically from the surprising results in Chapter 4, and the Stroop had already been employed the Animal Stroop was considered the most suitable option at the time.

Our sample size was moderate to small, though effects size analysis found the sample size more than suitable to work with (medium effect size $r = 0.3$). In order to make further overarching theoretical implications it is important that a larger sample is studied and compared to avoid sampling biases. Our results are unique and offer a tantalising glimpse at cultural differences that have been understudied. There are scant

psychological studies that have taken a more profound look at problem solving among unschooled populations, with much of this work falling into ethnographic realms spanning a different methodology than that of the social sciences. The results highlight the importance that experience may play in solving day-to-day problems. Hypothetical dilemmas that are universal in nature were looked at in this study and once again the importance of experience has been highlighted in the results. As in Chapter 4, in this study experience (as observed through hypothetical vignettes and through schooling) apparently plays an important role in the executive mechanisms that shape problem solving and ultimately decision-making.

The following chapter (Chapter 6) builds directly upon the last two chapters, where surprisingly experience has come to the forefront as a factor that could be playing an important role in shaping decision-making. The next chapters will further explore the mediating factors in problem solving and decision-making that shape real life. Trends in actual behaviour will be derived through anonymous responses in a questionnaire study. The factors surrounding risk taking will be explored via responses provided through a series of likert-styled questions and through vignettes. Understanding the mechanisms of decision-making and in particular poor decisions as observed through risk taking is of importance as it may help elucidate what underlying factors of decision-making lead to riskier and hence poorer decisions.

The following chapter will use our understanding of how adolescents may be using experience in order to more closely observe this experience. Adolescents will be asked to anonymously provide a description of how they have engaged in real life, risky, decision-

making situations. In this manner, the factors that are most important in decision-making will be highlighted.

CHAPTER 6

A QUESTIONNAIRE STUDY OF ADOLESCENT DECISION-MAKING

6.1. Introduction

It emerges from the findings in Chapters 4 and 5 that adolescents are equipped with social problem solving abilities equivalent to adults on MEPS tasks. That is they can demonstrate logical and reality-based reasoning when making decisions. Yet, it is also apparent that because adolescents engage in higher rates of risky behaviour than adults, it is necessary to go beyond understanding of decision-making skills to explore the factors that operate during adolescent decision-making (Steinberg, 2008). Culture, education and parental factors all are known to shape experience through childhood and adolescence. In principle young people are equipped to face challenging social problems with both formal knowledge and personal experience. However, when presented with decisions about potentially risky situations (such as using drugs or alcohol) young people often expose themselves to social and physical dangers. Indeed, young people put themselves at more risk than any other section of the population (Steinberg, 2007, Blum & Mmari, 2004). What is influencing this very high rate of poor decision-making, what experiences are being drawn upon?

Experience may be the source from where solutions to social problems appear to be drawn from as observed through MEPS tasks. In essence, with sufficient experience on the matter a six-year-old can be as effective as an adolescent in solving a hypothetical problem situation in their immediate social realm. In the two previous chapters there are no direct report of the engagement of the behaviours themselves, and this chapter will

improve on that by asking participants to report the engagement of behaviours they may possibly have experience in.

Understanding the interaction of factors, particularly experience, in adolescent decision-making is the focus of the present study. Real life decision-making will be focused upon, with seven distinct real life situations where teenagers are asked to make decisions. The role of gender, which has been the object of considerable debate, will be looked at this study in secondary instance. The experience that males and females may have in day-to-day situations may be very different, and as such males and females will be analysed separately in order to attempt to decipher if different experiences may be shaping decision-making. Findings of sex differences are inconsistent, with some studies reporting clear gender differences and others finding no real differentiation (Sorensen & Pechacek, 1986, West et al., 1993, Johnson et al., 1994, & Hudson, et al., 2007).

Age has also been shown to be an important factor in risk behaviour. For example, delay in the starting age of alcohol use from age of 12 to 13, reduced the risk of alcohol abuse in later adolescence (Grant & Dawson, 1997; Gruber, et al., 1996). In their study of 14 - 25 year-olds, Moore and Ohtsuka (1999) found that young gamblers were more likely to believe that gambling would provide the needed money, and that they could find the way of winning. Age differences were also found in the relationship amongst positive alcohol expectancies and alcohol involvement, with older adolescents sanctioning drinking more readily (Meier, Slutske, Arndt & Cadoret, 2007). Lundahl, et al. (1997) also found age differences on alcohol related expectancies, with a less fear based perception of drinking with maturation. Age was found to be an important factor in

beliefs about the personalized risk of smoking as well, with values placed on health as an outcome in younger participants (Chassin, Presson, Rose, & Shreman, 2001).

6.1.1. Study Aims

It is clear from the findings in Chapters 4 and 5 that adolescents are equipped with social problem solving abilities equivalent to adults on MEPS tasks. That is they can demonstrate logical and reality-based reasoning when making decisions. Yet, it is also apparent that because adolescents engage in higher rates of risky behaviour than adults, it is necessary to go beyond understanding of decision-making skills to explore the factors that operate during adolescent decision-making (Steinberg, 2008). The aim of this study is to examine adolescent decision-making in respect of challenging social situations involving risk or conflict. Specifically, the study is designed to tap into the factors operating in the sorts of social situations young people often find themselves in and explore the relative influence of these factors such as prior experience in arriving at decisions.

Using a qualitative approach, Rodham, Brewer, Mistral, & Stallard (2006) showed that the assumption that adolescents make rational decisions based on an appreciation of risk, and that misjudgements occur as a result of inexperience rather than of irrational decision-making, undeveloped cognitive abilities, or a perception of personal invulnerability. This is further supported by recent work by Fischhoff (2001, 2008), which demonstrated that poor decision-making by adolescents is not explained by irrational problem solving or the invulnerability hypothesis. These recent studies suggest that to better understand the decision-making processes one has to use methods that

encourage self-reflection. By asking adolescents to consider their own behaviours within the framework of real life problems this study aims to tap into adolescent decision-making processes (Fischhoff, 2001, 2008; Furby & Beyth-Marom, 1992) to better understand the factors that lead to risk taking, specifically risk that entails a negative consequence. Through a combination of closed questions and hypothetical vignettes inviting narrative responses, it is hoped to gather a fuller understanding of subtle changes that emerge during development and further explore the contribution of gender to adolescent decision-making.

6.2. Questionnaire Design

Using a questionnaire has a number of advantages over interviewing participants directly, especially when collecting data from a large number of participants. Questionnaires are meant to be easy to understand, they can be completed in a limited period of time, and are cost effective in terms of assessment and financial resources. It is also possible to conduct straightforward statistical analysis on the data, which are presented in a concise fashion, focused on the areas of interest to the researcher.

6.2.1. SALSUS (baseline)

Part of the intention of the present study was to build on and complement the findings of The Scottish Schools Adolescent Lifestyle and Substance Use Survey (SALSUS; 2004), which is undertaken by the Child and Adolescent Health Unit. SALSUS is a large-scale survey of young people in Scotland investigating their attitudes to smoking, drinking and drugs and the prevalence of these behaviours in this population.

SALSUS is conducted biennially for the government in Scotland and started in 1982 with the collection of data on smoking behaviour. Drinking behaviour was first examined in 1990 followed by drug use in 1998. In 2002 the survey examined lifestyle, social factors and substance use in S2 (aged 13 years) and S4 (aged (15 years), which was repeated in 2004 (n=7,062) and most recently in 2006 (n=23,180).

The SALSUS itself provides a detailed and comprehensive picture at both a national and local level of the frequency of smoking, drinking and drug use and the social context of the young people completing the questionnaire, including family structure, affluence and friendships. The frequency with which the SALSUS is carried out permits comparison across time and allows for exploration of trends, for example looking at the impact of health education messages on teenage behaviour.

Data collection in SALSUS is primarily through closed questions. The participant is guided step by step through the questionnaire from one question to the next as in the example provided below. The questions do not necessarily have to run in a sequential fashion, but they do adhere to asking about the same topic. The reader is asked to provide and answer from the responses available.

SALSUS Question 30 (2004)

During the last 7 days, how much beer, lager and cider have you drunk? *Please don't count drinks labelled low alcohol*

- Have not drunk beer, lager or cider in the last 7 days
- Less than half a pint
- Half a pint or more

Respondents are directed to the next question depending on which box they tick.

For example ticking the first two boxes leads respondents to Q33:

During the last 7 days how much shandy have you drunk?

- Have not drunk shandy in the last 7 days
- Less than half a pint
- Half a pint or more

Whereas ticking the last box on Q30 leads to the next question:

Question 31. Write in the boxes below, the number of pints, half pints, large cans, small cans and bottles of beer, lager and cider drunk in the last 7 days.

- Pints
- Half pints
- Large cans
- Small cans

The questionnaire developed for the present study was directly informed by the SALSUS. Initial question formatting was based on examples in the SALSUS. This was to ensure the use of well-validated questions, and where the topics are not covered in SALSUS, a well-validated question format. The following examples are taken from the questionnaire developed for this study:

Have you ever had a proper alcoholic drink, not just a sip? Yes No

If you have consumed alcohol, have you ever had enough alcohol where you felt you were no longer in control of your actions? Yes No

If you answered yes to the prior question, have you ever done anything you regretted or would have done differently while under the effects of alcohol. Yes No

In addition to these SALSUS-style questions, the questionnaire developed for this study also contained vignettes requiring participants to present a narrative response, for example:

*A. Lisa had never tried alcohol before, but her friends persuaded her to try some wine that was stored in their parent's house. She realised that after drinking one glass she was feeling pretty tipsy, and even though she did not want to have more she had two more glasses which made her very drunk. **Based on your experience or your knowledge of a similar situation, what would happen next and why?***

The format of these questions was informed by the MEPS scenarios used in the previous two studies (Chapters 4 and 5). However, instead of presenting a desired resolution to the social problems, this study used open-ended questions requiring participants to reflect upon personal experience or use personal knowledge in developing a response. Participants are required to engage with the question by writing their response rather than ticking a box. The vignettes are designed to establish situations that the participants may or may not have been encountered previously, but can reasonably be

expected to have some knowledge about, if not first hand, then through other channels such as peers, school or television.

Through the use of vignettes the present study hoped to add to the quantitative findings from SALSUS on the percentage occurrence of different behaviours by exploring something of the way in which young people make decisions about risky situations. The questions ask the participants to provide information that they know or have about the topic at hand. Alongside the SALSUS topics - smoking, drinking alcohol and drug use - the questionnaire also covers two other areas associated with risk-taking: sex and gambling. Two further sections were included to expand the scope of the study to other challenging situations young people encounter. The first of these explores relationships with family and peers with a view to investigating the participants' perspectives on these. The second examines issues around eating behaviour, which is included both as an issue of concern in adolescence but also to tap into adolescent thinking and understanding about mental health, alongside issues raised with alcohol and drug use.

SALSUS not only provides a well-validated scale as a foundation for the quantitative portion of this questionnaire. It also provides a measure of validity for the data collected with the new questionnaire, as it is possible to compare the percentage responses on key questions on both questionnaires. This in turn is important for establishing the validity of the qualitative questions.

The questionnaire itself was evaluated through a pilot study

6.2.3. Pilot study

The questionnaire was piloted on a total of 55 volunteers between the ages of 13 and 18, some of whom were recruited from the St Andrews' Scottish History and Creative Writing Summer programme and others who attended a local high school. Informed consent was obtained from all participants over 16 and from their parents for those under 16 years of age. The pilot study comprised two phases.

Phase 1. The first phase aimed to identify what the participants thought the questions meant, and whether there were any misinterpretations due to language or format, as well as gauging the adequacy of the length of the questionnaire. A total of 15 teenagers took part in this qualitative portion of the pilot study. Participants were asked to explain what they thought the questionnaire was actually asking of them and whether the questions themselves had any relevance to their daily life. Any discrepancies and suggestions from the participants were noted down, and changes were made accordingly before the second phase was carried out. The only substantial issues raised by the participants were the length of the questionnaire and that some of the questions appeared to be asking them for information they had already provided earlier. Open-ended questions that appeared redundant were exchanged for new questions broaching a different angle on the same topic. For example, a question talking about pregnancy was switched for a question talking about condom use during intercourse. This first pilot phase also demonstrated that the length of the questionnaire was excessive. Instead of presenting two open ended questions per topic, the number was reduced and two separate

versions of the questionnaire created, each with one question on each of the seven topics. Half an hour was set as a target time for completing the questionnaire.

Phase 2. This second pilot phase was completed by 40 participants, with the aim of testing the internal consistency of the questions (Table 6.1). As a result of this two questions were modified. In one the term “slumber party” was modified because of continuous misunderstanding of the term itself, and a question was shortened as there was more than one way to interpret it.

Table 6.1. Reliability of Phase 1 with Phase 2 Pilot data.

Topics	Items before 2nd phase of pilot	Items after 2nd phase of pilot	Cronbach’s Alpha of the remaining items
Smoking	8	6	.79
Drinking	2	2	.82
Gambling	8	6	.85
Personal Choices (Sex)	4	4	.76
Friendships	3	3	.75
Eating	2	2	.71
Drugs	4	3	.75

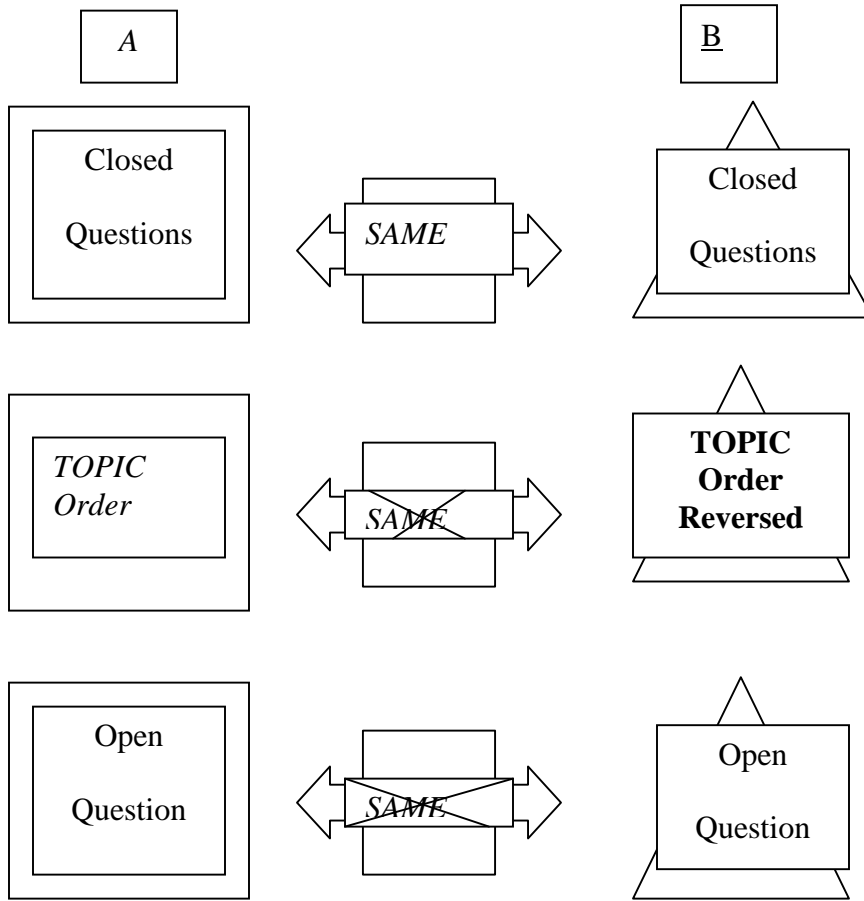
Questionnaire A and Questionnaire B were developed, each with a quantitative section for each topic and a vignette. Having two separate questionnaires allowed the researcher to counterbalance the presentation of the questions. The order of the

questionnaire was also reversed between questionnaire A and questionnaire B, accounting for any possible order effects that could present themselves.

6.2.4. Description of Final Version of Questionnaire A and Questionnaire B

There were two distinct, yet structurally identical versions of the questionnaire, version A and version B. While all the closed questions remained the same for both versions, the order of the topics was reversed in version B to counterbalance the design as well as to remove any order of presentation bias. Questionnaire A introduces smoking first and finished with gambling. Questionnaire B commenced with Gambling and concluded with smoking (Figure 6.1.).

Figure 6.1. Set up of Questionnaire Study, Version A and Version B



The open-ended question for Questionnaire B was also different from that of Questionnaire A. A total of two questions were developed for each topic. One question was presented in version A, the second question was presented in version B. Please refer to the diagram below showing the similarities and differences of the set up of the questionnaire.

Structure of the Questionnaire

On the frontispiece of the questionnaire (A & B) there was a total of four paragraphs which set out the following: a) Purpose of the Study, b) Confidential nature and anonymity of the questionnaire, c) Request to consider the questions thoroughly and to express personal thoughts and not those others may hold (to avoid Social Desirability Bias), and d) Request to read the simple instructions for each topic and an appeal to answer all questions as well as they knew how.

On the second page participants were asked to fill in their gender, provide current year of schooling (e.g. S2) for logistical purposes and their age in terms of year of birth and month of birth. If this information was not filled in, then the questionnaire itself was invalidated.

On the third page the actual questionnaire began. The closed response questions (yes / no) were presented first in order to allow the participant to consider the risk behaviour itself. This allows for the vignette, open-ended question that follows to have an appropriate introduction where the participant can reflect on the risk behaviour itself. By introducing the topic in this manner, there is an element of self-assessment that can occur. The participant is indirectly being asked to think about his behaviour and following this is then asked to provide what steps he/she would take from personal experience or knowledge regarding the risk behaviour presented (Table 6.2.).

Table 6.2. Number of Closed Questions and Open Questions in Questionnaire

	SALSUS Inspired Questions	Total Closed Questions	Total Open Questions A and B
Drinking	2	4	2
Smoking	3	3	2
Drug Taking	3	3	2
Gambling	0	2	2
Sexual Behaviour	0	2	2
Eating	0	3	2
Friendships	0	2	2
Total	8	19	14

After the closed questions were presented, there was one open question for each of the two questionnaires. For each topic there was either Question A, or Question B. Each topic had two separate open-ended questions, both probing similar yet distinct aspects of the topic itself. Each of the small vignettes concluded with: “*Based on your experience or your knowledge of a similar situation, what would happen next and why?*” Each of the open-ended questions asked concluded with the same sentence, providing a structural link between all of the open-ended questions. The initial portion of the questions related to a real life situation that the participants may or may not have come across, but of which they may have distinct knowledge about. Participants were asked explicitly to use knowledge or their experience to respond to the vignette in order to tap into real life problem solving and decision-making.

6.3 Method

6.3.1 Participants

A total of six hundred and five young people were recruited to take part in the study from four high schools in Dundee in the East of Scotland.

Participants were recruited using a judgment sampling strategy. The Dundee School population was the most socio-economically diverse school system that could cater to a study this size in the vicinity of St Andrews. A judgement was made that Dundee Schools could provide a close approximation of what the general Scottish population was like in terms of decision-making processes.

6.3.2 Recruitment

Ethical Approval

Ethical approval for the project was received from the School of Psychology at the University of St Andrews. Permission to approach high schools in Dundee was granted by the Dundee City Council Education Department. On receipt of this approval approaches were made to the Head Teachers of all 12 high schools in Dundee for permission to run the questionnaire study. Three out of the 12 schools agreed to participate.

6.3.3. Schools

School 1 (n= 256)

School 1 forms part of the Dundee City Council schooling system, but is located on the edge of the city. School 1 is a non-denominational school, and at the time of this

study had approximately 900 students on its roll. As a measure of socio-economic tendency within the school, the percentage of pupils entitled to a free-school meal at School 1 was obtained for 2004, 5.2%. The national average for Dundee is 20%, and for Scotland was 13.2% in Scotland. The percentage for this school fell sharply below the national average, suggesting that parents stood on solid socio-economic ground (Dundee City Council, 2004). The measure, though imperfect, allowed for a rough categorization of participant socio-economic status.

Her Majesty's Inspectorate (HMI) of Education rated the overall quality of the curriculum of School 1 as very good. The overall quality of attainment at all levels was good as well. Of particular relevance to this study the HMI found that pastoral welfare was good. PSE and Social Education classes were judged successful in teaching key aspects of relationships, health education, sexual health, and decision-making. The overall quality of staff support was found to be very good.

School 2 (n= 128)

School 2 included religious teaching and serves part of west and central Dundee. The school roll was approximately 900 at the time of the study. In terms of the socio-economic make up of the school population, free school meals fell in line with the national average during this particular school year. In this school (2004), the average was 14.3%, with the average in Dundee being 20%, and the national average 13.2%.

The general attainment of this school was rated as fair to weak by the HMI, and achievement in standard grades was slightly below the national average. A strong religious ethos was imparted to the students, particularly through music and after school

activities. An appropriate Social Education and PSE program was in place, though overall the teaching levels varied quite dramatically. The PSE covered a range of topics, including personal safety, drugs, personal relationships, and careers, as reported on the HMI report for that school year.

At the time of the study this school was housed in a temporary structure as the school building was undergoing redevelopment. Heavy construction work and relocation hampered recruitment, as older and younger participants were located on separate campuses. This resulted in a narrow recruitment of students from this school.

School 3 (n= 211)

School 3 is a non-denominational school situated in the West of Dundee. At the time of this study, approximately 815 students were enrolled. The percentage of students who were entitled to free meals was above average (23%), placing the students in a more impoverished socio-economic bracket than pupils attending schools 1 and 2. The city average for Dundee is 20%, and for Scotland 13.3%. Pupil attendance was also below average at school 3.

School 3 had a poor reputation within Dundee although a recent survey of parents had elicited positive views about the school and a belief that its reputation was slowly improving. HMI noted learning and teaching were weak overall, though other aspects of the school such as leadership, pastoral care, and curricular guidance were rated as satisfactory to good. In particular, it was found that the PSE programme covered an appropriate range of topics including healthy lifestyles, substance abuse, personal relationships, and citizenship.

The general attainment of this school were rated only as fair to weak by the HMI, and achievement in standard grades was slightly below the national average. A strong religious ethos was imparted among the students, particularly through music and after school activities. An appropriate Social Education and PSE program was in place, though overall the teaching levels varied quite dramatically. The PSE covered a range of topics, including personal safety, drugs, personal relationships, and careers.

6.3.4. Opt In /Opt Out

Head Teachers of the schools involved gave permission for participants to “opt out” of the study rather than “opt in”, which would have meant that individual parental permission would have been necessary for the study to be conducted. Parents were aware that the study was to be conducted and could ask for their child to be excluded if they were not of age to consent. Further to parental approval via the “opt-out” system, all pupils were given the option to opt out of the study or not complete the questionnaire if they did not want to. Participants were encouraged to do other work if they did not want to complete the questionnaire itself, which took approximately 25 minutes. It was agreed by the Head Teacher of each school that logistically speaking it would be easier that the questionnaire itself were to be seen as part of the Social Education curriculum rather than as a separate item during the school day. Consent forms and letters for parents to “opt in” (Appendix 3) were developed, but were not distributed as the “opt out” option was agreed upon as the most suitable of the options.

6.3.5. Inclusion Criteria

Although a total of 605 took part in the study only 548 were included in the final analysis. In order to be included in this study the main criteria was that respondents answered at least 50% of the survey questions and that gender and age were filled in correctly. Answering less than half of the questions could signify participant comfort levels were breached or demonstrated a general misunderstanding or general apathy. It is possible participants genuinely forgot to answer questions, but at more than 50% then it creates cause for concern. Excluding age or gender was also a reason to remove data from analysis. Without appropriate age or gender it would not be possible to process and analyse the data retrieved. If less than 50% of the questions were answered and neither gender nor age were included, the participant questionnaire was excluded from general analysis. As there was such a small sample of 18 year-old participants ($n = 5$), and the sample consisted mostly of School Prefects, it was considered that this sample could potentially skew the analysis and they were removed from general analysis. Furthermore, the small number of 12 year olds who took part was combined with 13-year-olds for the purpose of analysis.

Demographic information on the 548 cases who were included is summarised in Table 6.3. There were similar numbers of male and female participants in the sample. The sample ranged between the ages of 12 to 18, with the largest age group being 14-year-olds. The researcher did not have control over the sample recruited, which depended on school number and participation within school (see 6.3.7 below-Procedure section)

Table 6.3. Number and Percent of the sample included in the analysis

		Number	Percentage
Gender	Males	266	48.5%
	Females	282	51.5%
Age	12	13	2.4%
	13	118	21.5%
	14	202	36.9%
	15	89	16.2%
	16	58	10.6%
	17	63	11.5%
	18 (not included in analysis)	5	.9%
	Mean age	15	
	SD	1.34	
	Range	6	

6.3.6. Materials

An information sheet for participants explained the main purposes of the study, why the particular participant was chosen, what will happen during the participation, what will happen with the data, that the participant has the right to withdraw from the participation at any time, and that their data will be removed from the analysis if they desire (Appendix 3). Thus, the issues of anonymity, confidentiality, the right to withdraw without giving reasons, and the right to omit questions they did not want to answer were made known prior to participation

The questionnaire was designed to cater for students of mixed ability, and there was no expectation of the length of answers that needed to be provided in the open-ended questions (vignettes) section of the questionnaire. By completing the questionnaires the

participants were consenting to participate in the research. This knowledge was included at the beginning of the questionnaires, and every participant had the opportunity to opt out. No payment was offered to the participants, and the questionnaire was not a requirement for the sheet with relevant phone lines or contacts that was provided.

A list of agencies providing an anonymous service for teenagers in regards to any issues covered in the questionnaire (smoking, drinking, drug taking, sexual behaviour, gambling, eating, and time spent with friends) was given to all participants upon the completion of the questionnaire. These services all provided confidential help to anyone who contacts them and the listings provided were up to date for that year.

6.3.7. Procedure

School 1 was the only High School where the researcher was able to talk to all participants at once during a school assembly period. At this meeting it was conveyed to the students a) what the purpose of the study was, b) how to fill out the questionnaire, c) the fact the questionnaire was anonymous and that no member of the school staff would see it, d) the importance of the questionnaire in being able to understand decision-making processes, and e) the ability to opt out from doing it and or not filling in all questions if they felt uncomfortable doing so. Information about the study was given to each participant on the front cover of the questionnaire itself credit in the class.

For the other two schools (School 2 and School 3), the personal and social education (PSE) teachers in the schools administered the questionnaires during a normal classroom session. Teachers received very clear instructions on: a) what the study was about b) assurances about confidentiality and anonymity for students who were taking

part in the study c) explanations for how to conduct the study d) stressing that if participants were not happy about answering a certain question that they should not answer it e) and that students should work at their own pace, and if they finished early were to continue with work of their own and should not be talking to others, f) and that that this was to be done individually and other people's answers were not needed. Upon completion of the questionnaire, participants were given a sheet with useful numbers of organisations where they could call in case any of the questions in the questionnaire itself had raised any concerns or issues. Participants were also told they could ask a teacher or the researcher if they had any further issues or concerns that they wanted to address to ensure that the participant's welfare was safeguarded upon the completion of the study itself. The same associations who could offer help to students could offer help to any of the Social Education/PSE teachers themselves if they deemed necessary as well.

6.3.8. Data analysis - Logistic regression

The data were analysed using a logistic regression. When the dependent variable is dichotomous, direct logistic regression analysis can be employed in order to predict what category a respondent will belong to from a set of variables that are continuous, discrete, dichotomous, or a mix. Logistic regression is applicable in this instance because no assumptions need to be made about the normal distribution, linear relation, or equal variance of the predictor variables (Tabachnik and Fidell, 2001). One limitation is that logistic regression does not provide a measure that is as meaningful as a beta value in multiple regression to determine how important the predictors are in relation to each other. While the assumptions for logistic regression are not as stringent as those for

multiple regression, in order to fit the applicability of this test there must be a linear relationship between continuous predictors and the logit transformation of the dependent variable (Tabachnick and Fidell, 2001). These factors were satisfied with the Homer & Lemeshow Test (Box Tidwell Approach, 1989) using SPSS. High p-values ($p > .1$) were observed for all tests done. This signified that the data were adequately fit to the model that was produced. Logistic regression is also sensitive to extremely high correlations among independent variables (Tabachnick and Fidell, 2001). Correlations were run for all data prior to analysis, and there were not any sufficiently high correlations to account for skewness in the data. “Goodness of fit” tests are not relevant to this model since all the independent variables were dichotomous or interval level and entered as covariates for ease of analysis. In order to further test whether the model would at all be changed if the variables were entered as covariates or factors, several logistic regression were run with all of the dichotomous variables entered as factors. In all cases the results were substantially similar.

Age groups were collapsed for purposes of analysis into 4 distinct age group: 12 to 13 year-olds were collapsed into a group composed of 131 participants, 14 year-olds remained unchanged at 202 participants, 15 year-olds were 89 participants, 16 year-olds are 58, and 17 and 18-year olds were collapsed as one group with 63 participants. A total of 5 cases were not included in the analysis (18 –year-olds) as their small sample size was considered inadequate to garner any adequate data from.

6.4. Results

The quantitative data gathered from the questionnaire are examined below and the qualitative data collected using the vignettes are contained in Chapter 7.

6.4.1 – Results Overview

The data are presented on each topic in two ways to facilitate comparison with the SALSUS results of the year 2004, the same year this questionnaire was administered. This allows for the exploration of age and sex differences in this particular sample. The results are presented in terms of the percentage of “yes” responses to closed questions by age and gender.

The topics are considered in the following order: Alcohol, Drugs, Gambling, Smoking, Personal Choices (Sex), Friendship, and Eating.

6.4.2. Alcohol

Participants were initially asked if they had had an alcoholic drink, not simply sampled one. Table 6.4 reveals that 72.5% of the youngest age group (12/13 year-olds) had drunk alcohol. This is slightly higher than the 68% of the 13-year-olds in SALSUS 2004. By age 15, consumption levels in the present study were nearing 100% (Table 6.4), but then levelled off slightly. This compares with the 88% of 15-year-olds reported to have drunk alcohol in SALSUS (2004).

Participants were asked if when having had alcohol, they ever felt they were no longer in control of their own actions. A developmental trend was suggested with the younger participants claiming that they have been out of control at least 40% of the time

when imbibing alcohol, rising to over three-quarters of the oldest age groups (17 year-olds). A similar pattern was observed in respect of regretting their actions after consuming alcohol, with responses rising from 25% in the youngest group to 62% in the oldest group. In SALSUS (2004) these issues were addressed by asking what the consequences of drinking were, and if they ever drank to excess – hence there is no immediately comparable figure.

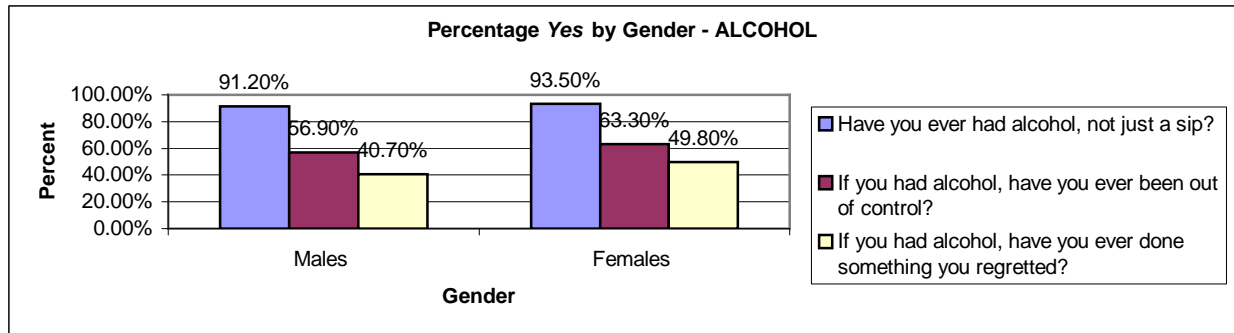
Table 6.4. Percentage of “Yes” responses to alcohol questions by age

	12 - 13	14	15	16	17
	N = 131	N = 202	N = 89	N = 58	N = 63
Have you ever had alcohol, not just a sip?	72.5%	78.2%	98.3%	96.3%	96.5%
If you had alcohol, have you ever been out of control?	39.5%	69.2%	68.3%	64.8%	76.2%
If you had alcohol, have you ever done something you regretted?	24.5%	48.9%	45%	50%	61.9%
If you have alcohol, how often? Only weekends?	31.4%	35.4%	38.3%	40.8%	21.2%
If you have alcohol, how often? More than the weekends?	1.9%	10.5%	6.7%	11.1%	16.9%
If you have alcohol, how often? Rarely?	37.8%	49.6%	58.3%	44.4%	21.2%
If you have alcohol, how often? Never?	28.9%	4.5%	5.8%	3.7%	3.45%

In terms of their drinking patterns, one-third of 12 to 13-year-olds reported drinking alcohol at least once a week (Figure 6.2.), compared with only 13% of the same age group in SALSUS 2004. Though according to SALSUS (2004) drinking patterns in Scotland remained unchanged for many years, this present study appears to produce a localised trend among younger participants when juxtaposed with the overall trends for

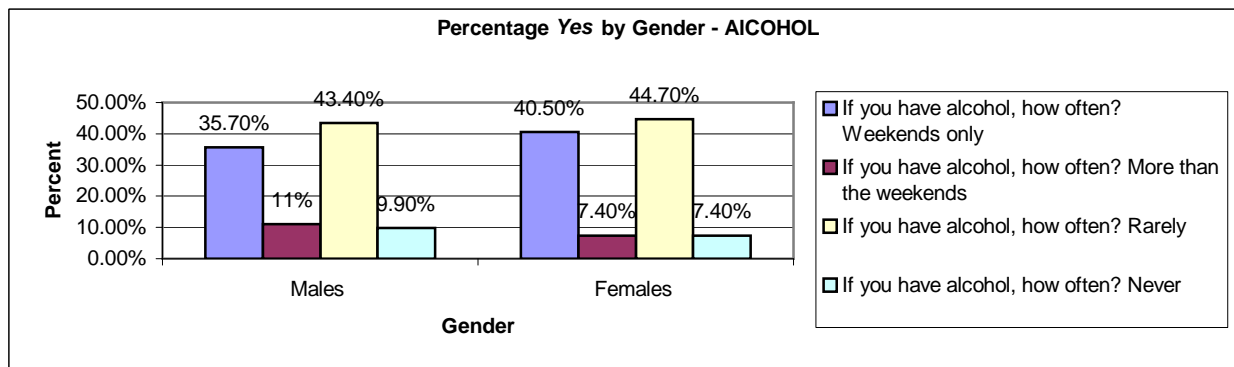
Scotland. The percentage was slightly higher overall when looking at 15-year-olds, with 38% of them claiming (34% for SALSUS 2004) they imbibed alcohol at least once a week, particularly during the weekend.

Figure 6.2. Percentage of “Yes” responses to alcohol questions by gender



Drinking patterns were similar between males and females although more females claimed to drink alcohol than males (Figure 6.2). Respondents of both sexes acknowledged engaging with alcohol and consuming it to the point where they had lost control of their actions. Ten percent more females claimed to have regretted their actions under the influence of alcohol than males (Figure 6.2).

Figure 6.3. Percentage of “Yes” responses for key alcohol questions by gender



Almost ten percent of boys and 7.4% of girls said that they never drink alcohol (Figure 6.3). Of those that do drink 40.5% of girls and 35.7% of boys reported only drinking at weekends with a further eleven percent of boys and 7.4% of girls drinking during the week as well. The largest number of drinkers claimed to fit into the “rarely” drink category, with 43.40% of boys and 44.70% of the girls claiming to drink very moderately. From this, it appears that among those who consider themselves regular drinkers young females stand out more prominently as “weekend” drinkers.

A logistic regression analysis was performed with the amount of alcohol consumed as the independent variable. This variable was transformed into a dichotomous variable by dummy coding responses into 0 or 1 depending on whether alcohol was consumed during the weekends or more than the weekends or whether alcohol was consumed rarely or never. By making these changes it is possible to observe what factors may predict the influence of a participant drinking moderately to highly or drinking in a conservative fashion to nil fashion. The DV values for this logistic regression were gender, age, whether participants smoked or not, whether participants took drugs or not, whether

participants took drugs and alcohol, and time spent with friends after school and in the evenings. A total of 543 cases were analysed and the full model significantly predicted rate of alcohol consumption (omnibus chi-square = 74.08, df = 11, $p < .00005$). This model accounted for 12.6% to 19.8% of the variance in alcohol consumption, with 67.8% of those drinking weekends and more than weekends predicted.

Table 6.5 Significant Variables in the Equation – Prediction of Amount of Alcohol Consumption (Yes)

	B	S.E.	Wald	df	Sig.	Exp(B)
Age (16/17)	-1.204	.30	15.7	1	$p < .00005$.30
Alcohol Yes	0.67	0.27	6.13	1	$p = 0.013$	1.96
Alcohol Out of Control	0.56	0.19	9.17	1	$p = 0.002$	1.75
Smoking	-1.09	0.28	15.07	1	$p < .00005$	0.34
Drug Taking	-0.57	0.28	4.27	1	$p = 0.039$	0.56
Time Friends Day	-0.14	0.06	4.99	1	$p = 0.025$	0.87
Time Friends Evening	-0.07	0.07	0.95	1	$p < .00005$	0.94

The following variables successfully predicted the degree and the amount of alcohol consumption: *alcohol consumption, having done something regrettable while drinking (yes), smoking (yes), drug taking (drug taking), time spent with friends directly after school, time spent with friends in the evenings* (Table 6.5). In essence, the factors most liable to predict greater amount of drinking would be the maturity of the participant, the consumption of other drugs such as tobacco or other non-prescription drugs (i.e marijuana) and time spent with peers both immediately after school. These factors could together help explain the influences that may exist on someone to drink. Though it is possible that the addition of other factors could change to some extent the significance of

the factors observed in the table below, the model provided strongly suggests that these factors in conjunction play a role in the decision-making process for smoking. No gender influence was observed for this factor.

6.4.3 Drugs

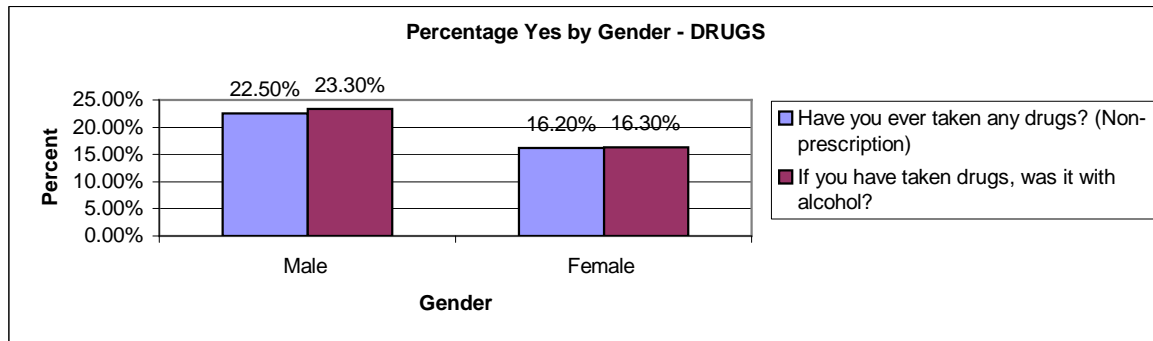
Drug taking was not as widespread as the use of alcohol within the sample population. Until the age of 17, drug taking in general was fairly stable between 15 and 20% (Table 6.4), after which it rose to 33%. The national trend (SALSUS 2004) showed that 13% of 13-year-olds stated that they had ever used drugs, whereas 35% of 15-year-olds stated they had used drugs, far higher than the 15.9% of this questionnaire (Table 6.6).

Table 6.6. Percentage of “Yes” Responses to drug questions by age

	12 to 13	14	15	16	17
Have you ever taken any drugs? (Non-prescription)	15.75%	17.40%	15.90%	19.40%	32.35%
If you have taken drugs, was it with alcohol?	18.60%	19.30%	13%	22.60%	48.40%

Drug taking appears to have a link with alcohol intake, with 18.6% of all 12 to 13-year-olds stating that they took drugs. Nationwide results by the SALSUS (2004) suggest that cannabis is the most frequently reported drug in this age group, though the present study did not ask this question directly as it was deemed inappropriate by the ethics board. By the age of seventeen, there was an increase in the mix of both alcohol and drugs combined use with half of the population stating that they had used both together.

Figure 6.4. Percentage of “Yes” Responses to drug questions by gender



Males and females reported roughly equal amount of drug use either alone or with alcohol (Figure 6.4.).

Drug taking or whether someone had tried drugs was the DV for a logistic regression performed looking at the following independent variables as possible predicting factors: gender, age, alcohol consumption, had alcohol and been out of control, had alcohol and done something you regretted, smoking, doing drugs and alcohol, time spent with friends daytime, time spent with friends evening. A total of 543 participants were successfully analysed and the full model significantly predicted drug taking (omnibus chi-square 191, $df = 11$, $p < .0005$). The model accounted for between 30 and 46% of the variance in drug taking, with 95% of those who did take drugs successfully predicted. The percentage for those not taking drugs was modelled successfully at 49% correct. Overall, 86% of the predictions made through this model were correct.

The following variables were most likely to predict drug taking: *gender (males)*, *age (15)*, *age (14)* whether alcohol was consumed (yes), whether something regretful was done under the influence of alcohol (yes), smoking (yes), and taking drugs and alcohol

together (yes) (Table 6.7). Males are more likely to consume drugs than females. Being aged 14 and 15 was also a factor.

Table 6.7 Significant Variables in the Equation – Predictors of Drug Consumption (Yes)

	B	S.E.	Wald	df	Sig.	Exp(B)
Gender (Males)	-0.61	0.27	5.05	1	p = 0.025	0.54
Alcohol Yes	-2.85	1.05	7.34	1	p = 0.007	0.06
Alcohol and Regret	0.71	0.27	6.53	1	p = 0.011	2.03
Smoking Yes	-1.51	0.33	21.19	1	p < .00005	0.22
Drugs and Alcohol						
Yes	2.57	0.31	71.28	1	p < .00005	13.11
Age – 15 years-old	1.10	0.47	5.52	1	p = 0.019	3.01
Age – 14 years-old	0.82	0.38	4.64	1	p = 0.031	2.27

6.4.4 Gambling

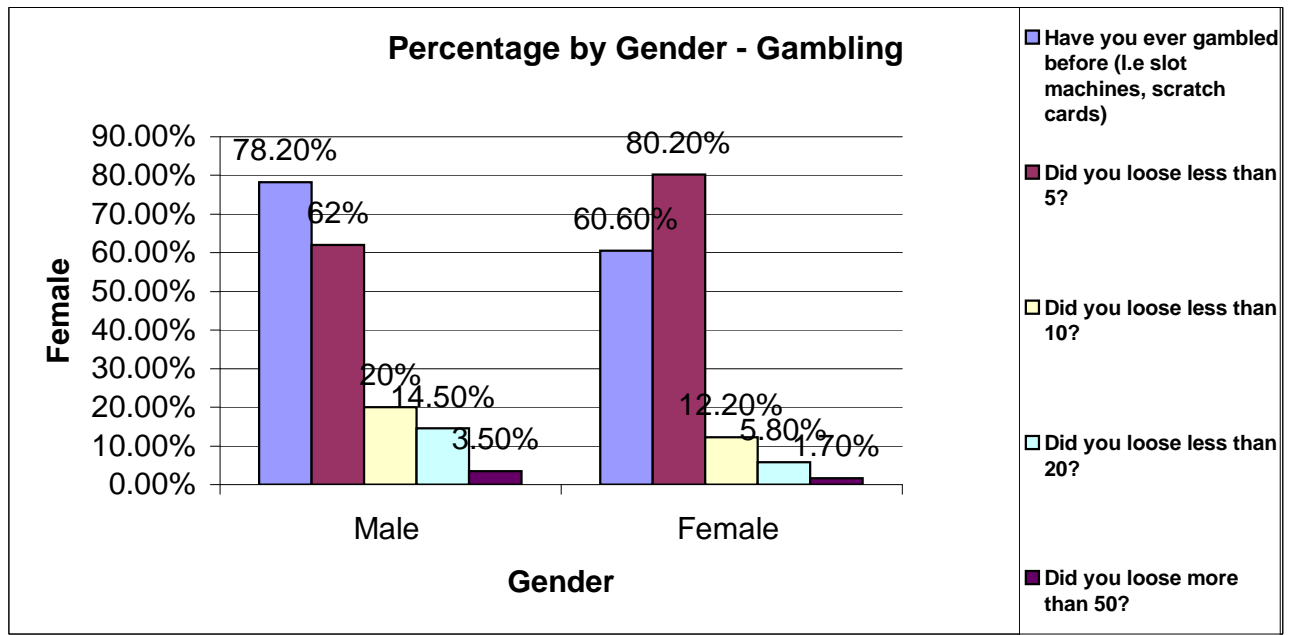
Seventy one percent of 12 to 13-year-olds in the sample have gambled. This figure lowered to just over half for 16 year-olds. Only those 16 and older had reached the legal age to gamble, the rest had done so illegally. The average loss reported was £5, although about one-fifth of 12 to 13 year olds reported losses of up to £10, which is a considerable amount for one who is not earning a salary (Table 6.8).

Table 6.8. Percentage of “Yes” responses to gambling questions by age

	12 -13	14	15	16	17
Have you ever gambled before (e.g. slot machines, scratch cards)	71.1%	74.7%	71.9%	53.2%	64.3%
How much have you lost? Less than 5	69.5%	68.5%	63.5%	75.8%	73%
How much have you lost? Less than 10	25.5%	16.8%	23.8%	15.2%	8.1%
How much have you lost? Less than 20	3.2%	12.8%	23.8%	15.2%	16.2%
How much have you lost? More than 50	1.9%	2%	4.8%	0%	2.7%

More males (78.2%) are prone to gamble than females (60.6%), and if a female does gamble usually the largest amount lost will be 5 pounds or less whereas as a male would be more likely to spend roughly 10 pounds or more when gambling (See Figure 6.5).

Figure 6.5. Percentage of “Yes” responses to gambling questions by gender



A logistic regression analysis was performed with Gambling as the dv and age, gender, alcohol consumption, rate of alcohol consumption, drug taking, drug taking with alcohol, time spent with friends after school, and time spent with friends in the evening. A total of 543 cases were analysed and the full model did significantly predict whether someone would be likely to gamble or not (omnibus chi-square = 70.2, df = 19, $p < .00005$). The model that was developed could account for 12% and 17% of the variance observed, with 91.4% of those who gambled predicted successfully. Only 24.7% of those who did not gamble were predicted successfully, however overall 71.2% of the predictions were accurate.

Table 6.9 Significant Variables in the Equation – Predictors of Gambling (Yes)

	B	S.E.	Wald	df	Sig.	Exp(B)
Gender (Male)	-0.70	0.20	11.49	1	p < .005	0.50
Friends After School			22.27	6	p < 0.005	
1 Day After School	-1.28	0.59	4.67	1	p = .03	0.28
Friends Evenings			14.18	6	p = .02	
2 Evenings a Week	1.15	0.51	5.07	1	p = .02	3.17

The following variables were successful at predicting the rate of gambling as observed through the corrected model: *gender (male)*, *time spent with friends after school*, and *time spent with friends in the evening* (table 6.9). Males are more likely to gamble than females but no age differences were observed.

6.4.5 Smoking

For as long as the SALSUS has been charting smoking within Scotland, a general trend for decline in numbers smoking has been observed. The SALSUS (2004) reported that 6% of 13-year-olds were regular smokers, a very different figure to the 16.5% of 12 to 13-year-olds who claimed to have smoked. It must be noted that the present questionnaire asked the question in a different format than that of the SALSUS. This questionnaire ascertained if the participants were smokers at present, not whether they considered themselves regular smokers. None the less, a ten percent discrepancy between

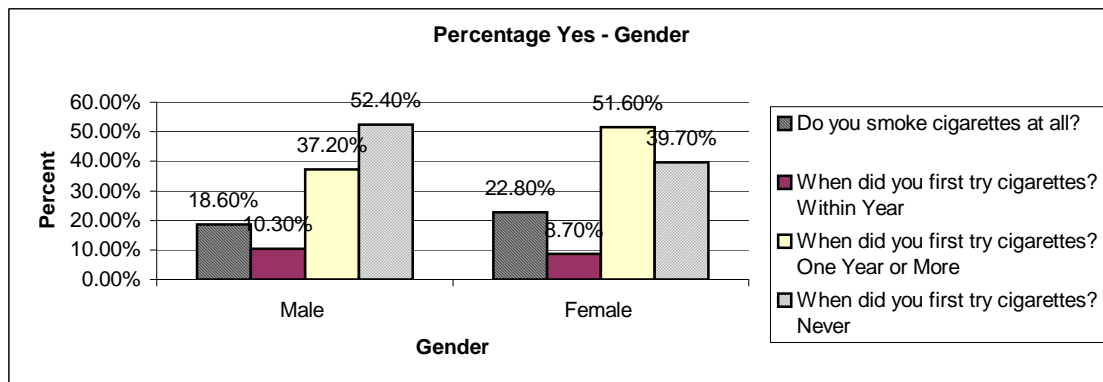
our statistics and those of the SALSUS exist, underlining possible regional discrepancies. Comparatively, 15-year-olds in a nationwide survey (SALSUS, 2004) claimed that 24% of them were regular smokers, with a slightly higher number reported by the 15-year-olds in this study with 33.3%. It should be noted that there is a sharp decline in smoking at 17 years of age, with the largest prevalence of smoking during the mid teens (Table 6.10).

Table 6.10. Percentage of “Yes” Responses to smoking questions by age

	12 - 13	14	15	16	17
Do you smoke cigarettes at all?	16.50%	19.70%	33.30%	31.30%	21.90%
When did you first try cigarettes? Within Year?	12.60%	4.50%	4.20%	15.60%	14.30%
When did you first try cigarettes? One Year or More?	17.30%	38.60%	62.50%	78.10%	81%
When did you first try cigarettes? Never ?	70.10%	56.80%	33.30%	6.30%	4.80%

Participants were asked to note how long ago they had first tried cigarettes. Over 70% of 12 to 13 –year-olds had avoided smoking cigarettes, but there is a clear developmental trend present with only 4.80% of 17-year-olds claiming to have avoided smoking altogether (Table 6.10). Most participants claim to have tried cigarettes within the year that they were surveyed. At present, in the United Kingdom, cigarette sales for anyone under the age of 18 have been banned (UK Government, 2008). In 2004, the minimum age for buying cigarettes was 16 years of age. A total of four-fifths of all participants claimed to have smoked within the year at the age of 16. This means that 80% of the underage population had access to cigarettes when they were not legally entitled to do so.

Figure 6.6. Percentage of “Yes” Responses to smoking questions by gender



More females than males claim to be cigarette smokers, which fall in line with the fact that declines in smoking have only been recorded amongst males within Scotland (SALSUS, 2004, 2006). Notably, more females have tried cigarette smoking at a younger age than their male counterparts, and more males than females have actually abstained from cigarette smoking period (Figure 6.6).

A logistic regression was performed for the dependent variable smoker or non smoker; with the following factors used as independent variables that could predict the inclusion into the smoking category: gender, age, time spent with friends after school and during the evening. An omnibus chi-square (chi-square = 75.41, df = 8, p <.0005) successfully predicted inclusion into the smoking group. The model accounted for between 13% and 22% of the variance, with 96.9 % of the smokers predicted and 13.2% of the non-smokers predicted. Overall the model predicted the very high rate of 83% percent correct for all measures.

The factors most likely to influence whether someone became a smoker or not were the following: *gender (female), high alcohol consumption (yes), and drug taking (yes)* (Table 6.11).

Table 6.11. Significant Variables in the Equation – Predictors of Smoking (Yes)

	B	S.E.	Wald	df	Sig.	Exp(B)
Alcohol						
Consumption	-1.05	0.28	14.33	1	p < .005	0.35
Drug Taking						
(Yes)	-1.59	0.27	34.74	1	p < .0005	0.20
Gender (Male)	0.60	0.26	5.43	1	p < .02	1.83

In other words, being a female, alcohol drinker and consumer of drugs you would be more likely to smoke. A combination of these factors could work together to predict the level of smoking recorded. A trend of significance was observed for the influence of friends at $p=.053$. This lay above the $p < .05$ threshold used, however it is noted as a suggestive trend. When analysis was rerun simply with age, gender, and time spent with friends the model successfully predicted time spent with *friends during the daytime as a factor* ($p = .014$, $p < .05$) influencing smoking. No age differences were observed as predictive in inclusion to smoking.

6.4.6. Sexual behaviour

There was a clear developmental trend in terms of the affirmative responses given when asked about sexual behaviour. A sensitive subject at all times, most participants at age 12 and 13 responded “yes: around 14.20% regarding having had intercourse. Unlike the SALSUS (2004), this questionnaire did not inquire about sexual behaviour other than intercourse (ie. heavy petting, kissing). As participants mature the number having had

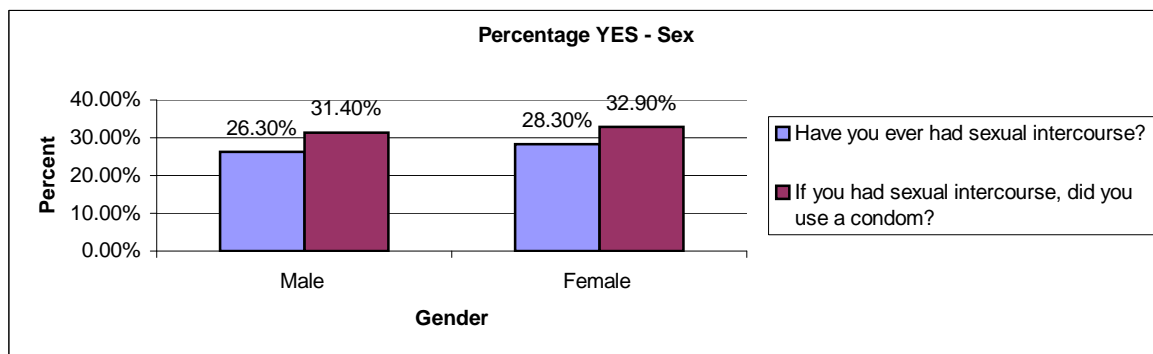
intercourse grows so that by age 17, 71.9% of all participants surveyed claim to be sexually active or have had a sexual experience (Table 6.12).

Table 6.12. Percentage of “Yes” responses to sex questions by age

	12 - 13	14	15	16	17
Have you ever had sexual intercourse?	14.2%	20.5%	25.8%	40.3%	71.9%
If you had sexual intercourse, did you use a condom?	12%	21.2%	56.7%	56%	73.3%

The same can be observed with the use of condoms. Their use increases with age as well, with an extremely low percentage of condom use at age 12 to 13, 12%, suggesting quite markedly that those who engage sexually at a younger age are more likely to be exposing themselves to potentially dangerous Sexually Transmitted Infections (Table 6.12)

Figure 6.7. Percentage of “Yes” responses to sex questions by gender



Males and females were quite similar in terms of their general behaviour, with girls reporting slightly higher amount of intercourse and a slightly higher level of disregard for condom use (Figure 6.7)

A logistic regression was performed for the dependent variable having sexual relations (yes or no), with gender, age, alcohol consumption, drug taking, drug and alcohol consumption, time spent with friends after school and time spent with friends in the evening as predictor variables for this model. A total of 543 cases were successfully incorporated into the model and the full model significantly predicted whether one would have sexual relations based on the predictor variables (omnibus chi-square, $df = 19$, $p < .0005$). The model accounted for between 13.5 and 19.3 percent of the variance in whether a participant would have sex or not, with 91.3% of those having sex successfully predicted. A total of 32.9% of those not having sex were successfully predicted, with an overall percentage average correct resting at 74.8%.

Table 6.13. Significant Variables in the Equation – Predictors of Sexual Relations (Yes)

	B	S.E.	Wald	df	Sig.	Exp(B)
Time with friends						
after school			11.33	6	p = 0.007	
1 Day	1.35	0.63	4.56	1	p = 0.03	0.26
3 Days	1.90	0.64	8.80	1	p < .005	0.149
4 Days	1.43	0.651	4.84	1	p = .02	0.24
Time with friends in						
the evening			40.11	6	p < .00005	0.24
1 Evening	1.30	0.56	5.47	1	p = .019	0.27
2 Evenings	0.99	0.47	4.39	1	p = .03	0.37
5 Evenings	1.04	0.54	3.70	1	p = .054	2.84

In terms of this model only *time spent with friends after school and evenings* successfully predicted whether someone would have sex based on the data provided by participants. In particular, participants who spent 1 day, 3 days, or 4 days after school with friends were more likely to have sex. In terms of time spent with friends during the evening, spending 1 night or 2 nights with friends during the evenings successfully predicted whether one would have sex. There was a trend (p = .054) for participants who noted they spent 5 evenings a week with friends who could potentially also be predicted to have sexual intercourse. It appears clear that the time spent in association with peers was an important factor in encouraging participants to engage in sexual intercourse. What is not clear is whether it is peer influence that is exerting this influence to have intercourse (at all ages) or whether other factors such as non parental supervision when

away from home was a factor that played a role in this behaviour. There were no sex differences in this behaviour.

Table 6.14. Significant Variables in the Equation – Predictors of Sexual Relations With Condom (No)

	B	S.E.	Wald	df	Sig.	Exp(B)
Friends after						
school	0.145	0.06	5.29	1	p = .02	1.16
Friends						
evening	0.15	0.07	4.86	1	p = .02	1.17
Alcohol						
regrets	0.34	0.19	3.13	1	p = .07	1.41
Alcohol high						
consumption	-0.42	0.20	4.63	1	p = .03	0.66

A further logistic regression was performed for the dependent variable having sexual relations with a condom (no), with gender, age, alcohol consumption, drug taking, drug and alcohol consumption, time spent with friends after school and time spent with friends in the evening as predictor variables for this model (Table 6.14). A total of 543 cases were successfully incorporated into the model and the full model significantly predicted whether one would have sexual relations without a condom based on the predictor variables (omnibus chi-square, df = 191, p < .00005). The model accounted for between 16 and 21 percent of the variance in whether a participant would have sex or not without a condom, with 73.1% of those having sex without a condom successfully predicted. A total of 63% of those having sex with a condom were successfully predicted, with an overall percentage average correct resting at 68.1%.

In terms of this model *time spent with friends after school and evenings* successfully predicted whether someone would have sex without a condom based on the data provided by participants (table 6.14). Furthermore the *amount of alcohol (drink often)* and whether someone has *done something regrettable while drinking* alcohol were the factors that predicted having sexual intercourse without a condom. Having had sexual intercourse (y/n) was removed from the model as the correlation between the two was extremely high, and introducing this variable would not have significantly brought anything new to the prediction.

6.4.7. Friendship

The questionnaire charted how much time participants spent afterschool and in the evening with their companions. Notably, around one-fifth of 12 to 13-year-olds state that they spend 5 days a week with their friends, relevant in terms of establishing influences that their peer group may have (Table 6.15). Only 17-year-olds surpass this percentage, but they only spend 1 and 2 days with friend's after-school as opposed to five (Table 6.15). The same percentage of 12 to 13 year olds also spend 7 nights a week with friends during the evening time, higher than any other age group.

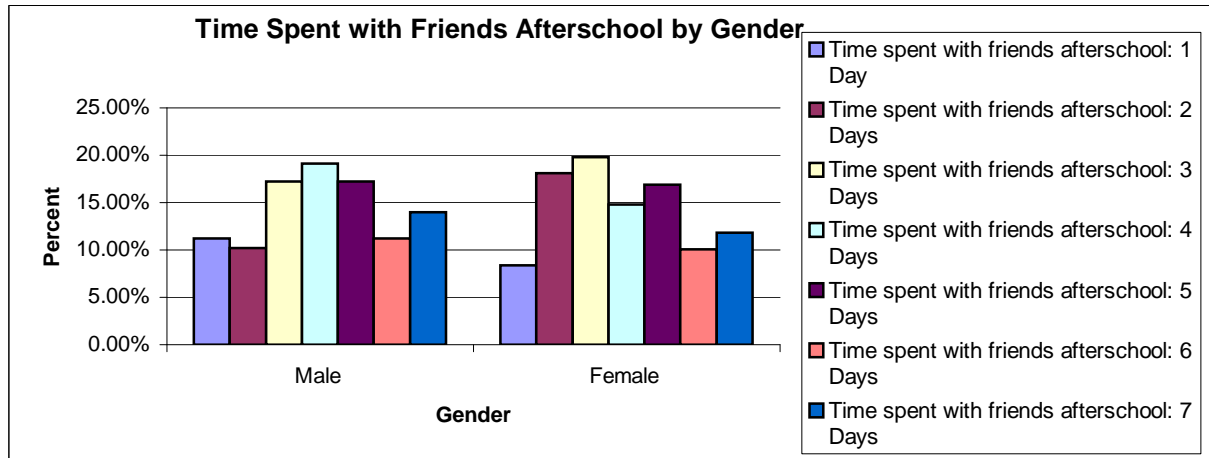
Table 6.15 Percentage of each age group spending 1-7 days with friends after school

Age group	12 to 13	14	15	16	17
Number of day per week spent with friends after school:					
1 Day	12%	6%	13%	13.6%	27.7%
2 Days	12%	9.5%	17.4%	25%	27.7%
3 Days	20%	16.8%	23.2%	13.6%	17%
4 Days	20%	13.4%	15.9%	22.7%	19.1%
5 Days	21%	18.4%	17.4%	13.6%	8.5%
6 Days	7%	19%	5.8%	6.8%	0%
7 Days	18%	17.3%	7.2%	4.5%	0%

Table 6.16. Percentage of each age group spending 1-7 evenings with friends

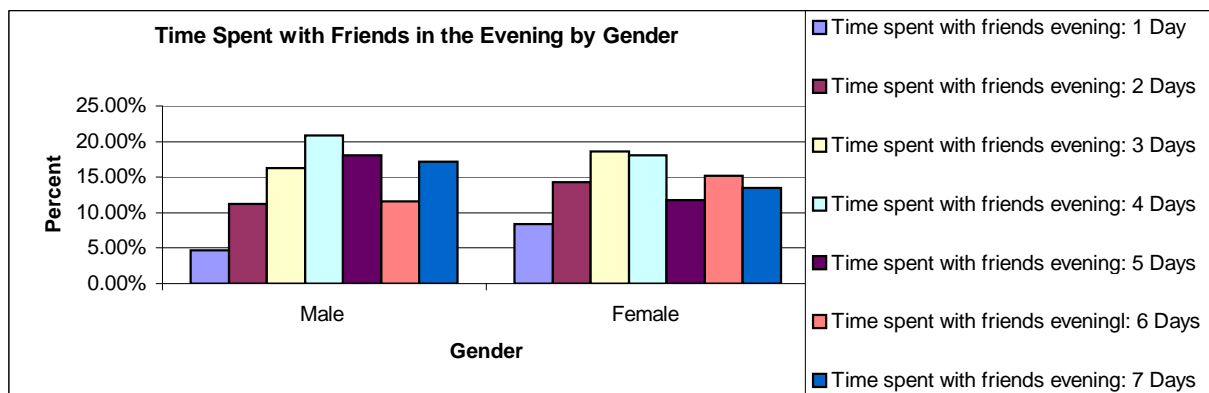
Number of days per week spend time with friends in the evening					
1 Day	4%	2%	4.30%	18.20%	17.00%
2 Days	10%	8.40%	14.50%	16%	31.90%
3 Days	15%	13.40%	26.10%	15.90%	23%
4 Days	20%	20.10%	18.80%	22.70%	17.00%
5 Days	15%	17.30%	13.00%	13.60%	8.50%
6 Days	14%	19.00%	11.60%	6.80%	2%
7 Days	22%	19.60%	11.60%	6.80%	0%

Figure 6.8. Percentage of males and females spend 1-7 days with friends after school



Approximately 14% of males reported spending time with their friends out of school 7 days a week (Figure 6.8) and roughly 17% spent times with friends every evening (Figure 6.9). The numbers of females seeing friends after school (11%) and in the evenings (14%) was slightly lower (Figures 6.8 and 6.9).

Figure 6.9. Percentage of “Yes” Responses provided in Quantitative Section as distributed by age for time spent with friends in the evening only by gender.



In the previous logistic regressions reported (See Tables 6.5, 6.9, 6.13, and 6.14) time spent with friends after school and during the evenings predicted the consumption of

alcohol, participation in gambling, whether sexual intercourse would occur, and not using a gambling during sexual intercourse. Spending time with peers has a distinctly clear influence in terms of some of the risky decision-making that has been observed in this adolescent population.

6.4.8. Eating behaviour

The questionnaire inquired how often participants had breakfast, to gain a better understanding of their general health and eating habits as well as trying to identify any patterns that could be associated with negative risk taking. Of all groups, 15-year-olds were the ones who most consistently claimed to have breakfast, with levels clearly declining after that (Table 6.17).

Table 6.17. Percentage of “Yes” responses to eating questions by age

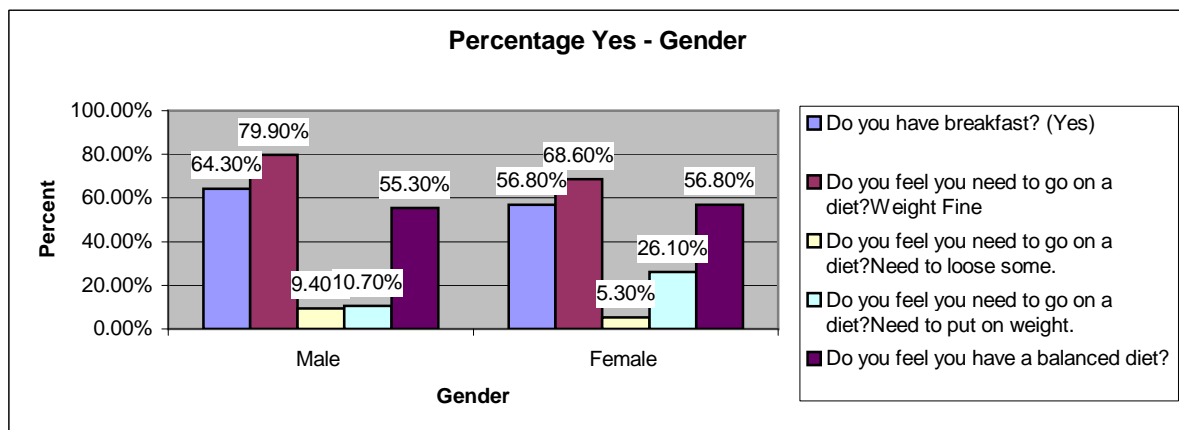
	12 to13	14	15	16	17
Do you have breakfast?	66.5%	49.5%	76.7%	67.8%	51.7%
Do you feel you need to go on a diet? Weight Fine	70.8%	77.7%	83.6%	64.4%	62.1%
Do you feel you need to go on a diet? Need to lose some.	7.1%	9%	1.4%	3.4%	13.8%
Do you feel you need to go on a diet? Need to put on weight.	22.10%	13.%	15.1%	32.3%	24.1%
Do you feel you have a balanced diet?	65.5%	53.7%	52.1%	50.8%	50%

This questionnaire also probed weight issues, to assess how relevant these issues with this particular population. Concerns about weight and body image issues have

clearly become a lot more of an issue among a younger population, and these questions aim to simply establish what this particular population was thinking of in terms of their own body appearance. Our 17-year-olds also rated themselves as the ones most needing to go on a diet, with 14 and 13-year-olds following. Interestingly, more participants claimed they needed to gain weight than lose weight, with 32.3% of 16-year-olds stating that they needed to gain weight (Table 6.17).

Eighty percent of males and 69% of female respondents reported that they felt their weight is fine (Figure 6.10). Interestingly, 26% of the female respondents felt they needed to put on weight compared to 10% of the males (Figure 6.10). Almost two thirds of males and 60% of females reported having breakfast (Figure 6.10). In addition, just over half of the participants in each group felt they had a balanced diet (Figure 6.10).

Figure 6.10. Percentage of “Yes” responses to eating questions by gender



No logistic regression was performed for eating behaviours as the relationship of the variables was not necessarily sufficiently demarcated in the literature in terms of theory to support a logistic regression as the most appropriate measure to conduct on the analysis of the data available for eating. A univariate analysis (2 (gender) x 4 (age) x 1

(weight) ANOVA) was run for whether participants felt that they had a nutritionally balanced meal. The goal was to discern if there were any differences between groups in terms of their views on their dietary habits. An ANOVA can help isolate the effect that an independent variables (gender and age) could have on a participant's DV score. There was no main effect of age $F(4, 533) = 1.98, p = .096$. Notably, there was a main effect for gender, $F(1, 533) = 10, p < .0005$, with more males feeling that they received a more adequate diet than their female counterparts.

6.5 Discussion

Analysis of the hypothetical stories presented in Chapters 4 and 5 suggest that what differentiates older participants from younger ones is a possible greater engagement with the behaviours themselves and thus the greater the experience might be. Children as young as six-years-old can be equally as effective as older adolescent peers in social problem solving in areas where children have had experience. In our earlier studies, friendship was one area where both young and older participants appeared to extrapolate from their experience. As adolescents mature they have more experiences to draw upon and thus appear superior at resolving problematic social situations they would have experience from (Goddard, Dritschel, & Burton, 2001). Of importance for understanding decision-making mechanisms, it is important to understand how adolescents apply their experience-based or school-based knowledge to their own social problem-solving as suggested through their responses. This section contains a summary of the key findings that have emerged from the quantitative section of the questionnaire, based directly on reported behaviours by adolescents themselves. The overall findings of the questionnaire

are discussed at the end of the analysis of the vignettes where an age based cognitive account of reasoning will be compared with an age based cognitive account of the reasoning behind their decision-making Chapter 7). The data will be discussed both by topic (e.g. SALSUS, sexual behaviour, alcohol, drugs) and by factors that may influence it (e.g. gender, peers, education). These topics and factors are not presented in order of importance, but are arranged by category in order to highlight some of the most important factors that have emerged from this study. The role of experience continues to be of importance and is discussed below.

TOPICS

SALSUS

Data gathered with the quantitative questions has established the reported frequencies of behaviour among 12-17 year old males and females in the following seven areas: alcohol use, drug use, smoking, gambling, sexual behaviour, friendships and eating habits. The results are consistent with those of the SALSUS (2004) in reporting significant gender trends in terms of the three risk behaviours that are also covered by SALSUS – alcohol, drugs, and smoking. The data in the present study are consistent with the national trend identified in SALSUS in terms of alcohol consumption and smoking with females predominantly choosing to engage in these behaviours more often than males. The SALSUS reported a decline in drug taking by males for the year 2004, which was not found here although the findings were consistent with gender patterns of drug use in previous SALSUS years (2002, 2000). In developmental terms, the findings collected in this study display similar trends to the SALSUS, supporting the view that as

participants mature and become cognitively more sophisticated they still engage in more risk behaviours.

Sexual Behaviour

The present study is unique in looking at sexual activity in participants as young as 12 and 13. A total of 14.2% of all 12 to 13 year-olds who responded to the questionnaire claimed to have had sexual intercourse. Out of that group, only 12% noted that they used a condom during intercourse. In 2002 Henderson et al reported that 15% of 14 year-old boys and girls were having sexual intercourse. This compares with over 20% in the present study. There is no immediate comparison with the SALSUS as this questionnaire does not include any questions of a sexual nature.

Young people's decisions around sexual activity have long been the focus of debate both in terms of risk and health policy but the findings to date are somewhat inconclusive (Coleman, 2001). In a study of risk behaviour among Scottish teenagers with an average age of 14years 2 months, Henderson et al (2007) found that alcohol use was one of the largest predictors in having sex. Luster and Small (1994) and Sen (2002) also reported this relationship between alcohol and sexual behaviour in adolescents. However, studies by Aladan and Beaty (1994) and Halpern- Flesher et al. (1996) did not find associations between alcohol consumption and sexual behaviour in adolescents, which was also the case in the present study. However, drinking alcohol and doing something regrettable after drinking were both significant predictors of condom use in the present sample of young people.

In the present study the amount of time spent with peers after school and during the evening hours was the most significant predictor of sexual behaviour. The more time

spent with peers and not observed by adult figures, the more likely it was that a participant would engage in sexual behaviour. Amount of time spent with peers was also significant in Henderson et al's (2002) study of Scottish youth.

Alcohol

Alcohol consumption has been linked as a disrupting factor in the ability to concentrate on problem solving, resulting in poor performance (Rivers et al., 2008). This would support findings by Johnson et al, 1994 and West et al., 1993 denoting that alcohol consumption can have a negative impact on the use of condoms. Alcohol also appears to play a pivotal role as a catalyst for smoking and for drug consumption, predicting both smoking and drug taking in a regression model.

FACTORS

Gender

One of the initial aims of this study was to explore the potential role of gender on adolescent decision- making. Most notably in respect of smoking and alcohol consumption more females reported engaging in these activities, which is in line with national trends. On the other hand, the main predicting factor for gambling and drug use was being male.

Peers

Another important trend emerging from the data linking these findings is the influence of time spent with peers after school and during the evening hours. Spending social time with peers was a main factor in predicting gambling. Wood & Griffiths (2002) report that scratchcard playing was frequently undertaken with peers rather than parents and that it was part of an "in group" socialization process. Some participants in

the Wood & Griffiths (2002) study noted that they would play scratchcard with their friends so as not to feel left out, emphasising the influence of social pressures.

Alcohol use can be influenced by the perceived consumption and use by proximate peers (Yanovitsky, Stewart, & Lederman, unpublished conference paper 2004). It was found that the strongest predictor of personal alcohol use by young people in the present study was the perceived use of alcohol by friends and especially best friends.

Education

The questionnaire itself was deemed to enhance the curriculum of the Social Education/PSE class in the schools which participated as some of these topics had already been part of the general government mandated curriculum. This highlights a similar consideration as observed in the previous chapter, where school was found to influence the experience that participants had, particularly in how non-schooled and schooled participants performed on hypothetical vignettes. This will be discussed at further length at the end of the next chapter, where the actual influences that schooling may have may be noted more clearly.

Summary:

The first portion of this study managed to identify patterns of risky behaviour occurring within this adolescent population, behaviours reported directly by adolescents themselves. The assumption is that these behaviours are descriptive of their own experience, and as such can provide useful information about the mechanisms influencing their decision-making. A survey questionnaire can deduce powerful statistical trends regarding behaviour and hence choices made during decision-making, but cannot

necessarily explain the behaviour and choices themselves. The qualitative portion in the next chapter will allow us to further improve our immediate understanding of the underlying mechanisms being used by individuals to problem solve and make decisions. The hope is that by having teenagers speak of their own behaviours they will also be parlaying the experiences that were drawn upon in order to inform their choices (decisions). The ensuing chapter will seek to unravel the mechanisms shaping decision-making by analysing actual responses produced to real life situations where experience and knowledge appear to be of significance. This will allow a comparison of actual reported behaviours with a cognitive account of their actions.

CHAPTER 7

DECISION MAKING QUESTIONNAIRE II – VIGNETTES

7.1 Introduction

A notable gap in the current literature on adolescent behaviours is behaviour examined from an adolescent viewpoint rather than from an adult-centred perspective (Mayall, 1994). There is a tendency in the literature to focus only on the frequency of the engagement in particular behaviours, usually ‘risky’ ones such as smoking or drinking alcohol, rather than examining what these risk behaviours mean to adolescents or the decision-making underlying the behaviour (Rodham et al, 2006). Adult driven assumptions and theories of risk may not be the most appropriate means of understanding adolescent risk behaviour if we are to understand the mechanisms that lie behind the decisions themselves

One way to understand the complex relationship between risk behaviours and decision-making, is to directly explore adolescent responses to hypothetical ‘real life’ situations based on their own experiences, their own knowledge, and their own problem-solving skills. This study explores the responses of adolescents to a series of situations depicting the seven categories— consuming alcohol, taking drugs, gambling, smoking, sexual behaviour, friendships, and eating behaviour— previously described in Chapter 6.

The qualitative approach to exploring adolescent’s risk behaviours provides a means for accessing their social world (Rodham et al, 2006), their interwoven values, as well as a means of understanding the context of some of their problem- solving. This

contrasts with the frequency counting of quantitatively driven analyses. Most research in this area has examined “general” levels of risk behaviour with correlations linking the different behaviours together. There has been little focus on the actual decision-making process behind the behaviour. A large portion of the research has focused on American teenagers and their educational system whereas there have been fewer British studies exploring the same phenomena (Wood & Griffiths, 2002, Coleman & Cater, 2005).

In this study a mixture of complex content analysis and thematic analysis was used to explore narrative responses. Thematic analysis was used initially to derive themes from responses given to real-life problem situations; in this case responses given to risk situations that teenagers could engage in or have knowledge of. The analysis involves reading the transcripts several times with the aim of identifying and understanding what the data suggest in relation to themes that emerge from the data (Donovan-Hall, 2004).. The context of the events, the gender and age of the participants, and the problem-solving of the events can all be taken into account during analysis, allowing thematic analysis to be flexible and sensitive to the social context. The interplay of all of the above aspects of thematic analysis makes it suitable for unpacking narrative responses to the real-life problem situations in this study. Content analysis goes a step further in helping to classify participant’s responses, allowing

Although it is common practise to draw a distinction between qualitative and quantitative aspects of scientific investigation, it has been argued that the two may go hand in hand. Kuhn (1961, p. 162) proposed that “large amounts of qualitative work have usually been prerequisite to fruitful quantification in the physical sciences”. This

approach has been taken in the questionnaire developed to explore adolescent decision-making and the following explores the qualitative portion of data.

7.1.1 Aims

The aim of this study was to better understand the factors that may lead to risk-taking by asking adolescents to consider their own behaviours and relay their own experiences within the framework of real-life problem situations. With this aim in mind the intention was to explore developmental and gender differences in adolescent decision-making (Fischhoff, 2007, 2008, Furby & Beyth-Marom, 1992). The ambition of the study was to gain a deeper understanding of the problem-solving mechanisms that teenagers employ in situations of risk. Ultimately, the aim is to provide a rich source of information as a foundation from where further research exploration can take place and complement the existing literature on risk behaviour in adolescence.

7.2. Methods

7.2.1. Participants

To simplify analysis the participants were collapsed into four age groups: 1) 12 and 13-year-olds, 2) 14 year-olds, 3) 15 year-olds, and 4) 16 and 17 year-olds (Table 7.1). No 18-year olds were included as explained in section 6.3.1.3. The four age groups were created using the following criteria. In the first instance, 12 and 13-year olds were brought together as one group as the number of 12-year-olds was too small for thematic analysis ($n = 13$). The second group, 14-year-olds, had a suitable number of participants and was left untouched, likewise for the 15-year-olds. Finally, 16 and 17-year-olds were collapsed into one group due to their developmental similarities (Wiltshire, Amos, Haw, & McNeill, 2005).

Table 7.1 Total number of participants by sex and age group

		Number
Gender	Males	261
	Females	282
Age Groups for	12 and 13	131
Thematic	14	202
Analysis	15	89
	16 and 17	121

7.2.2. Materials

The questionnaire is described fully in Chapter 6 - for a thorough description of both the quantitative and qualitative portions of the questionnaire please see Chapter 6.2.2. Participants were randomly assigned to either version A or version B of the questionnaire (Table 7.2). The responses to the open-ended questions, in both versions of the questionnaire were examined using thematic analysis. All responses were transcribed from a written format to a computerised format and analysis was performed only on the printed format of the responses.

Table 7.2 Number of participants by sex and age group completing versions A and B of the questionnaire

Age group	12/13	14	15	16/17	male	female
Version A n=269	N=67	N=98	N=46	N=58	N=130	N=139
Version B n= 274	N=64	N=104	N=43	N=63	N=131	N=143

7.2.3. Thematic Analysis and Content Analysis Design

Thematic analysis is a process of encoding qualitative data in order to analyse written text. It organizes themes found in a text into a structure that illuminates the material. Thematic analysis has several advantages over content analysis. In the first instance it goes beyond simple counting of the use of certain terms and then contrasting the levels of appearance of the terms between different texts. Thematic analysis counts the use of certain terms or a group of terms in a text and links them together under a larger umbrella theory, making sense of these terms by grouping them together into a larger theme. In the second instance, thematic analysis is concerned with the actual phrasing of text as opposed to simply a counting of terms and sorting of individual terms. Actual ideas are considered in the process of analysis itself.

The main purpose of content analysis is to count how often an ‘instance’ occurred in the data. The “instances” can be in the form of particular words or phrases (like “unhappy” or “grassed”), or in the form of categories, which have a particular meaning (e.g. “social support received from friends”) (Ryan & Bernard, 2000). The categories can be in the form of: events, concepts, classes of description, themes, etc.

Content analysis and thematic analysis complement each other. While, content analysis removes words from the context in which they occur, thematic analysis includes in the analysis the whole text. In the thematic analysis the meanings are found in larger blocks of text, and in content analysis meanings are found in smaller unit components, so that they can be counted more systematically (Ryan & Bernard, 2000, Kellezi, 2007).

7.2.4. Procedure

The distribution and administration of questionnaires to pupils within the three participating schools is explained in section 6.3.7.

7.3. Thematic Analysis and Content Analysis

All the transcripts from the questionnaires were subjected to thematic analysis to derive the categories eventually compared. Content analysis would then be used to explore the meaning of these themes as presented in the text itself. Each individual story (A & B) was looked at separately by topic (Alcohol, Drugs, Gambling, Smoking, Sex Behaviour, Friendship, and Eating). The data were transcribed verbatim from the written questionnaires. The data were then examined by three 3rd year Psychology students who had good knowledge of the underlying theory and research questions guiding the present work and who helped discuss and participated in the process of analysis. No computer programs were used to aid the data analysis due to the amount of data included in the analysis. After initial attempts to use computer programs (the QSR Software N-VIVO) it was noted to be easier to conduct analysis on the printed form of the data, which allowed viewing different transcripts at the same time, as well as faster reading of transcripts. The

steps taken in the analysis were a combination of those suggested by Aronson (1994), Donovan-Hall (2004) and Rubin and Rubin (2005) and were as follows.

1. The first step aimed at allowing the researcher to familiarise himself with the data in general, therefore each transcript (printed version) was read and notes were kept while reading, noting and marking out anything that seemed interesting and valuable for the research questions guiding the study itself.
2. Each interview transcript was read again with the intention of identifying any patterns that might suggest the presence of themes. The data was revised with the aim of identifying themes emerging from the data, rather than looking for themes *a priori* and forcing a good fit. For example, part of the interview questions were on eating patterns that affected weight, and it became clearer that a far more prominent idea that was emerging from the responses in the transcript itself was the importance of friendship in how participants or others might have resolved this real-life dilemma. Though the initial focus of the question was aiming for participants to reflect on their eating behaviours, the overall and more important picture that evolved was that friendships played a more important role in how participants saw their eating behaviour or modified their eating behaviour based on their peer's feedback. Each transcript was revisited with the aim of identifying the presence of ideas supporting, clarifying, developing or rejecting the concepts represented by the identified themes.
3. Once the researcher became familiar with the data, the next step of revisiting the transcripts involved coding of the data. Coding involved categorising and labelling the data with words representing the core knowledge of the theme (e.g.

the general ideas that were presented, interesting patterns emerging). The code of each category was a distinct label used for each theme. Coding was mostly guided by the patterns emerging from the data and trends were not specifically searched for using *a priori* themes. For example, the original coding of themes related to eating behaviours were labelled “nutrition”. But once a number of different aspects of eating behaviours were identified from the data, they were labelled accordingly like: “support from friends”, “would gain weight and not become healthy”, and “would seek external sources of help to control eating habits”.

4. Part of the search for concepts or themes included effortful discernment of metaphors and slogans. For example, the repetition of a word in the data might suggest an important theme. A specific example was the use of the term “grass him up” which was used both to denote the use of drugs as well as telling an authority figure in order to get someone into trouble or punishing someone for a misdeed. Such a phrase would be important in being able to synthesise individual narratives into an overall thematic bubble. In this case, the use of violence or the use of physical force is one such theme that is present in certain topics.
5. As analysis developed, the themes themselves became refined. The aim at this stage was to identify themes (whether theoretically or data driven) that would describe the most important ideas emerging from the data. The focus was on those parts of the transcripts (for each individual participant) that were the most important for understanding the research topics, and these themes are the ones that are presented in the Results section below. To complete the analysis the different concepts and themes needed to be put together, in order to define the

general implications in terms of the research questions. Thus, the final aim of the analysis was a) to look for evidence on the research questions of interest, b) when necessary develop new theoretical implications explaining the data and c) to elaborate broader implication of the findings in terms of theory and practice and while doing expanding into content analysis and straying from pure thematic analysis. Only the four most significant themes (top four in percentage) were looked at in terms of any further analysis to ensure that the most important concepts received due focus as well as allowing for a clearer link between each individual story. The themes that were would help classify the participant's responses, to then calculate numerical analyses on these in order to perform qualitative statistics.

7.3.1. Coding reliability

Coding reliability relates to coding of data for *thematic analysis*. Coding is based on judgments of meanings made by the researcher (Ryan & Bernard, 2000), and therefore it is crucial to establish whether the coding scheme would be used by more than one researcher. This can be done by calculating the inter-coder reliability, which is the amount of agreement amongst coders for each variable or theme (Neuendorf, 2002; Ryan & Bernard, 2000). The agreement measure is particularly relevant with nominal data where each coded instance is either a hit or a miss (Neuendorf, 2002). A number of methods like Cohen's Kappa (κ) can account for chance agreement (Neuendorf, 2002), but the properties of these data were not suited for such and did not allow for these tests to be performed. As Rourke, Anderson, Garrison, and Archer (1999) point out, it is not

possible to apply Cohen's Kappa for thematic analysis coding because it is not possible to establish *a priori* the total number of decisions to be made by the coders. Instead, the Holsti's method was used ($2m/n1+n2$), where the only information required was the number of coding decisions on which both coders agree (m), and the number of coding decisions made by each coder ($n1$ and $n2$) (the coding applies to both types of analysis). Holsti's method is considered to be a general yet effective method of reliability in coding practises with the limitation that it does not consider whether the coders achieved the same results by random chance, and this is acknowledged as a limitation (Kellezi, 2006).

Three coders participated in the inter-coder reliability assessment, with each coder responsible for 2 of the themes and 1 of the coders responsible for 3 of the total themes (7). The principal researcher conducted the coding of all initial material, and a second group of coders (3rd Year Psychology Students) conducted blind coding on 5% of the questionnaire data already coded by the principal researcher to allow the calculation of reliability of coding. The reliability sample was part of the full sample; it contained 5% from each of the seven topics chosen at random (uneven numbers were chosen from each of the three separate schools). The second coders were University of St Andrews Psychology students who were knowledgeable in coding practises and had been instructed on thematic analysis and understood the coding procedure. The amount of training needed to achieve the present results for the second coders was 8 hours. The results for interceding reliability for each of the individual themes were calculated for each of the 7 topics separately and are presented in table 7.3.

Although these values do not take into account chance agreement they are an indication of good agreement between the coders. Considering the rich amount of data

produced by the questionnaire and the complexity of the themes it was not expected that agreement levels would be maximal (close to 100%). The levels of agreement that were reached were considered sufficiently high for analysis purposes and were a good indication of reliability of the questions themselves.

Table 7.3. Results of inter-coder reliability for each topic (A & B) – Holsti’s Method

Story A and Story B per individual Topic	Percentage of Agreement
Alcohol Story A	91%
Alcohol Story B	93%
Drugs Story A	88%
Drugs Story B	92%
Smoking Story A	90%
Smoking Story B	98%
Gambling Story A	89%
Gambling Story B	82%
Sex Story A	88%
Sex Story B	87%
Friendship Story A	90%
Friendship Story B	95%
Eating Story A	84%
Eating Story B	90%

7.3.2. Analysis

The analysis was organised in the following manner. First, the themes that developed from the data were looked at by individual topic, and by individual story, A & B. The themes were then analysed developmentally by looking at age and differences on the most salient themes (total of 4), this was done both descriptively via percentages and systematically via a MANOVA (4 (age groups) x 2 (gender) x 4 (themes). Tukey’s (Honestly Significant Difference) test was used for all Post Hoc analysis to ensure that the chance of finding a significant difference in any of the comparisons (under a null

model). Blank scores were analysed separately by (2 (gender) x 4 (age) x 1 (blanks)) ANOVA's and are discussed separately in this chapter.

Box's Test of Equality of Covariance Matrices (Box's M) was not violated, with $p > .05$ for analysis on all 7 topics. This demonstrated that the null hypothesis that the observed covariance matrices of the dependent variables were equal across groups. A Bonferroni adjusted alpha level of .0125 was used for all statistically significant results as 4 dependent variables (4 themes) were analysed systematically ($.05 / 4 = .0125$). If 3 dependent variables (3 themes) were analysed, division would occur by 3, not 4.

7.4 Results

The topics are presented in the following order, Alcohol, Drugs, Gambling, Smoking, Sexual Behaviour, Friendships, and Eating. The results are organised by themes within the responses to each of Story A & B by age and gender.

7.4.1 ALCOHOL

7.4.1.1 Alcohol Story A:

Lisa had never tried alcohol before, but her friends persuaded her to try some wine that was stored in their parent's house. She realised that after drinking one glass she was feeling pretty tipsy, and even though she did not want to have more she had two more glasses which made her very drunk. Based on your experience or your knowledge of a similar situation, what would happen next and why?

Themes

A total of five different themes were observed in the data and were analysed. For convenience each individual theme is labelled from 1 through 5 and will be described fully. Blank responses are examined separately (Section 7.4.8).

Theme 1 – negative effects. Responses describing the possible health effects that imbibing alcohol would have, particularly with reference to a *hangover* or a general feeling of *pain* or physical discomfort that followed alcohol consumption. The detailed description of the symptoms suggested that participants had first hand knowledge of the effects of alcohol.

Theme 2 - behaviour is wrong. These responses referred to the consumption of alcohol in a moralistic tone, with the judgement that alcohol was a *negative influence* in people's lives and that it should not be consumed by those who were not yet of legal age. The responses that fit within this theme carried a social vernacular referring to the detrimental consequences, both physical and social, of alcohol. These responses appeared to be less experienced-based than those observed in Theme 1.

Theme 3 – ignore consequences. This category of responses were clear and to the point and presented the view that any negative consequences would be generally ignored.

Theme 4 – peers. Responses in this category referred to the influence of peers being a decisive factor in drinking, and continuing to drink even when warning signs of ill health or potential danger were present.

Theme 5 – regret. These responses expressed the view that Lisa would regret or be unhappy with how she behaved under the influence of alcohol. The responses indicated a

sense of personal identification with being intoxicated and sense of unhappiness at having behaved in an inappropriate fashion.

Table 7.4. Alcohol Story A – Percentage distribution of total responses across the five themes

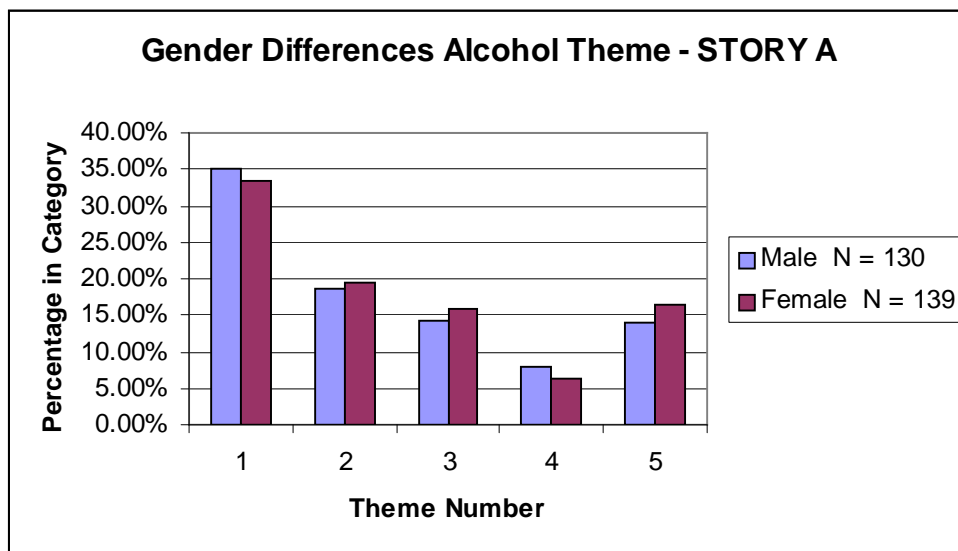
Theme	1. Negative effects	2. Behaviour is wrong	3. Ignore consequences	4. Peer pressure	5. Regret	6. Blanks
Percentage	27.8%	19.3%	14.1%	7.4%	13.9%	17.9%
N= 269	n = 75	n = 52	n = 38	n =20	n = 36	n = 48

The biggest single theme in the responses across all age groups was in reference to the negative effects of alcohol consumption (Table 7.4). This applied across all age groups (Table 7.5) and to both sexes (Figure 7.1). The second most common theme also referred to negative aspects of drinking, specifically that it was wrong (Table 7.4). The least expressed theme across all participants referred to the influence of peers (Table 7.4), although this was not consistent across all age groups (Table 7.5).

Table 7.5. Alcohol Story A - Percentage of each age group's responses falling into each theme.

Age groups	12 /13	14	15	16/17
Total = 269	N = 67	N = 98	N = 46	N = 58
1. The event would lead to trouble, particularly ill health.	23.8%	25.5%	32.6%	32.7%
2. Acknowledgement that the behaviour is wrong	19.4%	21.4%	19.5%	15.5%
3. Continue Drinking – ignore consequences	22.3%	14.2%	13.0%	5.1%
4. The influence of peers	5.9%	4.1%	15.2%	4 6.8%
5. Regret	7.4%	17.3%	10.8%	15.5%

Figure 7.1. Alcohol Story A - Percentage of each gender's responses falling into each theme.



Statistical Analysis Themes

The four most popular themes (1, 2, 3 & 5) are examined further by a MANOVA (4 (age groups) x 2 (gender) x 4 (themes))

Theme 1 – negative effects. A significant main effect for age was found for this theme, $F(3, 261) = 3.5$, $p = .0115$ (using a Bonferroni adjusted alpha level of .0125). Tukey (HSD) post-hoc analysis demonstrated that the significant difference lay between the youngest (12/13) and oldest (16-/17) participants, $p = .044a$, suggesting that older participants related drinking alcohol with pain or illness.

There were no main effect differences in gender for this theme, $F(1,261) = .138$, $p = .711$, suggesting that this response was equally common among males and females. No interaction was observed, $F(3,261) = .095$, $p = .758$.

Theme 2 - behaviour is wrong. A main effect for age was observed for pathis theme, $F(3,261) = 3.4$, $p = .0118$ (using a Bonferroni adjusted alpha level of .0125). Tukey (HSD) post-hoc analysis revealed that more 14 year olds gave this response than any of the other three age groups: 12/13 year-olds ($p = .019a$), 15 year-olds ($p = .043a$), and 16/17 year-olds ($p = .092a$).

There were no main effect differences in gender for this theme, $F(1,261) = .095$, $p = .711$, both genders performing equally. No interaction was observed, $F(3,261) = .138$, $p = .711$.

Theme 3- ignore consequences. For this theme there was a highly significant main effect observed for age, $F(3,261) = 3.4$, $p = .000$ (using a Bonferroni adjusted alpha level of .0125). To examine what age factors played a more influential role, a Tukey (HSD)

post hoc analysis was conducted, suggesting that 14 year-olds were different from 12/13 year-olds, $p = .029a$ and 16/17 year-olds, $p = .033a$.

There were also significant gender differences for this category, $F(1,261) = 6.12$, $p = .012$. More female respondents than males suggested they would ignore the consequences of drinking in the vignette.

Theme 5 – regret. As in the other categories, there was a main effect for age for this theme, $F(3, 261) = 3.6$, $p = .013$. Tukey (HSD) post hoc analysis revealed that 14 year-olds gave more responses in this theme than both the 12/13 year olds ($p = .029a$) and 15 year olds ($p = .033a$).

There was no main effect for gender ($F(1, 261) = 1$, $p = .317$), suggesting that males and females were similar to each other in terms of this category of decision making. No interaction was observed, $F(3,261) = 1.128$, $p = .338$.

7.4.1.2 Alcohol Story B:

Malcolm had been drinking heavily to celebrate his 17th birthday party. Though he was not of age to drink or be inside a pub, he thought it would be funny if they all went down to his local pub. His mates followed, and decided to continue the party inside the pub. Based on your experience or your knowledge of a similar situation, what would happen next and why?

Themes

A total of five different themes were observed in the data and were analysed. For convenience each individual theme is labelled from 1 through 5 and will be described fully. Blank responses are examined separately (Section 7.4.8).

Theme 1 – occurrence of violence. In these responses participants suggested that fighting will most probably ensue as a result of the events described in the vignette. Physical force would be the only way to control the situation.

Theme 2 – police involvement. These responses stated the police will become involved in drinking offences, and that minor drinking is an offence punishable by law. These answers also expressed the view that those who participate in underage drinking will be caught and punished.

Theme 3 – regret. These responses focused on regret and remorse at any actions involving underage drinking and the negative consequences that might have taken place when under the influence of alcohol.

Theme 4 – physical effects. Responses in this theme described the actual physical sensation of the effects of excessive alcohol use (hangover). The clear description in these answers conveyed a first-hand understanding of the effects of drinking alcohol to excess.

Theme 5 – ignoring consequences. These responses expressed the view that the protagonists would ignore the consequences of their actions, regardless of how severe these might be. These answers suggested that Malcolm and his friends would continue what was termed “reckless” behaviour or behaviour that can be punishable by law.

Table 7.6. Alcohol Story B – Percentage distribution of total responses across the five themes

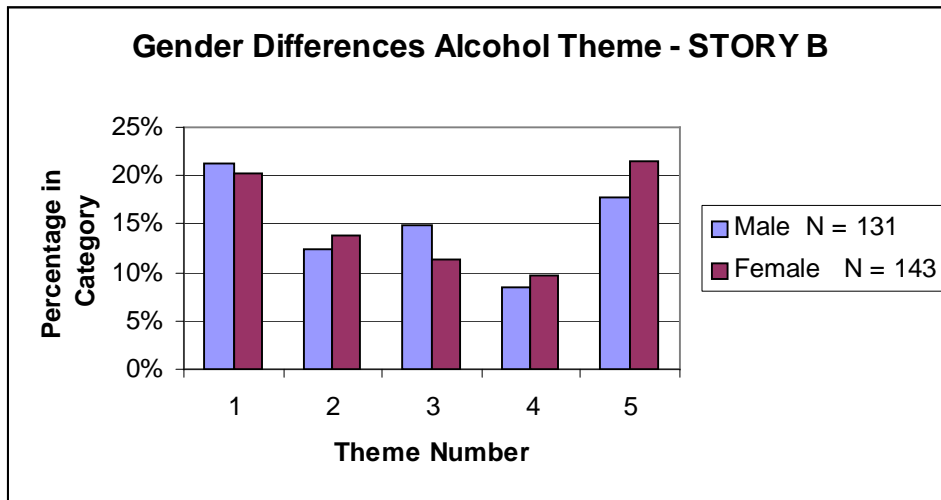
Theme	1. violence	2. Police	3. Regret	4. physical effects	5. Ignore consequences	6. Blanks
Percentage	30%	14.6%	9.8%	8.4%	13.9%	23.3%
N= 274	n = 82	n = 40	n = 27	n =23	n = 38	n = 64

The most commonly expressed theme across all participants was that violence would ensue (Table 7.6). This was consistent across all age groups (Table 7.7). Themes referring to consequences were also quite common, with some respondents raising negative consequences (police become involved) and others suggesting the protagonists would ignore the consequences (Table 7.7).

Table 7.7. Alcohol Story B - Percentage of responses by each age group falling into each theme.

Age groups	12 /13	14	15	16/17
Total = 274	N = 64	N = 104	N = 43	N = 63
1. It will lead to general trouble, particularly fights	23.4%	24%	41.8%	38%
2. Police will be involved	10.9%	20.1%	9.3%	12.6%
3. Regret and Remorse	12.5%	9.6%	9.3%	7.9%
4. Hangover	10.9%	4.8%	11.6%	9.5%
5. Ignore Consequences	12.5%	17.3%	18.6%	6.3%

Figure 7.2. Alcohol Story B - Percentage of each gender's responses falling into each theme.



Statistical Analysis Themes

The four most common themes (1, 2, 3 & 5) are investigated further using a MANOVA (4 (age groups) x 2 (gender) x 4 (themes)).

Theme 1 – violence occurs. There was a significant main effect for age, $F(3, 266) = 3.87$, $p = .010$ (using a Bonferroni adjusted alpha level of .0125). Tukey post hoc analysis revealed differences between the younger and older participants. The 16/17 year olds were more likely to give responses in this category than the 12/13 year-olds ($p = .029a$) and the 14 year-olds ($p = .013a$).

There were no differences in the amount of males and females making responses in this theme, $F(1, 266) = 1.05$, $p = .305$. No interaction was observed, $F(3, 266) = .363$, $p = .780$.

Theme 2 – police involved. There was no significant effect of age, $F(3, 266) = 3.2$, $p = .023$ (using a Bonferroni adjusted alpha level of .0125).

There were no significant differences for gender, $F(1,266) = .289$, $p = .592$. No interaction was observed, $F(3,266) = 1.510$, $p = .212$.

Theme 3 – regret. There was no significant main effect of age for this theme, $F(3,266) = 2.43$, $p = .066$, though there was a trend towards significance.

There was a main effect for gender, $F(1,266) = 9.8$, $p = .002$ (using a Bonferroni adjusted alpha level of .0125). Significantly more males than females suggested they would be remorseful if they were found drinking underage and would experience greater regret under similar situations.

A significant interaction between gender and age for this theme was observed, $F(3,266) = 6.6$, $p = .000$. Age and gender in conjunction appear to be a factor in whether regret was one factor affecting decision-making.

Theme 5 – ignoring consequences. A significant main effect was found for age, $F(3, 266) = 3.7$, $p = .0120$ (using a Bonferroni adjusted alpha level of .0125). Post-hoc analysis using Tukey (HSD) revealed that significantly more 14-year-olds proposed ignoring the consequences than 16/17 year-olds ($p = .028a$).

There was no main effect of gender, $F(1,266) = .557$, $p = .456$, but there was a significant age by gender interaction, $F(3,266) = 5.2$, $p = .002$, suggesting that both age and gender are important forces shaping decision-making in terms of understanding consequences, a key stage in social problem solving.

7.4.1.3 Summary for Alcohol stories A and B

Two themes emerged in the responses to both stories. The first relates to ignoring the consequences of alcohol consumption, which was more likely to be expressed by

younger participants. As participants become older and more mature, they made fewer of these responses to wither story. The second theme that emerged in response to both stories was expressing regret or remorse in relation to alcohol consumption and the way people behaved as a result of it. This was least likely to be expressed by the youngest participants, tentatively suggesting that this emerged as a result of experience.

A further theme that emerged in response to both vignettes was the use of alcohol as negative and carrying negative consequences, such as police involvement, or fighting. Younger participants were more likely to conceive negative consequences as involving the police or other authority figures whereas the older participants related negative consequences to violence, especially fights.

7.4.2 DRUGS

7.4.2.1 Drugs Story A:

In a group discussion about how drugs are harmful one of the questions asked was: “Why don’t people who take drugs care about the harmful effects they have?” Someone else speaks up to give their opinion. Based on your experience or your knowledge of a similar situation, what would happen next and why?

Themes

A total of four different themes were observed in the data and were analysed. For convenience each individual theme is labelled from 1 through 4 and will be described fully. Blank responses are examined separately (Section 7.4.8).

Theme 1 – drugs are negative/harmful. Responses in this theme suggested that drugs have a negative effect and can have repercussions such as damaging one’s body or health and perhaps even resulting in addiction.

Theme 2 – peers pressure/image. These responses referred to the effect peers have on influencing whether to take drugs or not. Most often mentioned was the issue of maintaining a certain social standing or a social image within a group of peers, and feeling that it was necessary to conform.

Theme 3 – causes of drug taking. This group of responses referred to drug takers being unloved or unwanted people, often citing mental health issues such a depression as part of the root causes for why people may become addicted. Participants suggest in their responses that drug takers do not care about themselves either physically or mentally.

Theme 4 – drugs are positive/harmless. This theme clustered all responses that suggested that drug taking had a positive effect that is overlooked. These responses suggested that drugs in fact can make you feel “good” and that there is not observable harm in consuming drugs.

Table 7.8. Drugs Story A – Percentage distribution of total responses across the four themes

Theme	1. Drugs are bad/harmful	2. Peer pressure	3. Causes of drug taking	4. Drugs are positive/harmless	5. Blanks
Percentage	22%	9.6%	16.7%	13.8%	37.9%
N= 269	n = 59	n = 26	n = 45	n =37	n = 102

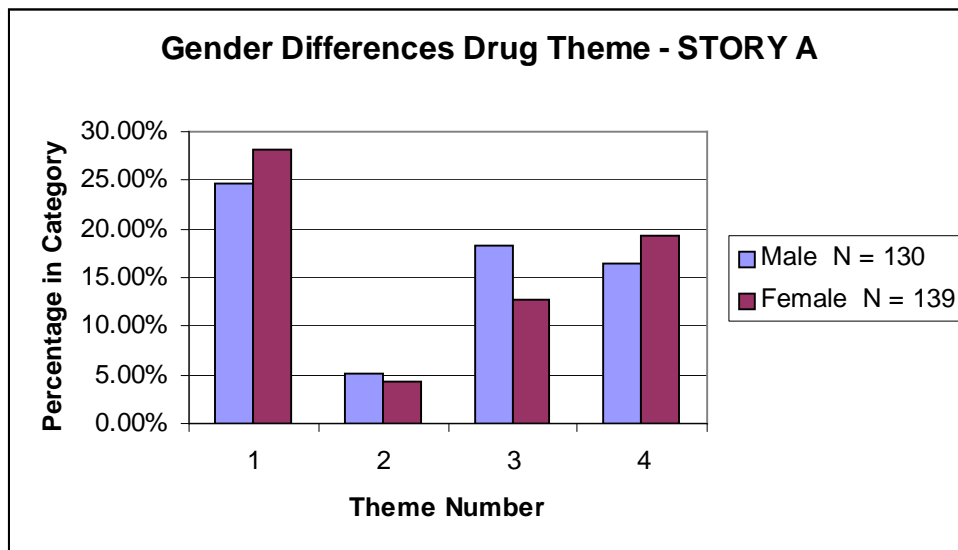
This story resulted in a large number of blank responses (Table 7.8.), which are analysed further in section 7.4.8. Among the themes that emerged, the most common was reference to the negative effects of drug across all participants (Table 7.8.). However, this was not consistent across the age groups, with 16/17 year olds expressing this the most

and 15 year olds the least (Table 7.9). This theme was the most common across both males and females (Figure 7.3).

Table 7.9. Drugs Story A - Percentage of responses by each age group falling into each theme.

Age groups	12/13	14	15	16/17
Total = 269	N = 67	N = 98	N = 46	N = 58
1. Drugs are bad and have repercussions such as addictions.	17.9%	22.4%	8.6%	37.9%
2. Peer pressure and image at school	17.9%	7%	10.8%	5.1%
3. Drug takers do not care about themselves and they have nothing better to live for (depressed, unhappy).	7.4%	20%	34.7%	6.6%
4. Drugs are harmless and positive in that they make you feel good.	10.4%	15.3%	13.0%	15.5%

Figure 7.3. Drug Story A - Percentage of responses by gender falling into each theme.



Statistical Analysis Themes

As there are only four themes for this story (A), all four themes were explored further with a MANOVA (4 (age groups) x 2 (gender) x 4 (themes)).

Theme 1 – drugs are negative/harmful. A significant main effect of age was observed in this theme, $F(3, 261) = 2.8, p = .0037$, suggesting a difference between ages in terms of their knowledge of the effects of drug taking. Post Hoc Tukey (HSD) analysis revealed that the 16/17 year-olds expressed this view more often than the 15-year-olds ($p = .015a$). The oldest group of participants cited the negative effects that drugs may have on the body the most, whereas the 15 year-olds expressed this view the least. 15 year-olds were also substantially different from 14-year-olds ($p=.014a$) and 12/13 year-olds ($p = .002a$). It suggests that there is a trend of older participants being more knowledgeable about drug consumption,

There was no main effect for gender observed on this theme, $F(1,261) = .067, p = .796$. Both males and females reported similar knowledge or experiences. However, there was a trend toward a significant age by gender interaction, $F(3,261) = 2.6, p = .053$.

Theme 2 – peer pressure/image. There was a main effect observed in terms of differences between ages in terms of how peer pressure moulded their actions or behaviours, $F(3, 261) = 7.9, p = .000$. Post Hoc analysis (Tukey HSD) revealed a complex set of differences that in simple terms reveal a basic difference between younger and older participants. The 12/13 year-olds expressed this view most often and difference significantly from the 14-year-olds ($p = .040a$) and 15 year-olds ($p = .000a$). This view was expressed less by the 16/17 year-olds than either the 14-year-olds ($p = .006a$) or the

15 year-olds ($p = .006a$). As participants matured peer pressure became less of an influence in their decision-making process.

There was no main effect of gender, $F(1, 261) = .716, p = .398$ revealing that males and females did not differ in how important they viewed peer pressure and image. No interaction was observed, $F(3, 261) = .992, p = .397$.

Theme 3 – causes of drug taking. There was no main effect for age for this theme, $F(3, 261) = 2.0, p = .110$ although the percentages suggested there might be (Table 7.5). No statistically significant differences could be confirmed between age groups in terms of views of why people consume drugs, suggesting that drug takers have an illness or a mental health issue. There was also no main effect of gender, $F(1, 261) = .119, p = .730$. No interaction was observed, $F(3, 261) = .692, p = .558$.

Theme 4 – drugs are positive/harmless. There were no statistically significant difference between age groups on their view of whether drugs are harmful, $F(3, 261) = .410, p = .746$. Likewise, no gender differences were found, $F(1, 261) = 2.2, p = .137$. It is important to note that there was a remote trend toward significance in terms of an age by gender interaction for this theme, $F(3, 261) = 2.5, p = .057$.

7.4.2.2 Drugs Story B:

Jim's brother walks in on him as he was smoking some cannabis. His brother was very shocked by what he saw and asked how he got started with drugs. Based on your experience or your knowledge of a similar situation, what would happen next and why?

Themes

A total of five different themes were apparent in the data. These are labelled from 1 through 5 and will be described below. Blank responses are looked at separately (Section 7.4.8).

Theme 1 - involve authority figure. Responses in this theme followed a general pattern where most participants would turn to a higher authority in order to resolve the problem at hand. Participants described how they could not resolve the situation on their own without the help of a figure of authority present.

Theme 2 – brother takes drugs. These responses suggested that in a similar situation the logical conclusion would be that the brother would be persuaded to take drugs, suggesting that it was an irresistible offer that could not be passed up.

Theme 3 – keep secret. This theme encompasses responses prioritising keeping the situation secret from any figure of authority and resolving the situation completely on their own without the possible hindrance or help of any figure of authority.

Theme 4 - peer pressure. Responses in this category referred to being swayed to try drugs or think of them in a positive light in order to appease friends or fit in socially.

Theme 5 - drugs are negative/harmful. Responses in this theme in response to Drugs Story B suggested that drugs are harmful, and that those who do drugs are aware of the negative consequences of drugs and continue doing drugs without any real care for their own physical or mental health.

Table 7.10. Drug Story B – Percentage distribution of total responses across the five themes

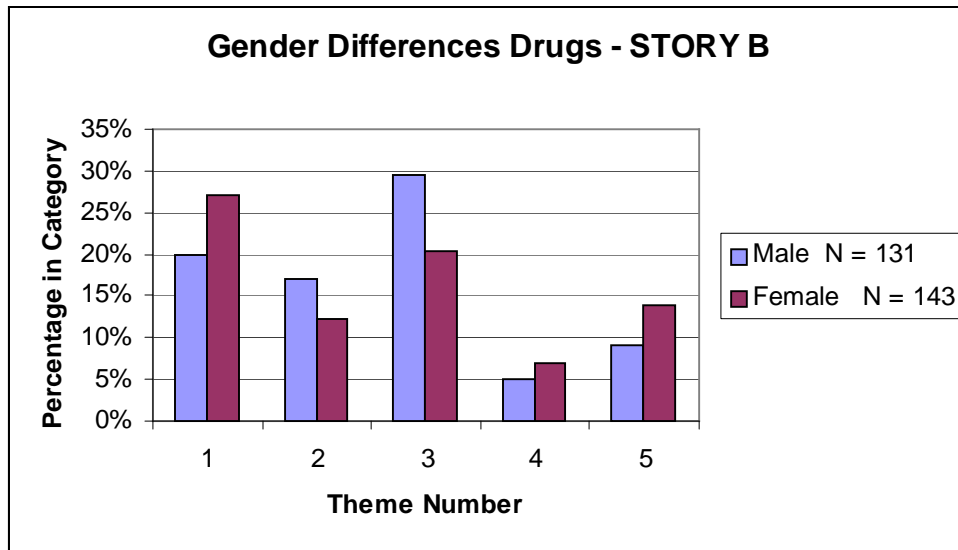
Theme	1. involve authority	2. brother takes drugs	3. keep secret	4. peer pressure	5. drugs are harmful	6. blanks
Percentage	26.6%	15.3%	22.6%	4%	8.8%	22.6%
N= 274	n = 73	n = 42	n = 62	n = 11	n = 24	n = 62

As with Drug Story A, this vignette yielded quite a lot of blank responses (Table 7.10.), which are analysed further in section 7.4.8. Among the themes that emerged in response to this story, the most common was reference to involving an authority figure, usually a parent, in addressing the situation (Table 7.10.). This was the highest subscribed theme among three of the four age groups but the oldest participants, 16/16 year-olds, made more responses suggesting that either Jim’s brother would also try drugs or that the drug taking should be kept secret (Table 7.11.).

Table 7.11. Drugs Story B – Percentage of responses by each age group falling into each theme.

Age groups	12/13	14	15	16/17
Total = 274	N = 64	N = 104	N = 43	N = 63
Report to parents so to make him stop.	29.3%	24.4%	30%	25.3%
Persuade brother to take drugs	14%	10.4%	9.3%	28.5%
Keep it secret and deal with it on one's own	24%	18.6%	25.5%	26.9%
Peer pressure is root cause	1.5%	4.6%	12%	0%
Drugs are harmful	1.5%	12.5%	9.3%	9.5%

Figure 7.4. Drugs Story B – Percentage of responses by males and females falling into each theme.



Statistical Analysis Themes

The four most common themes (1, 2, 3 & 5) were explored further by a MANOVA (4 (age groups) x 2 (gender) x 4 (themes)).

Theme 1 – involve authority figure. There was no significant main effect found for this first theme, $F(3, 266) = .296, p = .828$. All participants appear to be roughly similar in terms of their concordance that outside help is necessary when dealing with a situation involving drugs.

There was no gender effect observed either, $F(1, 266) = .791, p = .375$. It is notable however that there was a significant age by gender interaction for this theme, $F(3, 266) = 8.4, p = .000$, suggesting theoretical importance in terms of the relationship between age and gender in terms of seeking outside support for help when a situation is considered of greater magnitude.

Theme 2 – brother takes drugs. A developmental main effect was observed for this theme, $F(3, 266) = 6.1, p = .000$. A Post Hoc Tukey (HSD) was applied to reveal that 16/17-year-olds were significantly different from every other age group: 12/13-year-olds ($p = .002a$), 14-year-olds ($p = .000a$), 15, ($p = .002a$). The eldest of participants are more likely to endorse risk-taking behaviour than young participants are willing to do. Indeed, a trend that is highly significant in terms of problem solving in a possibly harmful situation.

There was no observable main effect for gender, $F(1, 266) = .350, p = .089$. No interaction was observed, $F(3,266) = .095, p = .758$. There was a significant age by gender interaction, $F(3,266) = 18.2, p = .000$, suggesting that there is an important, mutually dependent relationship in terms of how age and gender affect decision-making in this story.

Theme 3 – keep secret. There is no main effect for age differences for this particular theme, $F(3, 266) = 1.9, p = .125$. All age groups appear to be similar in terms of keeping matters concerning drugs in a private arena.

There was no gender main effect either, $F(1, 266) = 2.4, p = .119$. Once again, though, there is a highly significant interaction between gender and age for this theme, $F(3, 266) = 12.0, p = .000$. This suggests that there is a statistically strong likelihood that age and gender together play a role in how participants cope with situations that are considered too delicate to share with a general audience.

Theme 5 – drugs are negative/harmful. For the last theme no main effect was found for age differences, $F(3, 266) = 4.7, p = .419$. There was no statistical difference observed in participant's view of how harmful drugs can be. Numerically speaking, the

youngest participants subscribe less to the idea that drugs can be harmful than older participants. This was not confirmed statistically however.

In terms of gender differences, no differences were observed between males and females. In other words, no main effect for gender was found, $F(1, 266) = 1.1, p = .283$. Like all the other themes, there was a highly significant main effect for age and gender interaction, $F(3, 266) = 6.6, p = .000$. This suggests that age and gender together do play an important role in perceptions of how harmful an activity can be. In terms of risk, this suggests that age and gender do play a role in terms of how participants see risk, or understand risk in their environs.

7.4.2.3 Summary of findings for Drugs stories A and B

There are certainly some developmental trends that do present themselves in common between both stories. The influence of peers on participants is notable. This is followed through in STORY B themes, with the significant finding that older participants are more likely to endorse risk-taking behaviour as they become older. This plays an important role when considered in problem-solving terms. The influence of others appears particularly notable as a theme that unites the responses. It is important to note that participants all seem to have a base knowledge of the effect that drugs can have, even though older participants may more often cite health concerns perhaps due to greater experience, it still stands that all participants appear to have a running knowledge of the effect of drugs.

7.4.3 GAMBLING

7.4.3.1 Gambling Story A:

Katie liked to play lottery scratch cards for she found it very exciting. She had used all her own pocket money buying them up. She decided to break her little sister's piggy bank in order to get some more scratch cards. She was caught doing this. Based on your experience or your knowledge of a similar situation, what would happen next and why?

Themes

Four themes were highlighted in response to this story, labelled 1 through 4. Blanks are analysed further in section 7.4.8.

Theme 1 – gambling causes trouble. Responses in this theme suggested that those who participated in gambling would find themselves in trouble. This included financial trouble and trouble with parents, as opposed to any trouble with legal bodies such as the police as had been hinted at in earlier topics.

Theme 2 – negative consequences of stealing. These responses referred to the negative consequences that stealing entailed. Participants noted that stealing, and in this case stealing to fund gambling such as a scratch lottery, would be prejudicial.

Theme 3 – gambling as addiction. These responses viewed gambling as a form of illness that, like drugs, required rehabilitation. Gambling was seen as an addiction that required professional help to be overcome.

Theme 4 – lose money. Responses in this theme proposed that people who gamble lose money, which would not be recuperated. The odds were against one when gambling or in other words gambling did not have a positive financial dividend.

Table 7.12. Gambling Story A – Percentage distribution of total responses across the five themes

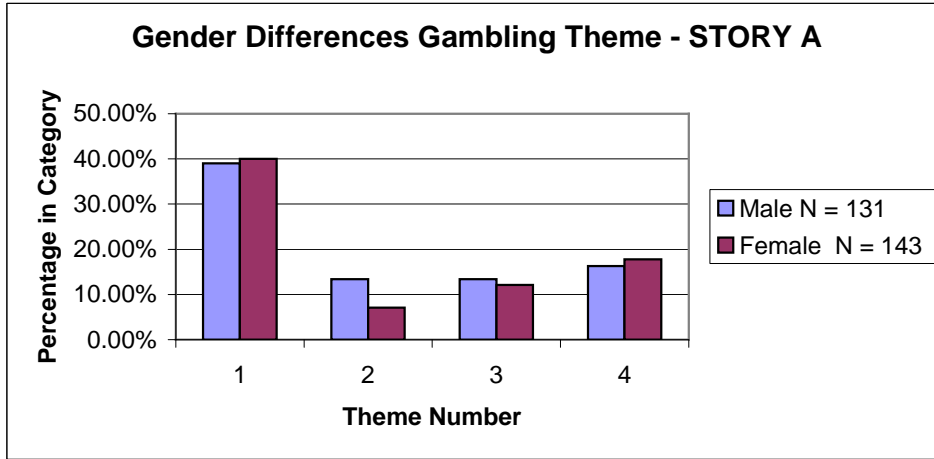
Theme	1. get into trouble	2. stealing has consequences	3. addiction/rehab	4. lose money	5. Blanks
Percentage	55.8%	4.5%	15.9%	18.9%	4.9%
N= 269	n = 150	n = 12	n = 43	n =51	n = 13

This story produced a very high response rate with fewer than 5% returning a blank (Table 7.12.). All four themes that emerged in response to this story can be viewed as negative. One theme in particular, that Katie would get into trouble, stood out above all others as the most likely outcome (Table 7.12.). This was consistent across all age groups (Table 7.13.) and both sexes (Figure 7.5.).

Table 7.13. Gambling Story A – Percentage of responses by each age group falling into each theme.

Age group	12/13	14	15	16/17
Total = 269	N = 67	N = 98	N = 46	N = 58
1. Get into trouble.	46.2%	54%	69.5%	58.6%
2. Stealing has consequences.	4.5%	6.1%	4.3%	1.7%
3. Addiction / Rehab	7.4%	20.4%	15.2%	18.9%
4. Lose Money	34.3%	14.2%	6.5%	18.9%

Figure 7.5. Gambling Story A – Percentage of responses falling into each theme by gender.



Statistical Analysis Themes

As only four themes emerged these are all analysed further by age and gender by a MANOVA (4 (age groups) x 2 (gender) x 4 (themes))

Theme 1 – gambling causes trouble. A main effect of age was observed for this theme, $F(3, 261) = 3.3, p = .012$. A Post Hoc analysis (Tukey HSD) revealed that the main difference lay between 12/13 year-olds and 15 year-olds ($p = .026a$), with the younger participants expressing this view less often than the older ones.

There was no main effect for gender differences, $F(1, 261) = .161, p = .689$. No interaction was observed, $F(3,261) = .199, p = .897$.

Theme 2 – negative consequences of stealing. There were no main effects for age, $F(3,261) = .081, p = .970$, or gender, $F(1,261) = .185, p = .174$, for this theme. No interaction was observed either, $F(3,261) = 1.1.54, p = .328$.

Theme 3 – gambling as addiction. There was a main effect of age, $F(3, 261) = 3.1, p = .025$. Post hoc analysis was conducted with a Tukey (HSD), which revealed

differences between 12/13 year-olds and 14 year-olds ($p = .013a$). This suggests that there is an early change in the way participants view gambling. A larger percentage of 14 year-olds expressed to the view that gambling is an addiction and would require rehabilitation. It is unclear from the responses themselves why gambling would be seen as an addiction, so little comment can be made on whether these responses are based on changes in experience or general understanding of gambling.

No gender differences were found for this theme, $F(1, 261) = .766$, $p = .08$. No interaction was observed, $F(3, 261) = 1.223$, $p = .302$.

Theme 4 – lose money. A main effect for age was found for this theme, $F(3, 261) = 7.6$, $p = .000$. Post hoc analysis revealed that the 12/13 year-olds produced responses in this theme significantly more than the 14 year-olds ($p = .013a$) and 15 year-olds ($p = .000a$).

There was no main effect for gender, $F(1, 261) = .029$, $p = .864$. No interaction was observed, $F(3, 261) = 1.306$, $p = .273$.

7.4.3.2 Gambling Story B:

Les had spent all his money on slot machines. He did not have any more money to spend and was very keen on spending some more so asked to borrow some from Andrea. Andrea thought that perhaps he had had enough. Based on your experience or your knowledge of a similar situation, what would happen next and why?

Themes

Four themes emerged in response to this story are labelled 1 to 4. Blank responses are explored separately in section 7.4.8.

Theme 1 – rely on Andrea. These responses all proposed that Les would rely on Andrea to get money. These responses conveyed the view that Les would find the money at any cost, and gambling could always be funded via alternate means.

Theme 2 – stealing. Responses in this theme suggested stealing would be the preferred means to an end to fund gambling. These responses contained an overtone that those who gambled were corrupt and would resort to other corrupt tactics to gain this money illicitly.

Theme 3 – lose money. This theme brought together all responses that suggested that Les would more than likely lose all money gained, and that gambling does not reap any profits in real life. Respondents made a distinct connection with gambling in real-life situations.

Theme 4 – addiction. This theme comprised all responses suggesting that Les had a gambling problem defined in direct terms as an “addiction.”

Table 7.14. Gambling Story B – Total percentage of responses across all themes

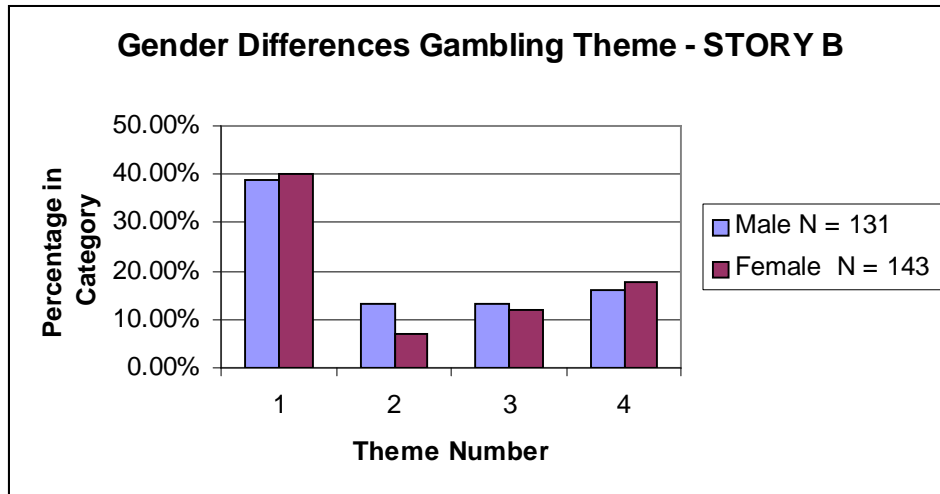
Theme	1. Rely on Andrea	2. Stealing	3. Lose money	4. Addiction	5. Blanks
Percentage	37.2%	11.3%	10.6%	16.8%	24.1%
N= 274	n = 102	n = 31	n = 29	n = 46	n = 66

The most common theme among responses to this story was the idea that Les would rely on Andrea to fund his gambling. This was the most common theme across all age groups (Table 7.15) and both sexes (Figure 7.6.). Stealing as a means to an end (i.e. to fund gambling) was a common theme among the 14-year-olds and the 16/17 year-olds but less so among the responses from the other two age groups (Table 7.15). This story also produced a high proportion of blank responses, which are examined further in section 7.4.8.

Table 7.15. Gambling Story B - Percentage of responses by each age group falling into each theme.

Age group	12/13	14	15	16/17
Total	N = 64	N = 104	N = 43	N = 63
1. Rely on Andrea	37.5%	41.3%	37.2%	30.1%
2. Stealing	3.1%	17.3%	4.6%	14.2%
3. Lose money	3.1%	12.5%	20.9%	7.9%
4. Addiction	14%	13.4%	30%	15.8%

Figure 7.6. Gambling Story B – percentage of responses by males and females falling into each theme.



Statistical Analysis Themes

All four themes are examined further for age and sex differences with a MANOVA (4 (age groups) x 2 (gender) x 4 (themes))

Theme 1 – Rely on Andrea. There was no main effect of age, $F(3, 266) = .951, p = .416$ or gender, $F(1, 266) = 1.8, p = .130$. There was an age by gender interaction ($3, 266) = 5.2, p = .002$. It suggests an important relationship exists between age and gender in terms of how often participants believe risk-taking behaviour is condoned by others. In this particular scenario, Andrea funds the gambling with her own money. Older participants appear to believe in terms of percentages that this would be less likely to occur.

Theme 2 – Stealing. There was no main effect of age for this theme, $F(3, 266) = 1.9, p = .130$, or for gender, $F(1, 266) = .094, p = .760$. No interaction was observed, $F(3, 266) = 2.23, p = .081$.

Theme 3 – lose money. There was no main effect of age for this theme , $F(3, 266) = 1.39, p = .245$. However, there was a main effect of gender, $F(1, 266) = 19, p = .000$. More males proposed that money would be lost compared to female participants. There was a trend toward significance in the interaction between age and gender for this theme, $F(3, 266) = 2.5, p = .055$.

Theme 4 – addiction. A main effect for age was observed for this theme, $F(3, 266) = 4.9, p = .002$. Post Hoc analysis unpacked the initial finding, demonstrating that the main differences lay between 12/13 - year olds and 14 ($p = .008a$) and 15 – year-olds ($p = .018a$). As participants matured they appear to develop a less marked sense that gambling is a non-profitable venture. This could possibly be reflected in experience, with the assumption that older participants may have a greater understanding of gambling's virtues having lived longer and been exposed to it.

No main effect was observed for gender, $F(1, 266) = .490, p = .485$. An interaction between age and gender was not observed, $F(3,261) = 2.56, p = .055$, though it does suggest a trend.

7.4.3.3 Summary for A and B

This topic has a few themes that unite it together across the stories (A & B). The idea that gambling is related to a dangerous activity, a risk activity, prevails through both topics even though age differences were not always corroborated. It does demonstrate a valid understanding from an early age (12/13-years-old) that gambling is not associated with positive virtues. These views become less pronounced as participants mature, suggesting a more lenient outlook on risk behaviour. Participants in both stories suggest

that stealing is a means for subsidizing the act of gambling. Stealing is not a socially sanctioned method of problem-solving, yet it is consistently suggested as one way to fund gambling (suggesting it would not be funded through other legal methods). Younger participants' assumption that gambling and addiction go hand in hand also appears to be a less experience-based view of the act itself, as older participants do not adhere to the same view of the act itself.

7.4.4 SMOKING

7.4.4.1 Smoking Story A:

Mary, Susan, and Stacey were invited to a house party. Everyone at the party had a cigarette in their hand. Mary smoked, but Susan and Stacey did not. Mary told her friends that they looked out of place without a cigarette. Based on your experience or your knowledge of a similar situation, what would happen next and why?

Themes

Responses to this story fell into one of two themes. Blank responses were analysed separately (Section 7.4.8).

Theme 1 – peer pressure. Responses in this theme referred to the influence of peers on smoking. In general, all responses referred to the social pressures that existed to smoke or conform so that participants would not look “out of place” OR so they could “fit in”.

Theme 2 – smoking is harmful. These responses referred to the physical harm that may result from smoking including diseases such as cancer.

Table 7.16. Smoking Story A – Percentage distribution of total responses across the five themes

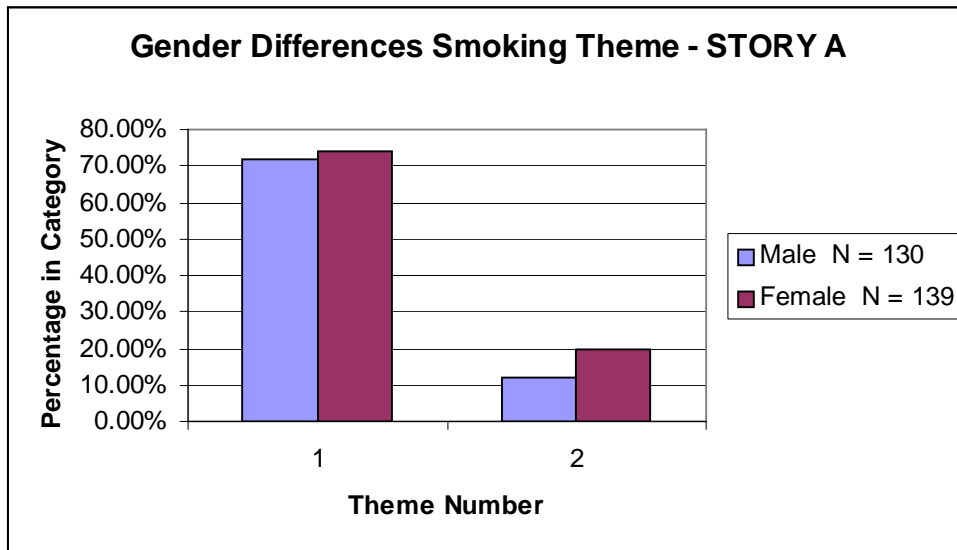
Theme	1. Peer pressure	2. Smoking is harmful	3. Blanks
Percentage	64.3%	13%	22.7%
N= 269	n = 173	n = 35	n = 61

Of the two themes that emerged in response to this story, the influence of peer pressure on how Susan and Stacey would behave was by far the more common (Table 7.16.). This was consistent across all age groups (Table 7.17.) and for both sexes (Figure 7.7).

Table 7.17. Smoking Story A – percentage of responses by age group in each theme

STORY A	12/13	14	15	16/17
	N = 67	N = 98	N = 46	N = 58
1. Peer Pressure	50.7%	60.2%	67.3%	84.4%
2. Smoking is harmful	22.3%	6.1%	13%	14%

Figure 7.7. Smoking story A - Percentage of responses made by males and females falling into each theme



Statistical Analysis Themes

A MANOVA (4 (age groups) x 2 (gender) x 2 (themes) was used to observe differences.

Theme 1 – peer pressure. No main effect but a trend towards significance was observed between participant age groups for this initial theme, $F(3, 261) = 3.0, p = .028$ (using a Bonferroni adjusted alpha level of .025). In terms of the percentage of each participant that adhered to this theme, the trend that appeared is that as participants became older they acknowledged a greater amount of peer pressure. This trend could not be confirmed by between age group comparisons. There was no main effect for gender, $F(1, 261) = .378, p = .539$. No interaction was observed, $F(3, 261) = .563, p = .640$.

Theme 2 – smoking is harmful. Developmental differences were observed for the second theme, $F(3, 261) = 4.3, p = .005$. A post hoc Tukey (HSD) revealed that the variance in place was caused by differences between 12/13 year-olds and 14 year-olds (p

= .005a) and between 14 year-olds and sixteen year-olds ($p = .049$). Younger participants stated more often that smoking was harmful than older students did.

No main effect was observed for gender, $F(1, 261) = .448, p = .504$. No interaction was observed, $F(3, 261) = 1.9, p = .116$.

7.4.4.2 Smoking Story B:

Michael and his friend Ian were walking back home one afternoon after school. Michael reaches into his pocket and pulls out a packet of cigarettes. Both Michael and Ian are under 16. Michael offers Ian a cigarette. Ian said he did not smoke. Based upon your experiences or your knowledge of a similar situation, what would happen next and why?

Themes

A total of three themes emerged for this story. Blank responses are considered separately (Section 7.4.8)

Theme 1 – peer pressure. This theme encompassed responses where participants noted that the influence of their peers was important in terms of their decision making processes, and peer acceptance was seen as of paramount importance in terms of the decision to smoke or not.

Theme 2 - smoking is bad. Responses in this theme referred to smoking as something that is risky and illegal for those under the age of 16 (2004). It also denotes that smoking can cause negative health effects.

Theme 3 – addiction. These responses express the view that smoking can lead to addiction. Responses stress the ability of cigarette-smoking to cause dependency.

Table 7.18 Smoking Story B – Percentage distribution of total responses across the five themes

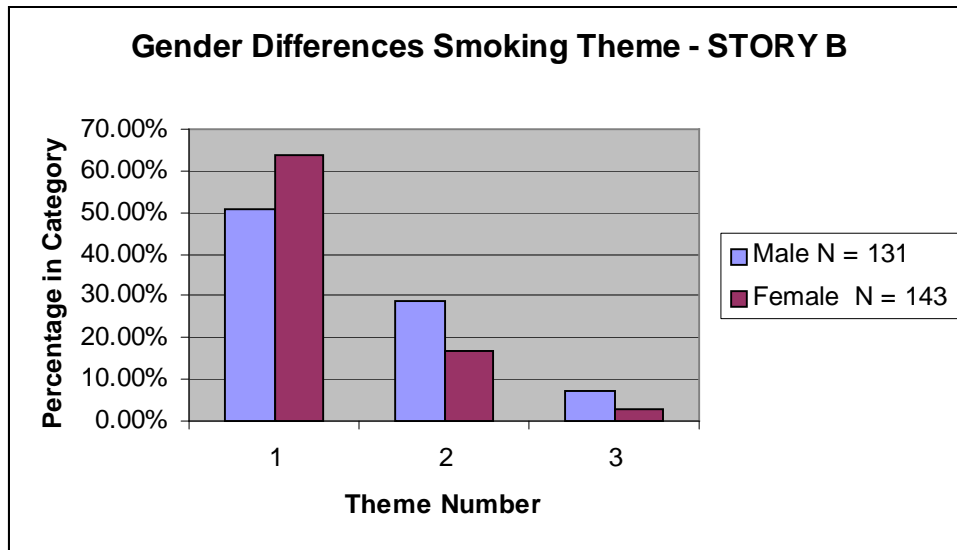
Theme	1. peer pressure	2. smoking is bad	3. addiction	4. blanks
Percentage	57%	17.9%	2.6%	22.5%
N= 274	n = 156	n = 49	n = 7	n = 62

Over half of the responses to this story fell into the theme of peer pressure (Table 7.18.). This applied to each age group (Table 7.19.) and both sexes (Figure 7.8.).

Table 7.19. Smoking Story B – percentage of responses by each group falling into each theme.

Age group	12/13	14	15	16/17
Total	N = 64	N = 104	N = 43	N = 63
1. Peer Pressure	50%	60.5%	67.4%	50.8%
2. Smoking is "bad"	23.4%	17.3%	11.6%	17.4%
3. Addiction	4.6%	2.8%	0%	1.5%

Figure 7.8. Smoking Story B - Percentage of each theme by gender



Statistical Analysis Themes

Theme 1- peer pressure. No main effect for age group differences was revealed for the first theme, $F(3, 266) = 1.7, p = .165$. In terms of percentages, over half of the participants responding in this story answered that peer pressure was the major factor in the reason why fellow adolescents smoked.

No gender differences were observed for this theme either, $F(1, 266) = .056, p = .813$. However, there was a significant main effect for age by gender interaction for this story, $F(3, 266) = 7.1, p = .000$. The interaction of age and gender appear to have a strong influence on adolescent decision-making, in this case deciding whether to smoke or not smoke.

Theme 2 – smoking is bad. No main effect for age was observed for this story, $F(3, 266) = .240, p = .868$. In terms of percentage displayed for inclusion within each theme, there is a complex story with a hint that younger participants believe that smoking

holds negative effects and as participants age this belief diminishes. This trend can only be deduced and is not verified statistically.

A main effect for gender was observed, $F(1, 266) = 14.3, p = .000$, suggesting that more males than females view smoking as harmful or dangerous. No interaction was observed, $F(3,266) = 2.1, p = .093$.

Theme 3 – addiction. A significant main effect for age presented itself for this theme, $F(3, 266) = .11.6, p < .0005$. In order to discern where the actual differences lay, a Tukey (HSD) test was performed, demonstrating that 15 year-olds were significantly different from 12/13 year-olds ($p = .028a$) and 16/17 year-olds ($p = .000a$) and 14 year-olds ($p = .001a$). As participants got older, fewer participants adhered to the assumption that smokers would become addicts by virtue of trying cigarettes.

No significant main effect was observed for gender differences on this topic, $F(1, 266) = 5.5, p = .020$. An interaction was observed, $F(3,266) = 11.6, p = .000$, denoting an important relationship between how age and gender hold and influential role on the decision to smoke.

7.4.4.3 Summary for A and B

The most salient trend for both of these stories was the influence that peers have on decision-making in terms of whether to smoke or not to smoke. Over half of participants in both stories describe that peer pressure is the main influence in the decision-making process behind whether one smokes or does not.

A second thread that unites both these stories, and which has been observed before is younger participants describing smoking as an action or behaviour that would involve

harm or would bring addiction, but this initial sense of apprehension towards smoking eases as participants mature. The initial understanding that smoking is a negative behaviour is present, but this appears to wear off as participants become more mature or gain greater experience with age.

7.4.5 SEXUAL BEHAVIOUR

7.4.5.1 Sexual Story A:

Nelson was bragging to friends in the locker room about him having had sexual intercourse with someone he had just met. His best friend Nick knew that he was making this story up. Based on your experience or your knowledge of a similar situation, what would happen next and why?

Themes

For Question A, a total of four different themes were observed in the data and were analysed. For convenience each individual theme is labelled from 1 through 4 and will be analysed accordingly (Please see Table 7.20)

Theme 1 – feel good. Responses in this category suggested that bragging about sexual experiences was a positive aspect in that it enhanced self-esteem.

Theme 2 – negative reaction. These responses suggested that a negative reaction would ensue to the locker room bragging that was occurring. Lying, specifically, was not seen to be positive.

Theme 3 – embarrassment. This theme grouped responses suggesting that other people would embarrass Nelson as a form of social punishment for lying.

Theme 4 – fighting. Responses in this theme suggested that violence would be used to deal with the situation. In other words, Nelson would be assaulted for telling this story.

Table 7.20. Sex Story A – Percentage distribution of total responses across the five themes

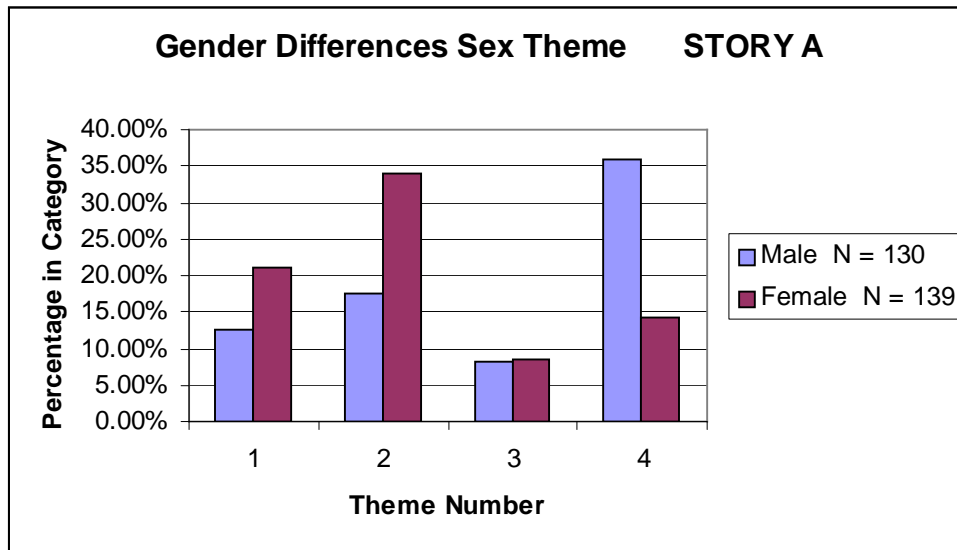
Theme	1. feel good	2. negative reaction	3. embarrassmen t	4. fighting	5. Blanks
Percentage	13.8%	39%	12.7%	16%	18.5%
N= 269	n = 37	n = 105	n = 34	n = 43	n = 50

The most common theme to emerge in response to this story involved Nelson’s friends reacting negatively to him lying about having sex (Table 7.20). This was consistent across all age groups (Table 7.21) but not across both sexes. While this was the most common theme of the responses made by girls to this story, the most common theme for boys’ responses involved violence towards Nelson (Figure 7.9).

Table 7.21. Sex Story A- percentage of responses by each age group falling into each theme

Age group	12/13	14	15	16/17
Total = 269	N = 67	N = 98	N = 46	N = 58
1. Feel good.	13.4%	18.3%	13%	6.8%
2. Negative reaction	32.8%	40%	50%	34.4%
3. Embarrassment	7.4%	14.2%	4.3%	14%
4. Fighting	11.9%	17.3%	14%	17.2%

Figure 7.9. Sex Story A - Percentage of responses falling into each theme



Statistical Analysis Themes

A MANOVA (4 (age groups) x 2 (gender) x 4 (themes) to look at differences between stories.

Theme 1 – feel good. No main effect for age was observed for this theme, $F(3, 261) = .827$, $p = .480$. Female participants appeared to believe that a male would be more likely to brag about sexual relations, although this was not confirmed statistically, $F(1, 261) = 2.6$, $p = .106$. No interaction was observed, $F(3, 261) = .636$, $p = .593$.

Theme 2 – negative reaction. There was no main effect of age, $F(3, 261) = 1.1$, $p = .319$ or gender for this story, $F(1, 261) = .113$, $p = .737$. No interaction was observed, $F(3, 261) = .176$, $p = .913$.

Theme 3 – embarrassment. There was a main effect of age for this theme, $F(3, 261) = 3.7$, $p = .0120$ (Bonferroni Correction of alpha of .0125). A post hoc analysis showed that differences lay between the 15-year olds and the 16/17 ($p = .029$) with the

older group more likely to use embarrassment as a means to an end. No main effects for gender were produced, $F(1, 261) = .448, p = .012$. No interaction was observed, $F(3, 261) = 1.0, p = .379$.

Theme 4 – fighting. No main effect of age was observable for this theme, $F(3, 261) = .625, p = .6$. There was an effect of gender, $F(1, 266) = 1.9, p = .000$, with more males producing responses in this theme than females. No interaction was observed, $F(3, 261) = 1.47, p = .221$.

7.4.5.2 Sexual Story B:

Susie and Henry had met each other at a party. They found each other mutually attractive. Henry brought Susie back to his room. Before they continued Susie and Henry realised they did not have any contraception. Susie was worried about getting pregnant. Based on your experience or your knowledge of a similar situation, what would happen next and why?

Themes

A total of six different themes emerged from the responses labelled from 1 through 6. Blank responses will be looked at separately (Section 7.4.8).

Theme 1 – pregnancy. Responses in this theme suggested that sexual intercourse would occur and that it is more than likely that she will become pregnant because of coitus.

Theme 2 - abortion. These responses suggested that in such a situation, where a condom was not available, that an abortion was a logical means of contraception. Participants mentioned using the morning after pill.

Theme 3 – STI. This theme clustered all responses where it was noted that a Sexually Transmitted Infection could occur as a consequences of having unprotected sex.

Theme 4 – sex with condom. These responses referred to only proceeding with intercourse if they had a condom.

Theme 5 – abstain. Responses in this theme described how the most likely conclusion would be to abstain from intercourse.

Theme 6 –ignore consequences. This theme covered responses that referred to having sex without using a condom. Any possible consequences would be ignored and sexual intercourse would proceed.

Table 7.22. Sex Story B – Percentage distribution of total responses across the five themes

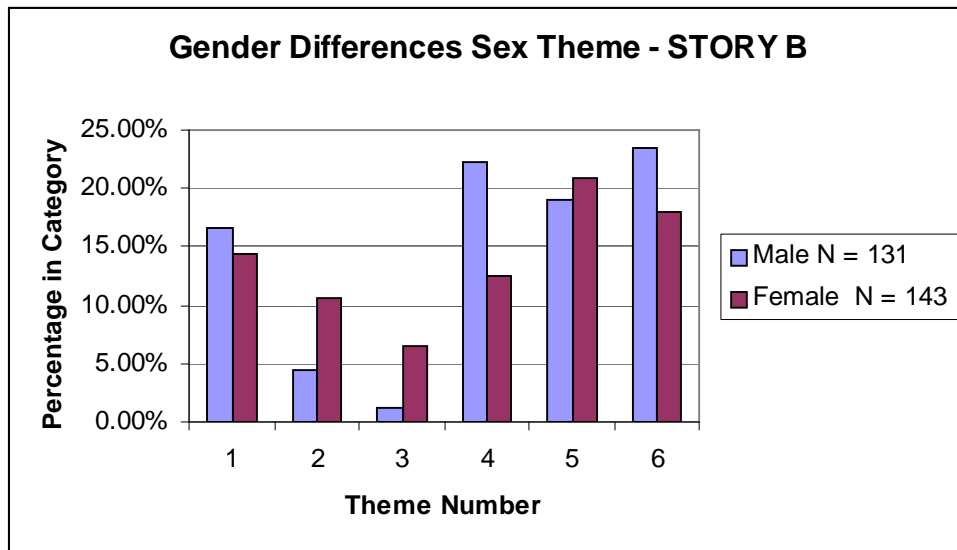
Theme	1. pregnancy	2. abortion	3. STI	4. sex with condom	5. abstain	6.ignore consequences	7. blanks
Percentage	16.4%	5.5%	3.3%	17.1%	21.9%	22.3%	13.5%
N= 274	n = 45	n = 15	n = 9	n =47	n = 60	n = 61	n = 37

Of the six themes the one that occurred most often was that Henry and Susie would proceed to have sex without a condom and ignore the possible consequences, although interestingly the next highest category of responses was that they would abstain from intercourse (Table 7.22). Risk of unprotected sex was primarily associated with pregnancy with fewer than 4% mentioning the possibility of catching a sexually transmitted infection (Table 7.22).

Table 7.23. Sex Story B – percentage of responses by each age group falling into each theme.

Age group	12/13	14	15	16/17
Total = 274	N = 64	N = 104	N = 43	N = 63
1. She would get pregnant, that is what usually happens.	25%	16.3%	16.2%	7.9%
2. Have sex and then have an abortion afterwards.	3.1%	4.8%	6.9%	7.9%
3. Mentioning an STI	17.1%	3.8%	6.9%	1.5%
4. Have sex with a condom.	21.8%	14.4%	16.2%	17.4%
5. Abstain from sex.	14%	24%	20.9%	26.9%
6. ignore consequences	19%	24%	23.2%	22.2%

Figure 7.10. Sex story B - percentage of responses by males and females falling into each theme



Statistical Analysis Themes

The four most common themes were: 1, 4, 5, & 6. A MANOVA (4 (age groups) x 2 (gender) x 4 (themes) looked at differences between themes.

Theme 1 – pregnancy. There was no main effect for age, $F(3, 266) = 1.7, p = .157$ or for gender, $F(1, 266) = .005, p = .943$ for this particular theme. There was a significant interaction between age and gender for this theme, $F(3, 266) = 4.5, p = .004$. Percentage scores for inclusion in the theme show that male and female participants as they mature believe that it is less likely to get pregnant from having sexual intercourse.

Theme 4 – sex with condom. There was a main effect for age, $F(3, 266) = 4.3, p = .006$. A post hoc analysis (Tukey (HSD) revealed that 15 year-olds were significantly different from 12/13 year-olds ($p = .004$) and 14 year-olds ($p = .001$) and 16/17 year-olds ($p = .000$).

No main effect was observed for gender, $F(1, 266) = 3, p = .084$ for this particular theme but there was an interaction effect between age and gender, $F(3, 266) = 7.5, p = .000$. As participants mature it appears that they make the decision to use or sanction the use of condoms *less*.

Theme 5 – abstain. There was no main effect for age found for this theme, $F(3, 266) = .112, p = .953$. A main effect of gender was observed $F(1, 266) = 33, p = .000$ ($p < .0005$) for this theme, suggesting that females may abstain from having sex or may choose not to have sex more often than males when placed in a similar situation.

Theme 6 – ignore consequences. There was no main effect observed for age for this theme, $F(3, 266) = .726, p = .537$ and neither was there an effect of gender, $F(1,$

266) = 3.5, $p = .062$. There was a significant interaction between age and gender for this story however, $F(3, 266) = 6.2, p = .000$. This suggests that combined, age and gender together play an important role in decision making when it comes to having sex without a condom.

7.4.5.3 Summary for Sexual stories A and B

As a common thread between both stories, younger participants demonstrate an awareness of the risks involved in behaviours that could lead to potential problems such as injury or disease. In story A, younger participants are keenly aware that lying about sexual behaviour is not a sanctioned behaviour. Likewise, younger participants in Story B are aware that unprotected sex can lead to sexually transmitted infections (i.e Chlamydia), and claim to endorse sex without a condom less frequently and abstain from sex more frequently than older counterparts. This initial understanding about risk does not translate into effective problem-solving as participants mature. Older participants are more likely to engage in sex without a condom than their younger counterparts. It appears counterintuitive that this decision process is reversed between younger participants and older participants. We have already established in our earlier studies that younger participants and older participants are equally effective in their problem-solving. It appears that there is a further mechanism shaping the behaviour of these participants as they mature where inhibition of these responses is overridden in favour of the riskier behaviour. One suggestion is that the type of experience that these teenagers are engaging in may influence their actual decision-making. This is something that needs to be further explored, but provides an interesting insight.

7.4.6 FRIENDSHIP

7.4.6.1 Friendship Story A:

Matt and Chris were good friends. Chris noticed, however that his friend Matt was not treating his girlfriend with respect. He did not know whether to say something to him or not. Based on your experience or your knowledge of a similar situation, what would happen next and why?

Themes

A total of four different themes were observed.

Theme 1 – confrontation. This theme referred to all responses that suggested a confrontation would occur.

Theme 2 – violence. This theme included all responses where physical violence would be used as a means to an end, with physical force being used as the way to solve the problem.

Theme 3 – argument. Responses in this theme expressed the view that Matt and Chris ended up using violent words to resolve the situation.

Theme 4 – discuss feelings. These responses proposed that Matt and Chris would express their feelings and bring about an amicable solution.

Table 7.23 Friendship Story A – Percentage distribution of total responses across the five themes

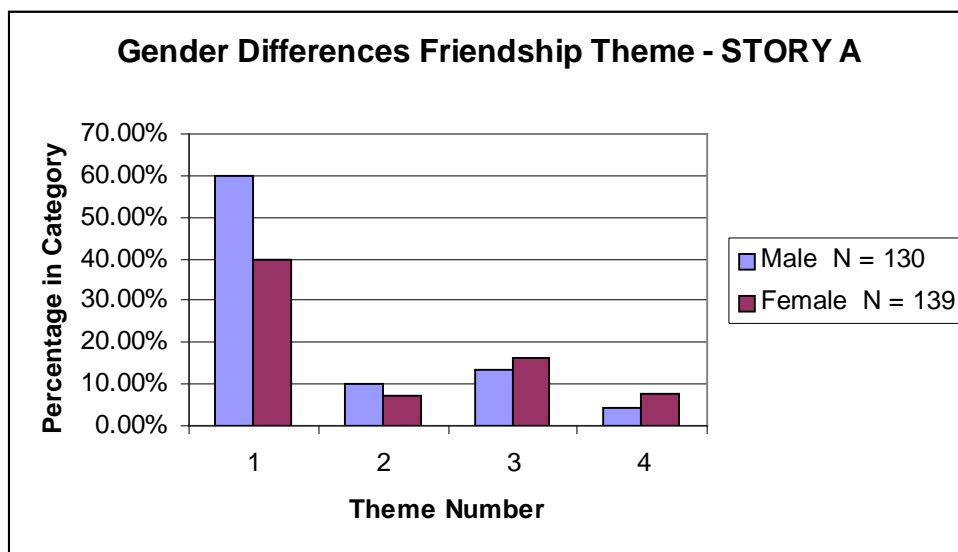
Theme	1. confront- ation	2. violence	3. argument	4. discuss feelings	5. Blanks
Percentage	54%	4.5%	12.3%	9.7%	19.8%
N= 269	n = 145	n = 12	n = 33	n =26	n = 53

The most common theme to emerge from the responses involved a confrontation between Matt and Chris (Table 7.23). This was consistent across all ages (Table 7.24) and both sexes (Figure 7.11.). Approximately 10% of responses suggested Matt and Chris discuss their feelings and reached an amicable agreement (Table 7.23).

Table 7.24. Friendship Story A – Percentage of responses by each age group falling into each theme.

Age group	12/13	14	15	16/17
Total = 269	N = 67	N = 98	N = 46	N = 58
1. Confrontation	44.7%	47.9%	52.1%	75.8%
2. Violence	1.4%	3%	13%	3.4%
3. Argument.	5.9%	16.3%	17.%	8.6%
4. Feelings Discussed.	5.9%	14.2%	13%	3.4%

Figure 7.11. Friendship Story A – percentage of responses by males and females falling into each theme.



Statistical Analysis Themes

All four themes were analysed further using a MANOVA (4 (age groups) x 2 (gender) x 4 (themes))

Theme 1 – confrontation. A main effect was found for age differences for the first theme, $F(3, 261) = 4.7, p = .003$. A Tukey (HSD) post hoc analysis revealed that 16/17 year-olds differed from all other participants: 15 year-olds ($p = .010a$), 14 year-olds ($p = .002a$), and 12/13 year-olds ($p = .006a$). As participant matured they appeared to have a greater interest in involving themselves in a social situation in order to protect social alliances. No gender effect was found for this theme, $F(1, 261) = .613, p = .434$. No interaction was observed, $F(3,261) = .405, p = .749$.

Theme 2 – violence. There was no main effect for age differences for this story, $F(3,261) = 2.4, p = .066$. Likewise, no gender differences were observed $F(1,261) = .013, p = .911$. No interaction was observed, $F(3,261) = 1.12, p = .339$.

Theme 3 – argument. There was no main effect for age differences for this story, $F(3,261) = 2.9, p = .035$. Likewise, no gender differences were observed $F(1,261) = .13, p = .274$. No interaction was observed, $F(3,261) = 1.3, p = .274$.

Theme 4 – discuss feelings. There was no main effect for age differences for this story, $F(3,261) = 1.8, p = .137$. A gender difference was observed however, $F(1, 261) = 7.6, p = .006$. Females would be more likely to suggest a solution where feelings were discussed and an amicable solution would be achieved. No interaction was observed, $F(3,261) = .042, p = .989$.

7.4.6.2 Friendship Story B:

Lara's friends are planning a slumber party. Lara has asked her mum permission to sleep over. Her mother feels it is not a good idea for her to do so. Lara's friends encourage her to sneak out in order for her to join them at the slumber party. Based on your experience or your knowledge of a similar situation, what would happen next and why?

Themes

Four different themes emerged in response to this story. Blank responses are analysed separately (Section 7.4.8).

Theme 1 – ignore Mum. This theme comprised responses proposing that to resolve the dilemma parental wishes would be ignored in order to attend a social function (sleep over)

Theme 2 – consequences. These responses stated that in this story the consequences of risky actions were evident.

Theme 3 – gets caught. Responses in this theme expressed the view that a figure of authority would become aware of the misbehaviour.

Theme 4 – peer pressure. These responses referred to social pressures and moirés shaping the decision making process.

Table 7.25. Friendship story B– Percentage distribution of total responses across the five themes

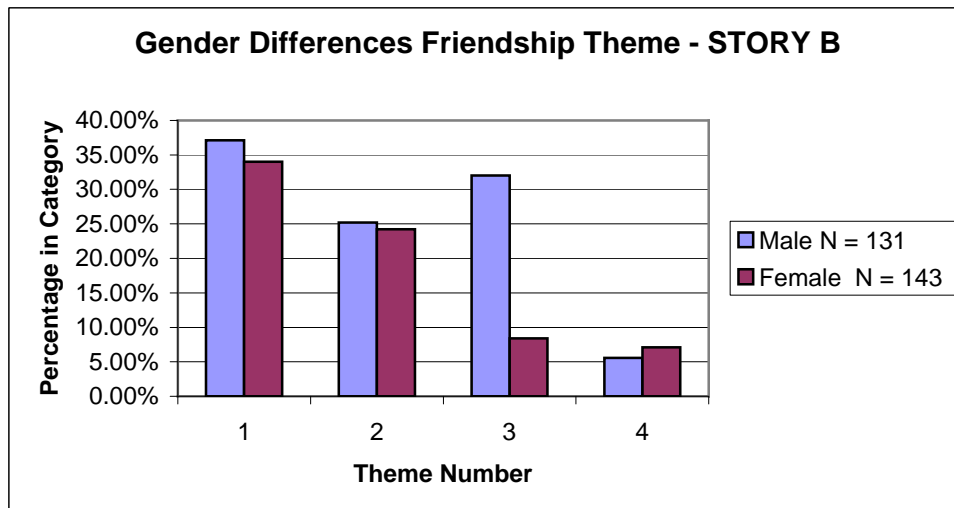
Theme	1. ignore Mum	2. consequences	3. gets caught	4. peer pressure	5. Blanks
Percentage	33%	26.7%	26%	10.6%	3.7%
N= 274	n = 91	n = 73	n = 71	n =29	n = 10

One third of responses proposed that Lara would ignore her Mum (Table 7.25) Getting caught or other negative consequences were about equally proposed in responses of a further quarter of responses each (Table 7.25).

Table 7.26. Friendship Story B – percentage of responses by each age group falling into each theme

Age group	12/13	14	15	16/17
Total = 274	N = 64	N = 104	N = 43	N = 63
1. Ignore Mum	39%	31.7%	25.5%	34.9%
2.Negative consequences.	25%	23%	34.8%	28.5%
3. Caught breaking rules.	26.5%	25.9%	13.9%	33.3%
4. Peer Pressure.	9.3%	23.4%	23.4%	3.1%

Figure 7.12. Friendship Story B - Percentage of responses for each theme by gender



Statistical Analysis Themes

All four themes were analysed further for age and sex differences. A MANOVA (4 (age groups) x 2 (gender) x 4 (themes)) was used to tease out differences.

Theme 1 – ignore Mum. There was no significant main effect for age, $F(3, 266) = 1.2, p = .305$ or gender, $F(1, 266) = .010, p = .919$. However there was a significant age by gender interaction, $F(3, 266) = 5.8, p = .001$. Males and females appear to disregard parental rule less often as they mature. No interaction was observed, $F(3, 266) = .095, p = .758$.

Theme 2 – negative consequences. A main effect for age was noted, $F(3, 266) = 3.9, p = .009$. Tukey's (HSD) revealed that the 15 year-olds produced responses referring to negative consequences significantly more than the 16/17 year-olds ($p = .041a$). No gender differences were observed, $F(1, 266) = 4.4, p = .037$. However an interaction between age and gender was revealed $F(3, 266) = 11.8, p = .000$, suggesting that males and females do become better at acknowledging the consequences of their behaviour as they become older. This suggests that it is not misinformation that is driving risk and that experience is shaping their actions.

Theme 3 – get caught. No main effect for age was observed for this theme, $F(3, 266) = 3.3, p = .020$, though there was a trend towards significance. No gender differences were revealed either $F(1, 266) = .065, p = .799$. A main effect for interaction was observed between age and gender, $F(3, 266) = 5.8, p = .001$. This suggests that males and females as they mature become more aware of their own behaviour.

Theme 4 - peer pressure. No main effect was found for age $F(3, 266) = 1.8, p = .144$, nor for gender $(1, 266) = .210, p = .647$. A main effect between age and gender was found, $F(3, 266) = 7.7, p = .000$, suggesting that as males and females matured they were more cognisant of the peer pressure that was exerted upon them in terms of the responses they provided for Story B.

7.4.6.3 Summary for Friendship Stories A and B

The general trends for this story are mixed. We do see a general endorsement of risk behaviour at early ages, particularly in terms of using physical violence or force to reach a goal or to resolve a troubled situation. The youngest participants also appear to endorse breaking rules in order to achieve their desired purpose (attending a social gathering).

Peer pressure is still evident as a factor that influences decision-making. Clearly, social influence does play a role on adolescent behaviour.

Overall it appears that the first story (A) was perhaps not as effective as some of the previous stories in terms of finding significant age or gender differences.

7.4.7 EATING BEHAVIOUR

7.4.7.1 Eating Story A:

Alex wants to put on more muscle in order for him to join the rugby team. He feels he does not weigh enough. His friends notice how putting on weight has become his sole concern, and he no longer is engaging in activities which he used to enjoy. Based on your experience or your knowledge of a similar situation, what would happen next and why?

Themes

A total of five different themes were observed, labelled from 1 through 5. Blank responses are looked at separately (Section 7.4.8).

Theme 1 – positive outcome. These responses provided a positive outcome to the story, where the protagonist’s efforts in gaining weight were ultimately rewarded.

Theme 2 - friends. Responses in this theme expressed the view that Alex’s friends would warn him of the dangers of attempting to gain too much weight, usually with a warning about becoming obese.

Theme 3 – exercise. This theme clustered responses where participants provided an alternative solution where exercise played a key role in maintaining health and fitness.

Theme 4 – negative outcome. These responses suggested that too much weight would be gained and ultimately obesity and being “fat” would be the result.

Table 7.27 Eating Story A – Percentage distribution of total responses across the five themes

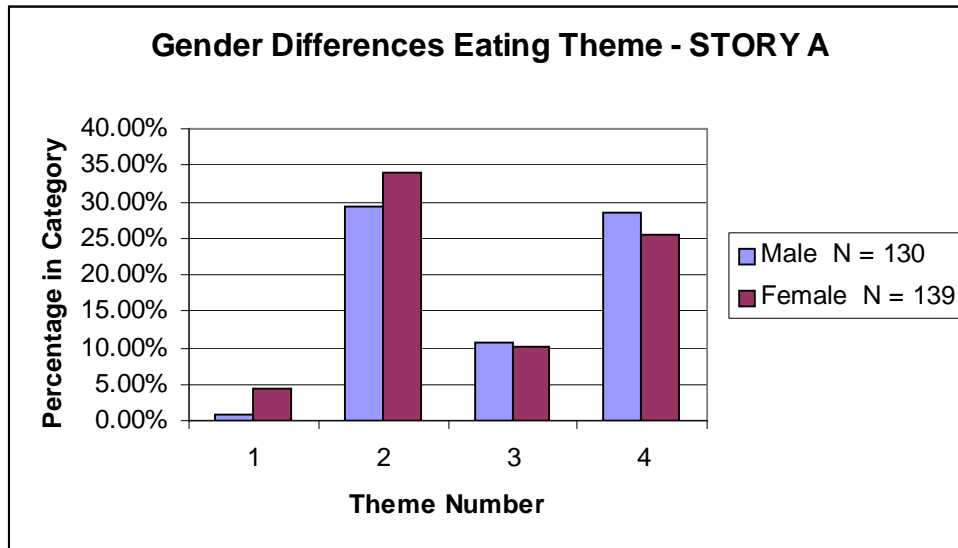
Theme	1. positive outcome	2. friends	3. exercise	4. negative outcome	5. blank
Percentage	6%	32%	16%	18.2%	27.8%
N= 269	n = 16	n = 86	n = 43	n = 49	n = 75

Over a quarter of responses to this story were blank. The most common theme to emerge was that Alex’s friends would be concerned about his desire to gain weight (Table 7.27). This was the strongest theme across all age groups (Table 7.28) and both sexes (Figure 7.13).

Table 7.28. Friendship Story A – percentage of responses by each age group falling into each theme.

Age groups	12/13	14	15	16/17
Total = 269	N = 67	N = 98	N = 46	N = 58
1. Positive outcome	10.4%	6.1%	0%	5.1%
2. Friends.	23.8%	24.4%	39.1%	48.2%
3. Exercising	17.9%	21.4%	10.8%	8.6%
4. Negative outcome	16.4%	14.2%	28.2%	18.9%

Figure 7.13. Eating Story A - Percentage of each theme by gender



Statistical Analysis Themes

All four themes were analysed for age and sex differences. A MANOVA (4 (age groups) x 2 (gender) x 4 (themes)) was used to tease out differences.

Theme 1 – positive outcome. No main effect for age was observable for this first theme, $F(3, 261) = 2.6, p = .048$. No gender effect was noted for this theme either, $F(1, 261) = .008, p = .927$. No interaction was observed, $F(3,261) = .621, p = .927$.

Theme 2- friends. There was a trend toward significance in age differences for this particular theme, $F(3, 261) = 3.4, p = .017$. There was no main effect for gender for this theme, $F(1, 261) = .012, p = .912$. No interaction was observed, $F(3,261) = .441, p = .724$.

Theme 3 – exercising. No main effect for age was observed for this particular theme, $F(3, 261) = 1.03, p = .376$. Neither was there a gender effect, $F(1, 261) = .002, p = .967$. No interaction was observed, $F(3,261) = 2.1, p = .090$.

Theme 4 – negative outcome. No main effect for age was observed with this particular set of responses, $F(3, 261) = 1.9, p = .119$. No interaction was observed, $F(3,261) = 1.4, p = .241$.

7.4.7.2 Eating Story B:

Sally feels that she does not look attractive enough in her clothes because she needs to lose weight. Her friend Anne has noticed that she is not eating adequately during meal times and that this is affecting her performance at school and interactions with friends. Based on your experience or your knowledge of a similar situation, what would happen next and why?

Themes

Four different themes emerged in response to this story.

Theme 1 – lose weight. These responses proposed the ultimate result would be a loss in weight. Interestingly, this loss was not considered a negative but instead considered a positive outcome of the unusual eating patterns observed.

Theme 2 – be a friend. Responses in this theme highlighted the role that friends should play in reinforcing positive eating habits and not skipping meals. It is underscored that a true friend would be supportive in this situation.

Theme 3 –get help. These responses suggested that help was necessary and that only an outside source of help (not within friends) would be able to provide effective support.

Theme 4 – negative outcome. This group of responses shared the common motif that eating dysfunctions always end negatively and there is little that can be done to rectify such a situation.

Table 7.29. Eating Story B– Percentage distribution of total responses across the five themes

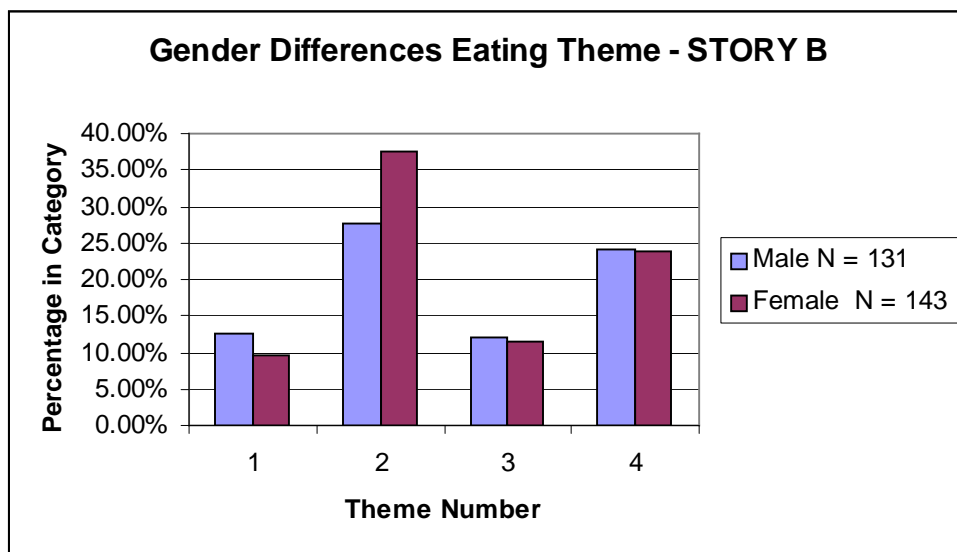
Theme	1. lose weight	2. be a friend	3. get help	4. negative outcome	5. blanks
Percentage	12.8%	33.6%	13.2%	24%	16.4%
N= 274	n = 35	n = 92	n = 36	n = 65	n = 45

The strongest theme to emerge referred to being a friend and trying to support Sally (Table 7.29). This theme was most common among the two older age groups (Table 7.30).

Table 7.30. Eating Story B – percentage of responses by each age group falling into each theme.

Age group	12/13	14	15	16/17
Total = 274	N = 64	N = 104	N = 43	N = 63
1. Lose Weight	9.3%	18.2%	16.2%	11.1%
2. Be a Friend	29.6%	21.1%	51.1%	46%
3. Get Help	14%	10.5%	16.2%	14.2%
4. Negative outcome	26.5%	28.8%	16.2%	17.4%

Figure 7.14. Eating Story B - Percentage of each theme by gender



Statistical Analysis Themes

All four themes were analysed further using a MANOVA (4 (age groups) x 2 (gender) x 4 (themes)).

Theme 1 – lose weight. No main effect was produced for age for this topic, $F(3, 266) = 1.1, p = .314$. There was an observable main effect for gender, $(1, 266) = 7.6, p = .006$. A greater number of males suggested that the ultimate goal of disordered eating

habits was to lose weight in order to look attractive. No interaction was observed, $F(3,266) = 1.9, p = .116$.

Theme 2 – be a friend. A main effect for age differences was observed, $F(3, 266) = 13.1, p = .000$. A post hoc Tukey (HSD) revealed that 14 year-olds were significantly different than 15 year-olds ($p = .003a$) and 16-year-olds ($p = .000a$). Younger participants differed in how often they cited they would be supportive of a friend whose eating habits cause worry. As participants mature they become better able to perform as a support mechanism.

There was no main effect for gender, $F(1, 266) = 5.03, p = .026$. However, it is notable that an interaction effect between age and gender was present, $F(3, 266) = 12.7, p = .000$, suggesting that there is a relationship present between age and gender in terms of social support.

Theme 3 – get help. There was no main effect for age found for this theme, $F(3, 266) = .575, p = .026$. There was no main effect for gender observed for this theme either, $F(1, 266) = 5.4, p = .020$. However, an interaction between age and gender was discovered for this topic, $F(3, 266) = 13.7, p = .000$. This suggests a notable combination of both age and gender in terms of how often participants would seek help for this social situation.

Theme 4 – negative outcome. There was no main effect for age $F(3, 266) = 6.5, p = .359$ or gender on this theme, $F(1, 266) = .846, p = .359$. No interaction was observed, $F(3,266) = 3.2, p = .022$.

7.4.7.3 Summary for Eating Stories A and B

The main thread connecting both these stories centres around friendship and the support that is expected by teenagers of each other when a difficult situation does present itself. It is notable that teenagers will turn to higher authority or to an adult figure in their midst only when they find the situation to be out of hand and that it could not be sorted within a peer group.

Story A appears to have produced fewer statistically significant results than Story B, even though in terms of the themes that were developed from each there are very similar trends. Once again friendship and friend support or disdain (in terms of gaining too much weight) appears to be the overarching idea that brings these stories together.

7.4.8. BLANKS

As noted earlier, blank responses were looked at separately from the main analyses. A blank response must be considered of interest as it can be interpreted in several ways. In first instance the participant may not have felt comfortable answering the question itself because of undisclosed personal factors at the time. In second instance, it is possible the participant simply chose to ignore the question and leave the answers blank, a limitation for any questionnaire. Finally, and perhaps most relevant to this study, the participant may have left the question unanswered as an indication that they did not have any real experience or knowledge of the situation at hand to discuss, hence not responding rather than fabricating a response (See Table 7.31). Only the most salient findings regarding blanks will be discussed to elucidate patterns possibly explaining decision-making mechanisms.

Table 7.31. Blank response to vignettes on questionnaire version A.

Age group	12/13	14	15	16/17	Male	Female
Total = 269	N=67	N=98	N=46	N=58	N=130	N=139
Alcohol	21%	21%	8%	6.8%	10%	8.6%
Drugs	46.4%	34.6%	30.4%	36.2%	35.6%	35.5%
Gambling	7.4%	5.1%	4.3%	1.7%	3.6%	3.6%
Smoking	26.8%	33.6%	19.5%	1.7%	15.7%	15.9%
Sex	32.8%	9.1%	15%	18.9%	25.6%	22.4%
Friendship	41.2%	18.3%	4.3%	8.6%	12.4%	28.6%
Eating	29.8%	33.6%	21.7%	18.9%	30.3%	26.2%

Alcohol story A. In developmental terms, there was a significant main effect for age in terms of participants who did not respond to the question, $F(3, 261) = 7.6, p = .000$. A Tukey post hoc test demonstrated that this difference was due to differences between 12/13 year-olds and 15 year-olds ($p = .000a$) and 14 and 15 year-olds ($p = .003a$) as well as differences between 12 and 16/17 year-olds ($p = .0093a$). In basic terms, younger participants were different than older participants in terms of how many blanks were left, with older participants filling in more questions than their younger counterparts.

Smoking story A. A main effect for age group differences was found for blank responses. Initial visual inspection of percentages suggested that younger participants left a greater number of blanks than older participants. A post hoc Tukey (HSD) test was run to establish individual differences between groups, presenting that 12/13 - year olds and 16/17 - year olds differed from each other ($p = .001a$) and 14 and 16/17 year-olds differed from each other ($p = .019$). As participants got older, they left fewer blanks.

Sex story A. A main effect for age differences was observed for this story, $F(3, 261) = 5.46, p = .001$. As revealed in previous stories, younger participants were more likely to leave blanks than older participants. A post hoc Tukey (HSD) confirmed this, with 12/13 year-olds differing from 14-year olds ($p = .002$) and differing from 15 year-olds ($p = .009$). No differences in gender were observed, $F(1, 261) = .835, p = .362$.

Table 7.32. Blank responses to vignettes on questionnaire Version B.

Age group	12/13	14	15	16/17	Male	Female
Total = 274	N=64	N=104	N=43	N=63	N=131	N=143
Alcohol	29.6%	17.3%	18.6%	6.3%	17.8%	21.4%
Drugs	29.6%	29.8%	13.9%	9.5%	19.5%	19.4%
Gambling	40.6%	15.3%	6.9%	30.1%	17.7%	22.8%
Smoking	21.8%	19.2%	20.9%	30.1%	13.1%	16.6%
Sex	15.6%	12.5%	10.7%	15.8%	12.9%	16.7%
Friendship	0%	3.8%	13.9%	0%	0%	26.5%
eating	20.3%	21.2%	4.6%	11.1%	23.4%	17.1%

Alcohol story B. In terms of differences per age group, there was a significant main effect, $F(3, 266) = 7.6, p = .000$. Post Hoc tests (Tukey HSD) demonstrated that these differences lay between 12/13 and 15 year-olds ($p = .000a$) and between 14 and 15 year-olds ($p = .003a$). This does suggest differences between how younger participants (12/13 and 14) and older participants (15 years-old) respond. Once again, there are fewer empty responses for older participants than for younger, suggesting a possible trend.

Drugs story B. There was a significant main effect for differences in age for blank responses, $F(3, 266) = 4.3, p = .001$. As participants get older they leave fewer blanks than their younger counterparts, possibly because of the effect experience may play in the

understanding of drugs and drug-related knowledge. A post hoc (Tukey HSD) analysis allowed a better understanding of this difference. 12/13 year-olds were significantly different than 15 year-olds ($p = .000a$) and 16 year-olds ($p = .05a$), the youngest and oldest participants differed from each other.

Smoking story B. There was a main effect for age differences for participants leaving blanks, $F(3, 266) = 4.0$, $p = .007$. Older participants differed from younger participants, with a greater number of older participants in this instance leaving stories blank, a reverse in the trend observed in other stories. A post hoc Tukey (HSD) was performed verifying these differences with 16/17 significantly differing from 15 year-olds ($p = .001a$) and significantly differing from 14 year-olds ($p = .000a$).

Summary A and B:

In general, younger participants leave a larger amount of blank responses. The reasons can be varied, ranging from a misunderstanding of the question but more likely denoting a lack of experience with the actual real-life situation described by the vignette. As mentioned in the introductory Chapter 1, not all adolescents fit the stereotypical pattern of risk. Adolescence can be considered a relatively “healthy” period in maturation where many day-to-day choices are made rationally. It is logical to find that many participants do not have experience on each of the seven fields. Stories concerning substance abuse and sexual relations prompted greater blank responses in younger participants, suggesting a lack of experience may lead to greater hesitance in discussing the topics.

7.5 Discussion

Relatively few studies have compared group differences in real-life social situations that can lead to risk on the basis of self reported decision-making (Rolison & Scherman, 2002). By asking adolescents to consider their own behaviours and their own experiences within the framework of real-life problems, these stories have successfully gathered a rich source of data explaining some of the mechanisms underlying problem-solving in this particular period of development (Fischhoff, 2008). Gender differences and developmental differences in terms of problem-solving and decision-making have been deconstructed for each of the individual real life situations presented to participants in this study.

Baseline Understanding of Risk

One of the encompassing trends in the data shows that younger participants are aware of behaviours that may lead to risk situations. Younger adolescents are cognisant of the dangers of behaviours that may lead to harm. This is manifested in the fear that by engaging in risk activity they would be breaking establishment rules. Specifically, this can be seen in the tendency of younger adolescents to worry that underage drinking or gambling for example, would result in police intervention or parental disapproval.

There is a clear understanding that behaviours such as smoking, drinking, gambling, having unprotected sex, or drug use have consequences attached to them. Moore & Rosenthal (1992) reported that adolescents judged themselves to be at less average risk for negative events, particularly when their actual health was involved. The findings of the present study suggest that adolescents are aware from an early age of the potentially detrimental effects of risky behaviours in real life. A baseline of knowledge of the

adverse effects is charted in the responses that younger participants provide. It can be inferred from the narratives (particularly for younger participants) that these responses are not always based on first-hand knowledge of the events.

Schooling as an Influencing Factor (An Experience in and of itself)

Schooling also appears to be a factor that influences problem solving in risk behaviour. Definitive answers cannot be gained from this data set and what can be done is that information can be extrapolated speculatively from the answers obtained. Any information gathered will add to our understanding of the mechanisms at play. Education has been highlighted as one area that can be considered or has a direct influence on our experience. Experience is thought to have an effect on our decision-making as derived from our earlier empirical chapters. Social Education classes cover many of the issues presented in the hypothetical vignettes. In the present study this may pose a specific limitation in that the questionnaire was filled out during a Social Education class. Participant responses may have been influenced by the setting they were in with participants providing more examples of knowledge on risk situations because of the academic setting. Further information may be provided by education campaigns targeted at young people through advertisements in youth programming.

Of note is that participants appear to have an early understanding of the risk behaviours that they are reportedly engaging in (Please refer to section 6.4). Education serves as a means to transfer knowledge and provides a scaffolding of information on which planning for problem solving and decision-making can be drawn upon. Education not only models the requisite skills from which to problem solve and make decisions (i.e

mathematic problems, historical problems) it also provides students with information on risk behaviours and their consequences, and a baseline understanding of risk.

Influence of Experience

Analysis of the narrative responses to the hypothetical stories suggests that what differentiates older participants from younger ones is a greater report of engagement with the behaviours themselves, with more experience-based descriptions. As adolescents mature they have more experiences to draw upon (Goddard, Dritschel, & Burton, 2001). This can be further inferred by the fact that as participants got older they left fewer blank responses for each story. In immediate terms, an age-based cognitive account of reasoning is being contrasted with a age-based experience account of reasoning. This contrast has been drawn earlier, but it is important to emphasise it once more. Experience appears as a very important factor that may shape mechanisms in problem solving and ultimately in decision-making.

Of importance for understanding decision-making mechanisms, as might have been expected by the researchers as participants became older they did not necessarily apply this experience-based or school-based knowledge to their own social problem-solving as suggested through their responses. Smith & Rosenthal (1995) found that as adolescents age, they perceive risk-taking such as drinking beer, smoking marijuana, and smoking cigarettes as less risky. Participants in this study suggested they found their behaviours as less dangerous, even though their awareness of consequences was apparently heightened with age. Males in particular reported less remorse in engaging in risk behaviour. It is possible that with more first-hand knowledge in engaging in risk behaviours, adolescents

gain a sense of immunity towards suffering any adverse consequences (Fischhoff, 2008; Rolison & Scherman, 2002).

The present data hints at that older adolescents are not attempting to block out impulsive tendencies but rather consequences are viewed to pose less of a threat. This represents a shift from a naivety-based fear of punishment for infringement of establishment rules (as exhibited by the younger participants) to an understanding that these behaviours do not always reap negative consequences (among older participants). There is an understanding that the possibility of negative consequences is present, but there is also a certain blasé view that through probability alone it may not always turn out wrong. It does not appear that it is cognitive disinhibition that is influencing the decision-making, as cognition appears intact in adolescent reasoning skills. This finding seems to follow Crone, Vendel, & van der Molen's (2003) earlier suggesting that that real-life decision-making does appear to be intact even in cognitively dis-inhibited individuals, suggesting decision-making mechanisms may function independently. Experience may be playing a role in influencing decision-making that is unrelated to the inhibition of negative impulses. Our studies did not have any conclusive support for the role that cognitive inhibition played.

One explanation for why adolescents appeared to engage in riskier decision-making even with knowledge and schooling experience is that experiences may vary themselves. Hogarth (2005) described *kind experience* and *wicked experience*. In essence, these are positive and negative experiences where positive experience provides reward, making it a logical choice to repeat. If an event or behaviour is experienced negatively, the choices are very clear themselves. Perhaps there are evolutionary advantages to learning from our

mistakes (Steinberg, 2008). On the other hand there is positive experience, where an activity may have had a positive impact or the behaviour led to reward. Experiences derived through association with peers serve as part of the chain of positive feedback. If a particular social group is more prone to risk activity, it follows that through experience and general understanding that this environment will influence decision-making as it has been linked with the positive attributes of being part of a social group. Pretz (2008) suggested that experience that is often informally obtained (as through peer interactions) is often more prone to influence by heuristics, such as the availability bias, representative-ness bias, and the overconfidence heuristic. These peer experiences may appear more positive and more salient to teenagers and thus are used more readily. As observed through the responses in this study, participants appear to draw upon their experiences as part of the mechanism that shape their decision-making.

Peer Pressure

Peer pressure is cited repeatedly as a factor shaping decision-making. This finding is certainly not new (Smetana, Campione-Barr, & Metzger, 2006). Adolescence is a time period in life where dependence on adult figures is minimised in order to establish a sense of autonomous thinking. Peer groups gain a larger role as support mechanisms. Older participants in our study revealed that they would only seek adult help in a situation that their immediate peer group could not handle. A finding contrasted with younger participants stating that in a difficult situation they would resort to outside help if needed.

Summary:

This study has looked at the factors influencing the decision-making situation in a teenage population from actual teenage responses. Fischhoff (2008) suggests that in order to understand the cognitive mechanisms underlying decision-making and behaviour in the real world it is essential teenager's viewpoints and values get considered. These results demonstrate that experience does appear to play a key factor in shaping day-to-day decisions. An understanding of the consequence of risk appears to be successfully transferred through a school curriculum, yet it appears other factors serve to shape decision.

Adults develop strategies to open-ended, unstructured problems such as those in this study by recollecting previous examples of solving either identical or similar problems (Dritschel, et al., 1998; Pretz, 2008). The findings of this study suggest that this also applies to adolescents with developmental differences arising due to exposure to different experiences, rather than simply being attributable to different stages of development. The responses obtained from this study as a whole are very complicated, and once again it must be stressed that only the largest trends are being derived from this body of work.

Peer pressure is an important source of influence, ranging from direct pressure, such as the use of social coercion to get someone to smoke, to much more indirect sources such as stereotypes or assumptions shaping views held about ideal body weight, for example.

The following chapter, Chapter 8, will bring the findings from the past four empirical chapters into perspective. The role that experience has played will be

highlighted as it applies to all four empirical chapters. In particular, the role of experience in terms of negative and positive situations will be discussed as an overarching trend that experience may play in the mechanisms influencing decision-making. The strengths of the study as well as its weaknesses will be considered in an overall fashion leading to future directions this body of work may take.

CHAPTER EIGHT

GENERAL DISCUSSION

8.1 Overview

The aim of this thesis was to explore the major factors and mechanisms that influence the decision-making process in children and adolescents. Due to the scope of the work itself, it is impossible to pick out all of the minor trends that were present in a very complicated set of data. One of the major trends to evolve was the influence of experience on decision-making. Experience emerged as one important factor that possibly could be playing a distinct role on decision-making. Though it was not sampled directly in our first two empirical chapters, the results were significant enough that they suggested that experience be looked at in risk behaviours in adolescence (thus shaping our last two empirical chapters). The acquisitional trajectory and developmental patterns associated with decision-making, focusing on cognitive inhibition and social problem solving were initially explored using vignettes depicting challenging social situations. Prior experience of similar situations emerged as a possible factor enabling both children and adolescents to be equally effective in social problem resolution. The role of education emerged as possibly influencing ones' experience and was then explored in a cross-cultural study, which highlighted the universality of solving social problems in a non-schooled and schooled population. Experience between the two groups appeared to be drawn upon different sources leading to unique ways of reaching a solution. The contribution of experience to decision-making was further explored, along with the parameters influencing risk behaviour, using hypothetical examples of real-life situations.

Experiences that were positive appeared to be more readily drawn upon than those that were negative.

8.2 Contribution of the thesis to the understanding the factors affecting problem solving – **Study 1**

This study presented new information about the nature of social cognition in childhood and adolescence. One of the surprising findings to emerge was that prior experience appeared to be an important factor influencing problem-solving in both children and adolescents. The study originally sought to find links between cognitive inhibition and effective problem solving, but these links were tenuous with experience appearing as a more plausible explanation for differences between groups in terms of their ability to effectively solve social problems. Contrary to expectation, in spite of greater maturity and neurodevelopment as measured by the Stroop task, adolescents were not universally superior at solving social problems. In social situations relating to social relationships children and adolescents were equally efficient at generating strategies to reach a desired solution. However, adolescents were more effective at developing strategies in response to situations of conflict with a parent or teacher. The difference appeared to reflect adolescents having more experience of similar conflict situations and children having less.

Adults develop strategies to open-ended, unstructured problems such as those in this study by recollecting previous examples of solving either identical or similar problems (Dritschel, et al., 1998; Pretz, 2008). The findings of this study suggest that this also applies to children and adolescents with developmental differences arising due to

exposure to different experiences, rather than simply being attributable to different stages of development.

In addition to experience, the results may also reflect the influence of education. Schooling provides both formal teaching about problem solving as well modelling higher-order concepts that serve as a foundation for all current and future social interactions. From an early age children are required to negotiate social situations and in school settings are exposed to adult monitoring and reinforcement of appropriate and acceptable behaviour. The surprising findings on experience and education both informed the next study, which attempted to replicate the studies of this initial finding. The role that experience played was to be further explored in a new cultural setting. A cross cultural study in a country where literacy was low provided a perfect venue to study both education as a source of experience and modelling and to study cultural differences between two groups in terms of the mechanisms shaping problem-solving and decision-making.

8.3 Contribution of the thesis to the understanding of factors affecting problem solving in literate and non-literate populations – **Study 2.**

The influence of formal education in decision-making was explored through comparison of schooled and non-schooled participants in urban and rural settings in Ecuador using modified versions of the materials from study 1. The results were consistent with those of the first experimental study, where children and adolescents did not differ on the number of means that they produced for each story or the effectiveness of each story. Surprisingly, in the Stroop like measure (Animal Stroop), children and

adolescents did not display typical maturation of cognitive inhibition. Anecdotally, the measure did not appear as suitable to older participants. This further reinforced the finding that decision-making and problem solving are not explained solely by maturational prefrontal refinement, but require more complex explanations (Casey et al., 2008). These were further explored in terms of the roles that education and experience may possibly have on decision-making.

One striking difference between the urban and rural participants was the type of strategies they developed to solve the hypothetical social problems. The urban participants utilised words as a means to rectify a situation that are at odds. Their problem solving relied on implementing verbal over physical strategies. By contrast, the rural participants offered solutions where a more active, involved approach was used to gain favour or to make amends. Words were not their tool of choice to bring amends.

This may in part be explained by the difference between the groups in verbal ability, which was predicted to be different (not lesser) by exposure to formal education. These findings suggest that the influence of education on refinement in solving social problems and decision-making could be explained by vocabulary development. Schooling presents models of resolving social problems and diplomatic solutions using words, which facilitates a shift from more physical and active strategies. Likewise, these findings could also reflect differences in the actual experiences participants had. Education can be seen as an actual experience in and of itself.

These findings accord with recent evidence that those who receive a Western education differ from those who are non-schooled or semi-schooled (Ventura et al., 2008). Schooling provides children and adolescents with the advantage of engaging with

written instances of logical reasoning and critical thinking that non-schooled counterparts are not privy to. These differences in experience were apparent in the strategies offered to social problems developed by the urban and rural participants in the present study. It appears that experience gathered in daily social interactions plays an important role in planning and decision-making processes for all young people. Those who go to school are provided with myriad examples of social problem solving techniques from which to extrapolate to novel social situations.

The participants appeared to draw on different (not lesser) pools of experience in developing their strategies. This makes ecological sense as the most viable solutions are extrapolated from contextual inferences (Hoff, 2005). The next study was designed to explore the operation of experience in decision-making about real-world social challenges and issues. In particular, the following study examines the interaction of prior experience with other factors operating in social situations in less than optimal decision-making. The results from these two first studies suggest that experience is a key factor that may influence decision-making and along with education is one that needs to be further expanded upon. The next study picks up on these two concerns directly, asking high school teenagers to provide their own viewpoints on what experiences they used to solve risk situations.

8.4 Contribution of the thesis to the understanding decision-making by Scottish youth associated with challenging or risky behaviour – **Study 3**, quantitative data

The first phase of the questionnaire study was designed to examine the frequency with which young people aged between 12-18 engaged in a range of behaviours

associated with risk or challenge, including drug use and sexual behaviour. The findings revealed that three quarters of the youngest participants consumed alcohol with consumption nearing 100% by the age of 15. Good fitting regression models revealed that consumption of alcohol, particularly high amounts of alcohol, were also associated with risk behaviours such as unprotected sexual relations, smoking, and drug taking. Poor decision-making may be due to the deleterious effects of alcohol on prefrontal cortical functioning which produces disinhibition and poorer planning and appreciation of consequences.

The findings mirrored current trends regarding smoking and drinking, with more females reporting that they were smokers as well as drinkers (Osaki et al., 2006). In terms of sexual behaviour 14.2% of adolescents aged 12 and 13 reported that they were already engaging in sexual relations. Interestingly, neither alcohol, age, or gender predicted engagement in sexual relations, as has previously been reported (Henderson et al., 2002) although alcohol consumption did predict condom use.

The biggest predictive factor for having sexual relations was the influence of peers, specifically the amount of time spent with each other after school and during the evenings. Even the assumption that peers are engaging in similar behaviour is sufficient to promote riskier choices, with adolescents more likely to make riskier decisions when their friends are perceived as taking equally high risks as well (Yu et al., 2007). Wong (1999) and Zwane and colleagues (2004) also found that peer pressure and acceptable behaviour, such as having a partner (boyfriend or girlfriend) among peers was associated with increased sexual relations amongst adolescents. Keller and colleagues (1996) added that adolescents who had friends who did not use condoms were more likely to not use

condoms. This finding is supported by a recent study by Gardner and Steinberg (2005) who looked at adolescents playing video games, and noted that only adolescents who played together were more likely than other groups to engage in riskier practises. It also confirms findings by Prinstein, Boergers, and Spirito (2001) that those who engaged in riskier decisions were more likely to have friends who engaged in risk.

This finding also linked directly to the influence that experience may have on decision-making. As in Studies 1 and 2, experience appears to influence decisions about behaviour. Hogarth (2005) and Pretz (2008) have both noted that experience of prior risky behaviour resulting in positive (or pleasurable) outcomes predicts future engagement in risky behaviours. For example, young people are less likely to use a condom if they have previously experienced this as a sign of mistrust (Zwane et al., 2004).

8.5 Contribution of the thesis to the understanding of adolescent decision-making in challenging or risky situations – **Study 3**, qualitative data

The quantitative data revealed patterns of risk behaviour among the respondents. This second phase permitted deeper probing of the processes operating during situations requiring decisions about these risk behaviours. One important finding was that younger participants were aware of the risks in their environment and demonstrated a direct understanding of the causes and consequences of engaging in these behaviours. This supports previous findings that adolescents are able to reason and understand the risk behaviours they engage in (Reyna & Farley, 1996). However, education and formal

knowledge per se do not prevent adolescents from making poor decisions (Steinberg, 2007).

Moore & Rosenthal (1992) reported that adolescents judged themselves to be at lower than average risk for negative events, particularly when their health is involved. In the present study participants appeared to be well aware of detrimental effects that risk behaviours could entail. However, they were more likely to report that they would engage in risk behaviours the older they got. This did not appear to be due to a feeling of invincibility, but rather that the risks appeared less of a threat. This accords with more recent suggestions that the invincibility hypothesis has been overstated as an explanation of adolescent behaviour (Fischhoff, 2001, 2008).

In the present study it appeared that with age, respondents moved from a naïve based fear of punishment for infringing establishment rules to an understanding that these behaviours do not always reap negative consequences. This appears to come from direct experience. Older adolescents have an understanding of the potential for negative consequences but they develop a certain blasé view that through probability alone it may not always turn out wrong, which is bolstered by experience.

Previous experience serves as a model from which to develop approaches to new situations. Hoff (2005) and Pretz (2008) have argued that positive experiences are more easily recalled than negative experiences. For example, if a teenager has engaged in a risk situation (e.g. unprotected sex) and there was no immediate adverse effect (no pregnancy, no identifiable Sexually Transmitted Infection) then he or she is more likely to engage in the same decision-making process again than if the results had not been favourable.

This accords with Shallice's (1989) supervisory attention model, wherein prior experience is a motivating factor at the planning stages of whether or not to engage in a given behaviour. People are more likely to opt for a riskier choice if there were no negative effects or the consequences were not immediately discernable. This is reflected in the participants' responses to several of the scenarios where their concerns were not about the action itself, such as a sneaking out at night to attend a social gathering, but rather with being caught in the act. If the participant did not get caught sneaking out, chances are high that it would occur again.

Peer pressure is an oft-cited factor in adolescent decision-making but the mechanism of influence is still to be fully explored (Smetana et al., 2006). It is interesting to note that in the present study, participants left the fewest blanks for the question relating to friendship. This may be because they felt most comfortable answering questions about friends or that they possessed the most knowledge about similar situations. Adolescence is a life period of decreasing dependence on adults in order to establish a sense of autonomous thinking. As adult influence declines, peer groups gain a larger role as support mechanisms. This was apparent in the older participants in the present study revealing that they would only seek adult help in a situation that their immediate peer group could not handle. In contrast, younger participants stated that they would seek adult help in resolving a difficult situation.

These findings illuminate the results of the quantitative portion of this questionnaire study regarding the influence of peers on risk-taking behaviour. Specifically, logistic regression revealed that spending time with peers appeared to directly influence whether one decided to have sexual intercourse, wear a condom, and engage in the consumption

of alcohol. There is some evidence that the influence of peers reflects the strength and quality of relationships with parents. Laird, Pettit, Dodge, Dodge, & Bates (2003) suggested that the more time adolescents spend away from home without adult supervision, and that if they are more cognisant of parental influence, then the more likely they are to monitor their decision-making to fit more ideal strategies. On the other hand, teenagers whose parents did not actively monitor their behaviour, would be less likely to modify their own behaviour to fit suggested patterns of right or wrong when making decisions. Stattin and Kerr (2000) argued that rather than simply being an issue about monitoring or not monitoring, this is a reflection of whether a teenager has an open relationship with parents. Those who are more securely attached and more deferent to parental influence are less likely to engage in risky decision-making (Stattin & Kerr, 2000).

8.6 Theoretical Underpinnings – Links with Findings

One of the most consistent findings to emerge is the role that experience appears to play in decision-making. The youngest participants in this thesis were six years old and the influence of experience was clear in their approach to solving social problems. From their facility with dealing with the hypothetical situations, using experience to solve social problems, appears to emerge quite early in development. It also appears to be culturally universal, with young people in Ecuador showing similar facility at solving social problems as their Scottish counterparts. Differences between the cultural groups emerged in the strategies they adopted to resolving the problems, which reflected their different educational and social experiences.

Experience affects the organization of knowledge. The more experience one has, the more “highly sophisticated” one’s schemas become (Pretz, 2008). This was apparent in the present study and adds to the previously reported findings from studies of adults. One factor in this may be the influence of education. Schooling can be regarded as an experience in and of itself, with Western education providing a significantly different pool of experiences for young people to draw on than those who are not Western schooled (Ventura et al., 2006). Schooling provides students with the explicit instruction of logical reasoning and critical thinking. In the questionnaire study, participants described the cause and effect of ill decision-making, noting for example that stealing was corrupt and that unprotected sexual behaviour could lead to pregnancy and sexually transmitted infections. Schooling in this situation appears to set up the mechanisms for appropriate decision-making, and provided the available knowledge and information about the consequences of poor decision-making. However, what schooling did not provide in this instance was the actual experience. The findings of Study 3 demonstrated that even with their sophisticated understanding of risk, many participants still continued to engage in risky behaviour. The assumption would be that with greater understanding of risk and as participants got older, that in general these behaviours would be avoided. This does not seem to follow through. The reality is that teenagers are far more complex in their social behaviours. These findings help provide further knowledge to the field and are highly significant, but it is acknowledge there are limitations to their application.

Differences in experience may be able to explain why teenagers make certain decisions over others, even if they do possess knowledge on the matter that may suggest they follow a certain path (i.e. the less risky one). Hogarth (2005) described *kind*

experience and *wicked experience*. In essence, these are positive and negative experiences where positive experience provides reward, making it a logical choice to repeat. Negative experience is not part of the feedback loop, making it a less clear choice. Experiences derived through association with peers serve as part of the chain of positive feedback. If a particular social group is more prone to risk activity, it follows that through experience and general understanding that this environment will influence decision-making as it has been linked with the positive attributes of being part of a social group. Pretz (2008) suggested that experience that is often informally obtained (as through peer interactions) is often more prone to influence by heuristics, such as the availability bias, representative-ness bias, and the overconfidence heuristic. These peer experiences may appear more positive and more salient to teenagers and thus are used more readily.

Shallice and Burgess (1989) have outlined in some detail how experience may play a role in problem-solving and decision-making. In their framework central executive functioning is described in terms of a supervisory attentional system. There are three key stages in problem solving which involve the supervisory attentional system. First there is a planning stage where the goal is to devise a solution to a problem. The second stage involves the processes required to implement the plan and the third stage involves the monitoring of progress towards meeting the goals. Episodic retrieval plays a key role in the planning stage. The argument is that by recalling previous examples of solving either identical or similar problems that solutions to problems that are open-ended and unstructured can be facilitated (Dritschel, et al., 1998). As observed through the studies in this thesis, participants clearly draw upon their experiences as part of the mechanism that shapes decision-making.

This can be seen to reflect the third step in successful decision-making outlined by Raifa (1968) and von Winterfeldt & Edwards (1986). This is the stage in decision-making where the desirability of consequences has to be considered. If positive experiences are associated with peer interaction then logical, optimal decision-making would favour decisions catering to peer group desires. Likewise the next step in successful decision-making requires one to assess the likelihood of the consequences of an action (Raifa, 1968; von Winterfeldt & Edwards, 1986). The fewer negative experiences one has as a result of risky decisions, the more likely that they will be repeated or modelled. Using the previous example of condom use during sexual activity, participants cite negative experiences with condom use as a reason for not using them again. It stops them from using condoms, but does not prevent the actual sexual intercourse, which is associated with positive, pleasurable, experiences.

8.7 Limitations and future directions

There are limitations to this body of work that must be acknowledged. Experience emerged as a finding in the first two studies but was not sampled directly. This is not to suggest that the findings that emerged were not surprising and could help us better understand problem solving and decision-making in general. A direct measure of experience, such as adding in a question to the MEPS about prior experience of a similar situation, would confirm this in the two first studies. However, even without such a measure the findings still stand as exciting and novel. Young children and adolescents appear to be equally as effective at resolving social problems in certain situations. This indeed can be applied to other psychological realms, such as evolution. In evolutionary

terms, it would be logical that certain abilities be present in early years in order to allow children to navigate their social environment successfully. The studies in this body of work grew organically, and there is much to be said about understanding experience even if it was not measured directly.

Self-regulatory capacity as measured by the Stroop task was examined in the first two experimental studies, but it was not measured in Study 3. Part of the ethical requirements for engaging with an “*at risk*” population (in this case minors) was that if sensitive information was provided that it had to remain anonymous. Asking participants to be tested individually would pose extra pressure to answer sensitive questions that through a questionnaire could have been left blank, and may have not been answered candidly, which was one of the immediate concerns of the study.

The goal of this thesis was to identify broad developmental trends explaining the mechanisms at play in decision-making. The largest trends have been touched upon, leaving smaller trends not fully explained. There are limitations to any study, and future work is required to tease out further the smaller trends that contribute to adolescent decision-making. None the less, the findings emerging from this work are unique and deserve further study.

This thesis included children and young people between the ages of 6 and 18 years. To fully understand the interaction of cognitive, biological and environmental factors with the emergence of experience in the development of decision-making would require study of younger children. Because this early developmental period is marked by very rapid cognitive changes, this could be achieved through an observational, micro-genetic study to chart in more precise detail the changes occurring in inhibitory and social

mechanisms. Levels of problem solving and inhibition could be identified and categorised and identified through videotaped interactions.

8.8 Summary

The main aim of this thesis was to investigate decision making from a broad developmental perspective to clarify the role of the underlying mechanisms influencing it. Problem solving and cognitive inhibitory capacity were chartered initially through the use of hypothetical vignettes depicting socially relevant situations and through the use of the Stroop task, to tap into automatic inhibitory capacity. Initial assumptions that prefrontal cortical refinement would denote enhanced social problem ability were not confirmed. Experience emerged as distinct factor in problem solving/decision-making, with the youngest participants equally as effective in producing solutions to situations that they had the most experience in. A shift in development is observed with maturation denoting greater experience and this being applied directly to problem solving and decision-making situations.

Education was identified as a possible contributory factor in decision-making and this was explored in a cross-cultural study that tapped into a non-schooled population. The results reinforced the centrality of experience in shaping decision-making.

Decision-making was then looked at through real life decision making situations, where adolescents were asked to provide their knowledge or experience of situations where risk was involved. Adolescents possessed the necessary knowledge to distinguish between optimal and sub-optimal decisions in terms of the consequences that risk behaviours carried with them. However, many still chose to engage in risky behaviours.

This paradox could also be explained by experience, with the suggestion that positive experience in a peer group was serving as a pool from which adolescents drew to make future decision-making. If risk behaviours were not experienced adversely, the likelihood of their repetition was high.

Taken together the findings suggest that adolescents are well equipped with the cognitive skills to make decisions. Compared to younger children, they have more experience of a greater range of situations. They also have a great deal of knowledge and information about the negative consequences associated with a range of challenging situations and risk-taking behaviours. However, when faced with decisions in the social domain, the behaviour of friends and perceptions of what other people are doing are powerful influences on adolescent decisions.

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APPENDIX 1

Modified MEPS Vignettes

1. MEPS Vignettes:

1. Problem: John/Sue is being treated unfairly by one of his/her teachers.

Resolution: John/Sue gets on with his/her teacher again.

2. Problem: John's/Sue's friends tease him/her for not socialising enough.

Resolution: They respect his/her choice.

3. Problem: John/Sue moves to a new neighbourhood, he/she doesn't know anybody.

Resolution: John/Sue makes lots of friends.

4. Problem: John/Sue has a major row with his/her parents.

Resolution: John/Sue gets on with his/her parents again.

1. MEPS Stories for Younger Participants

1. Little Bear's teacher is not happy with Little Bear.
2. Little Bear's friends are not playing with each other.
3. Little Bear has moved to a new house and has no friends to play with.
4. Little Bear's parents are upset with Little Bear.

MEPS Sample Marking

Child:

A. Problem: Little Bear's has moved to a new neighbourhood and has no friends.

B. Resolution: Little Bear makes many friends.

Adolescent:

A. Problem: John/Sue has moved to a new neighbourhood and has no friends.

B. Resolution: John/Sue has a lot of friends.

Group	Transcribed Response	Means	Effectiveness
9 years 1 month MALE	He starts tidying up and then he goes outside and see lots of people playing with each other and he asks if he could play and they wanted to know his name. They wanted to play a game of duck, duck goose and hide and seek. He goes into his room and gets out the teddy bears and they start to play.	6	7 out of 7
16 years 8 months MALE	At school he speaks to people he sits next to. He gets to know a bit better, gets to be friends and he goes to afterschool club. This was something that he enjoyed before, so he does the same things.	6	5 out of 7

Transcription and Scoring of Means and Effectiveness for 2 male participants: Children and Adolescents.

VERBAL SCRIPT CHILDREN

Verbal Script for Children on the Means Ends Problem Solving Task

1. I will be taping what we say so that after we are done it will be easier for me to remember what we talked about. Is that all right with you?
2. For this task I would like you to help me make up some stories that solve a problem.
3. For each story you will be given the beginning of the story and how the story ends. Your job is to make up a story that connects the beginning and the end of the story and solves the problem.
4. You will be making up the middle of the story, and helping Little Bear solve the problem.
5. You can tell me what to write and I will write the story down for you.
6. How about we practice creating a story first, and then we can start on the others. Remember to try your best.
7. That was very good, thank you for helping me. Can we try some of the other stories now? These stories will about Little Bear as well.

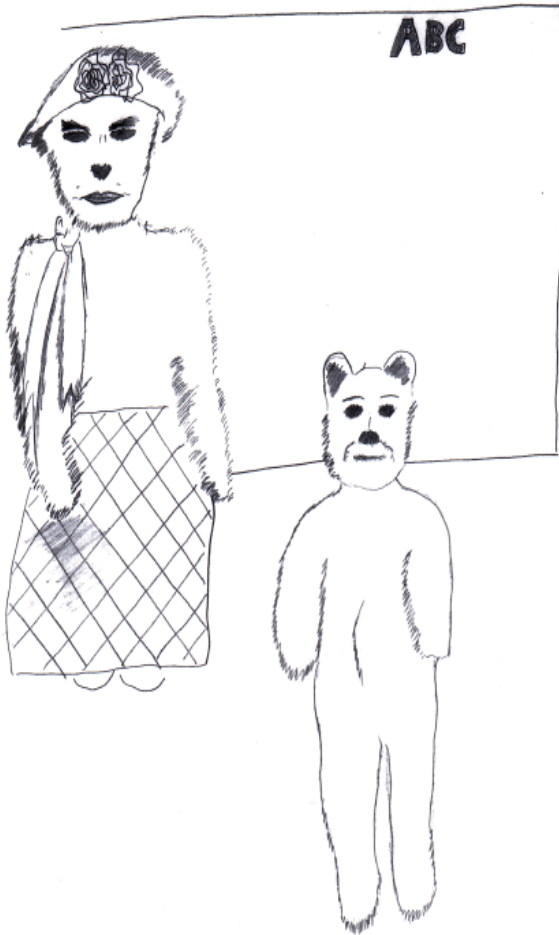
VERBAL SCRIPT ADOLESCENTS

Verbal Script for Adolescents on the Means Ends Problem Solving Task

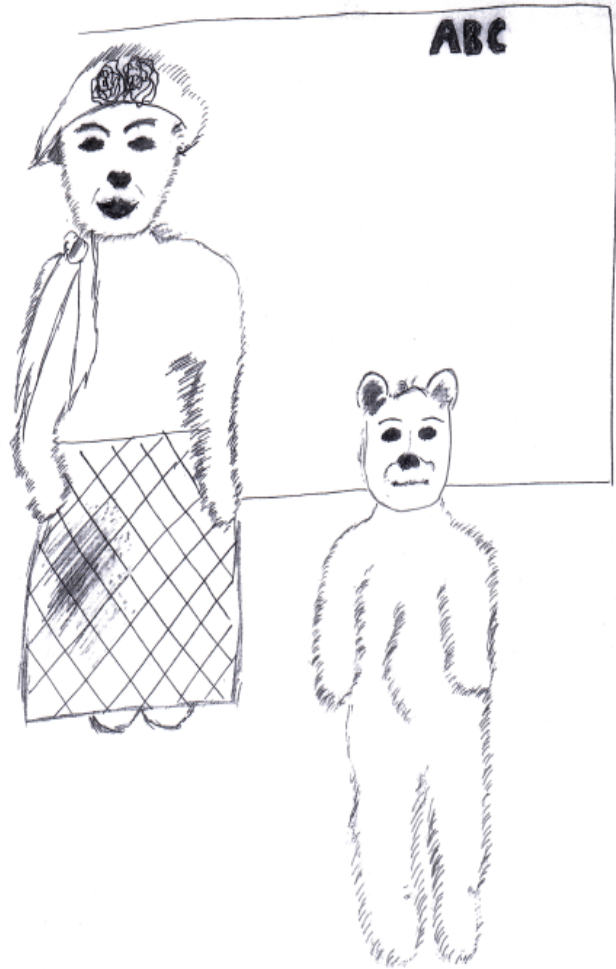
1. I will be taping what we say so that after we are done it will be easier for me to remember what we talked about. Is that all right with you?
2. I am going to tell you the beginning and the end of a story. The story involves having to solve a problem. The start of the story is a problem, such as forgetting to do something you promised a friend and your friend becoming angry with you. The end of the story is a solution to the problem, for instance you and your friend make up. I would like you to tell me the middle of the story to connect the beginning and the end.
3. You can tell me what to write down, and I will also tape record your answer so that I make sure I have written it all down exactly as you have told me.
4. How about we practice creating a story first, and then we can start on the others.
5. That was very good. Can we try some of the other stories now?

SOCIAL PROBLEM STORIES – CHILDREN

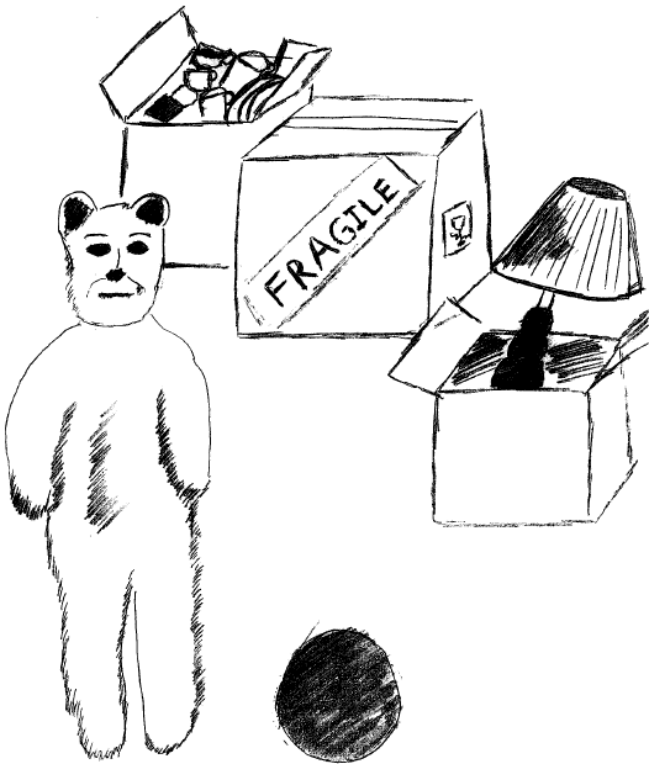
Little Bear's teacher is not happy with Little Bear.



Little Bear gets along with teacher again.



Little Bear's friends are not playing with each other.
Little Bear has moved to a new house and has no friends to play with.



Little Bear's friends are happy and are playing with each other again.

Little Bear makes lots of new friends.



Little Bear's Parents are upset with
Little Bear.



Little Bear's Parents are very happy with
Little Bear.



STROOP

Neuropsychological Screening Test

RECORD FORM

Max R. Trenerry, Ph.D.
Bruce Crosson, Ph.D.
James DeBoe, Ph.D.
William R. Leber, Ph.D.

Name _____
Sex _____ Age _____ Date _____
Reason for Referral _____
Diagnosis/Notes _____

SCORES

	Color Task	Color-Word Task
Number of Responses	_____	_____
Incorrect Responses	_____	_____
Score	_____	_____
Percentile	_____	_____
P _r (Brain Damage)	_____	_____

Psychological Assessment Resources, Inc./P.O. Box 998/Odessa, FL 33556/TOLL-FREE 1-800-331-TEST
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Set 10

100 denotation (2) _____
101 summit (4) _____
102 situation (1) _____
103 agricultural (4) _____
104 generic (3) _____
105 idiom (3) _____
106 consuming (3) _____
107 dwelling (2) _____
108 renounce (2) _____
109 behaving (2) _____
110 descending (2) _____
111 spherical (4) _____

No. of errors _____

Set 11

121 exterior (1) _____
122 vesicle (2) _____
123 perforated (2) _____
124 fowl (3) _____
125 cascade (4) _____
126 vague (1) _____
127 turgid (1) _____
128 incanting (2) _____
129 azule (3) _____
130 beacon (3) _____
131 deciduous (4) _____
132 submerging (3) _____

No. of errors _____

Set 12

133 physician (1) _____
134 aufer (4) _____
135 converging (1) _____
136 replicate (1) _____
137 fobson (3) _____
138 incrementing (3) _____
139 incline (3) _____
140 encumbered (4) _____
141 ceasar (1) _____
142 expansion (2) _____
143 convex (3) _____
144 cultury (4) _____

No. of errors _____

Set 13

145 munificence (1) _____
146 nautical (4) _____
147 incontinent (2) _____
148 gulf (1) _____
149 erpichthyan (2) _____
150 bovine (3) _____
151 prodigae (4) _____
152 succubus (3) _____
153 allocation (3) _____
154 copious (2) _____
155 obsequating (4) _____
156 crenoph (1) _____

No. of errors _____

Set 14

157 nullifying (3) _____
158 promiscuous (2) _____
159 varicos (3) _____
160 supine (4) _____
161 oscillating (1) _____
162 laminated (1) _____
163 labyrinth (2) _____
164 psychobloom (2) _____
165 mauling (4) _____
166 escrement (3) _____
167 unceasing (4) _____
168 calyx (1) _____

No. of errors _____

Set 15

169 mutifarious (3) _____
170 promiscuous (2) _____
171 varicos (3) _____
172 supine (4) _____
173 oscillating (1) _____
174 laminated (1) _____
175 labyrinth (2) _____
176 psychobloom (2) _____
177 mauling (4) _____
178 escrement (3) _____
179 unceasing (4) _____
180 calyx (1) _____

No. of errors _____

Set 16

181 mutifarious (3) _____
182 promiscuous (2) _____
183 varicos (3) _____
184 supine (4) _____
185 oscillating (1) _____
186 laminated (1) _____
187 labyrinth (2) _____
188 psychobloom (2) _____
189 mauling (4) _____
190 escrement (3) _____
191 unceasing (4) _____
192 calyx (1) _____

No. of errors _____

Set 17

193 mutifarious (3) _____
194 promiscuous (2) _____
195 varicos (3) _____
196 supine (4) _____
197 oscillating (1) _____
198 laminated (1) _____
199 labyrinth (2) _____
200 psychobloom (2) _____
201 mauling (4) _____
202 escrement (3) _____
203 unceasing (4) _____
204 calyx (1) _____

No. of errors _____

Set 18 Start - Ages 13-17

89 slender (2) _____
90 acute (2) _____
91 engineering (3) _____
92 co-operation (3) _____
93 frictional (3) _____
94 boiling (3) _____
95 isolation (3) _____
96 syringe (4) _____
97 composing (3) _____
98 fern (1) _____
99 weary (4) _____

No. of errors _____

Set 9 Start - Ages 16-21

97 parallel (4) _____
98 displaced (2) _____
99 departing (2) _____
100 casel (4) _____
101 embarking (3) _____
102 unenial (2) _____
103 quarter (3) _____
104 class (3) _____
105 dilt (1) _____
106 felure (2) _____
107 enter (1) _____
108 No. of errors _____

No. of errors _____

Calculating the Raw Score
Record below the number of the Calling Item, which is the last item in the Calling Set. Subtract from it the total number of errors made by the subject from the Basal Set through to the Calling Set.
This is the Raw Score.

Calling Item _____
minus errors _____
Raw Score _____

321



University of St Andrews

School of Psychology

**UNIVERSITY OF ST ANDREWS
SCHOOL OF PSYCHOLOGY ETHICS COMMITTEE**

21 March 2003

Paul Escalante-Mead
School of Psychology
University of St Andrews

Dear Paul

Re: Developmental correlates of inhibition and social behaviour in a healthy population

The above-named project has been read and approved by the School of Psychology Ethics Committee, based on the information provided.

If, during the course of the proposed research, any important condition were to alter, then the Committee would wish to be informed.

Yours sincerely

Dr Juan Carlos Gomez
Acting Convener

(Dictated but not read)



APPENDIX 2

**“COMO LOS NINOS RESUELVEN PROBLEMS HIPOTETICOS”
CARTA DE INFORMACION**

Nombre del participante _____

Edad del participante _____

Grado Escolar del participante _____

Yo, el familiar del participante, doy consentimiento ha que participe mi hijo/hija en este estudio.

Nombre del Familiar o Padre de Familia:

Firma _____ Fecha _____

Por Favor Devolver a la Oficina de Primaria lo Más Pronto Posible

Minor's Assent to Participating
(TO BE FILLED IN BY THE INVESTIGATOR)

I confirm that verbal assent has been obtained from the participant.

Investigator's name _____

Signature _____ *Date* _____

The participant has been fully explained about what is required in this study and the participant has agreed to participate. The participant was given the opportunity to ask questions about the study and it has been explained to the participant that he/she is free to withdraw from the study without any consequences.

Witness's name _____

Investigator's Signature _____ *Date* _____

Querido padre de familia de _____

Usted dio consentimiento para que su hijo/hija participara en el estudio titulado “Como Los Niños Resuelven Situaciones Hipotéticas” en la Academia Cotopaxi. Quisiera tomar esta oportunidad para agradecerle una vez más por su ayuda. Ha sido un verdadero placer trabajar con su hijo/a, y todos los chicos que han participado hasta el momento han hecho un trabajo fabuloso.

Como se lo explico en la primera carta de información, hay un segundo componente del estudio que pide que los padres de familia respondan a unas preguntas sobre el comportamiento y las acciones de su hijo/a. Este breve formulario se lo manda a **todos** los padres de familia que dieron permiso para que su hijo/a participe en este estudio internacional. Puede ser que ninguna de estas descripciones corresponda al comportamiento de su hijo/a, pero por favor responda a todas las preguntas. Sus respuestas ayudarán a crear una impresión más acertada para los resultados finales que los compartiremos con la Academia Cotopaxi. No se presentará ningún resultado individual.

Por favor tome nota del número de participante en la parte superior derecha de la hoja. Esto provee una mayor cantidad de protección en lo que se refiera a la privacidad. Solo el investigador conoce a quien le corresponde el número. Por favor no escriba el nombre de su hijo/hija en esta hoja.

Agradeciéndole una vez más por su tiempo y ayuda,

Sr Paul Escalante-Mead
School of Psychology
University of St Andrews

Child Behavior Checklist
Para Las Edades de 4 a 18 años
 Achenbach, Thomas (1997)

Lo siguiente es una descripción del comportamiento de niños. Para cada punto que describa a su hijo/hija **dentro de los pasados seis meses** por favor marque el numero **2** si el punto describe muy acertadamente or correctamente a su hijo/hija. Por favor marque el numero **1** si el punto es verdad a menudo o de vez en cuando. Si el punto **no describe** a su hijo/hija, por favor marque el **0**. Este cuestionario abarca una extensiva trayectoria de maduración humana y por ende algunos de los puntos no aplicarán a su hijo/hija. Por favor responda a todas las preguntas, **aunque algunas de las preguntas no apliquen a su hijo/hija**. Gracias por tomar su tiempo para completar este cuestionario. Su ayuda es muy importante en este estudio internacional. Si es posible por favor devuelva este cuestionario el día **Lunes 6 de Septiembre, 2004**.

- 0 = No es verdad**
1 = A veces es verdad
2 = Muy acertado, si es verdad

1. Actua inmaduramente para su edad	0	1	2
2. Argumenta mucho	0	1	2
3. Fanfarronea, hace alarde de sus atributos	0	1	2
4. No se puede concentrar por periodos de tiempo muy largos.....	0	1	2
5. No puede parar de pensar o hablar sobre un tema, de manera obsesiva	0	1	2
6. Se aferra a un adulto o es muy dependiente	0	1	2
7. Se queja de estar muy solo/a	0	1	2
8. Crueldad a otros.....	0	1	2
9. Requiere mucha atención	0	1	2
10. Desobediente en clase	0	1	2
11. No se lleva con los otros chicos	0	1	2
12. No se arrepiente despues de hacer una travesura	0	1	2
13. Piensa que el/ella pueda pensar o hacer algo mal	0	1	2

14. Piensa que el/ella tiene que ser perfecto/a	0	1	2
15. Siente que no tiene recursos cuando se encuentra en problemas	0	1	2
16. Se mete en muchas peleas	0	1	2
17. Le hacen muchas bromas o fastidian sus amigos	0	1	2
18. Se lleva mucho con amigos/amigas que a menudo se meten en problemas	0	1	2
19. Impulsivo/a o actua sin pensar	0	1	2
20. Problemas académicos	0	1	2
21. Prefiere jugar con niños/niñas de mayor edad	0	1	2
22. Se avergüenza muy a menudo	0	1	2
23. Quiere ser chistoso/a en clase	0	1	2
24. Muy tímido/a	0	1	2
25. Habla mucho	0	1	2
26. Fastidia a otros estudiantes	0	1	2
27. Caracter fuerte o tiene rabietas	0	1	2
28. Muy preocupado/a por su organización o limpieza ...	0	1	2
29. Acude a un adulto para que resuelva sus problemas ..	0	1	2
30. Muy solitario/a, no se involucra con otros	0	1	2
31. Muy popular en la clase o con los amigos	0	1	2
32. Muy misterioso, guarda bastantes secretos	0	1	2

Muchas GRACIAS POR SU AYUDA

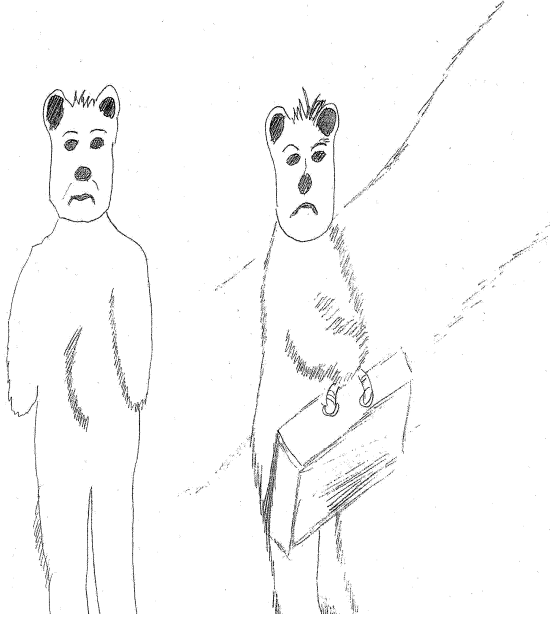
Por Favor Devolver a la Oficina de Primaria

Por favor no escriba el nombre de su hijo/hija en este papel

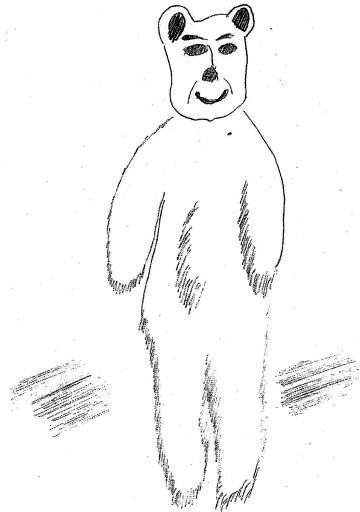
Means Ends Problem Solving Tasks Adolescents

1. Problem: John/Sue is being treated unfairly by one of his/her teachers.
Resolution: John/Sue gets along with his/her teacher again.
P: La profesora de Jorge/Susana le esta tratando injustamente en clase.
R: Jorge/Susana esta de buenas con la profesora.
2. Problem: John/Sue's friends tease him/her for not socializing enough.
P: Los amigos de Jorge/Susana le dicen que no pasa suficiente tiempo con los amigos.
R: Los amigos respetan la decision de Jorge/Susana.
3. Problem: John/Sue move's to a new neighbourhood, he/she doesn't know anybody.
Resolution: John/Sue makes lots of friends.
P: Jorge/Susana se muda a nuevo vecindario. El/Ella no conoce a nadie.
R: Jorge/Susana hace bastantes amigos
4. Problem: John/Sue has a major row with his/her parents.
Resolution: John/Sue gets on with his/her parents again.
P: Jorge/Susana tiene una pelea con sus padres.
R: Jorge/Susana se llevan de nuevo con sus padres.
5. Problem: John's/Sue's best friend has moved away. They will not see each other again and John/Sue is upset.
Resolution: John/Sue stops being upset.
P: El mejor amigo de Jorge/Susana se va. No se podran ver otra vez y Jorge/Susana esta muy triste.
R: Jorge/Susana para de estar triste.
6. Problem: Michael/Mary has received a gift. His/Her friend Paul/Paula likes the gift and steals it.
Resolution: Paul/Paula returns the gift that was taken.
P: Miguel/Maria ha recibido un regalo. Su amigo Paul/Paula le gusta el regalo y lo roba.
R: Paul/Paula retorna el regalo.

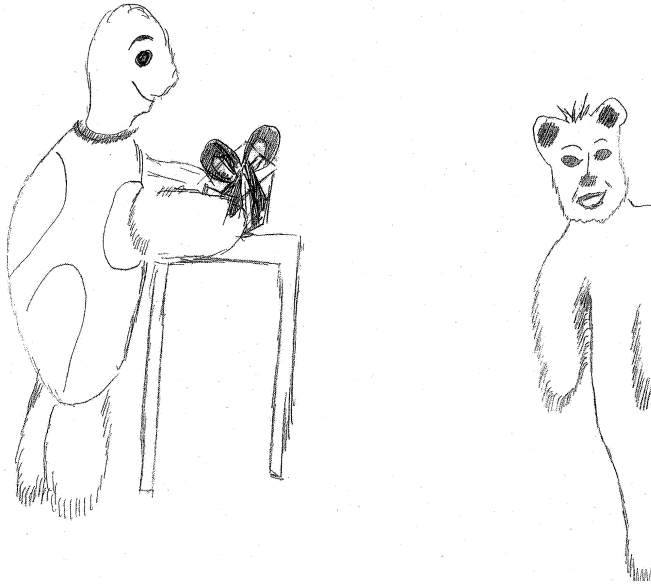
El mejor amigo de osito se va ir. Los dos nunca se podrán ver otra vez. Osito está muy triste.



Osito para de estar triste.



La Tortugita ha recibido un regalo. Su amigo el Osito le gusta el regalo y lo roba.



El osito devuelve el regalo que robo.






PAPEL UNIVERSITARIO

TODO TRAMITE

\$ 0.80 ctvs. USD.

Nº 607456

1	
2	Universidad Central del Ecuador
3	Departamento de Psicología
4	Año Lectivo 2004-2005
5	
6	Paul Escalante Mead
7	Universidad de Saint Andrews
8	Marco Aguirre 192 y Ave Brasil
9	Quito - Ecuador
10	Sr. Escalante Mead
11	
12	Concerniente: <u>"Risk Taking Behaviour in an Adolescent Population"</u>
13	<u>"Comportamiento de Alto Riesgo en la Adolescencia "</u>
14	
15	El proyecto "Comportamiento de Alto Riesgo en la Adolescencia" ha sido
16	aprobado por el Departamento de Psicología y su Comitiva de Ética basán_
17	dose en la información que se ha presentado.
18	
19	Algún cambio en la estructura básica del proyecto se lo debe reportar para
20	que la Comitiva considere cualquier cambio.
21	
22	Sinceramente,
23	
24	Dr. Bruno Stornaiolo 
25	DECANO
26	
27	



APPENDIX 3

“HOW ADOLESCENTS SOLVE DECISION MAKING PROBLEMS”

CONSENT FORM

Name of participant _____

Age of participant _____

Class Year _____

I, the participant’s parent, consent to my child being approached to take part in this study.

Parent’s name _____

Signature _____ Date _____

.....
Please Return to X High School As Soon as Possible.

*Minor’s Assent to Participating
(TO BE FILLED IN BY THE INVESTIGATOR)*

I confirm that verbal assent has been obtained from the participant.

Investigator’s name _____

Signature _____ *Date* _____

The participant has been fully explained about what is required in this study and the participant has agreed to participate. The participant was given the opportunity to ask questions about the study and it has been explained to the participant that he/she is free to withdraw from the study without any consequences.

Witness’s name _____

Investigator’s Signature _____ *Date* _____

Hello!

Thank you very much for taking the time to help us out with our survey!

By taking the time to answer these questions you will help us understand more about the ways that young people make decisions. This survey is being given out to High School Students in Scotland.

Your answers will be totally confidential. The only people to look at them will be the survey team at the University of St Andrews and no-one else. Parents or teachers will not be seeing them. Please don't write your name on the questionnaire as this way it can remain anonymous. After you have filled it you can put it in the envelope we will provide, where it will be sealed.

Please read the questions that follow very carefully and take your time thinking about the answers that you give. Your responses are very important to us. We are interested in your opinion and experiences, and not what somebody else might think. You may find that some of the questions do not relate to your life in any way, so don't worry and just answer the sections that apply to you. Your individual answers will be tallied together to come up with a large average for Scotland, and individual answers will never be used.

Please remember to read the directions and only tick the appropriate boxes. Think about how you would answer these questions, and if a question is difficult think how you would answer it most of the time.



Scottish Youth Lifestyle (A)

Scottish Youth Lifestyle

First, a few details about yourself

1. Are you a boy or girl? Boy Girl
2. What Class are you in? Secondary 1 Secondary 2 Secondary 3 Secondary 4

3. What month were you born in?

- | | | | | | | | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
| (01) | (02) | (03) | (04) | (05) | (06) | (07) | (08) | (09) | (10) | (11) | (12) |

4. What year were you born in?

- | | | | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |

These next questions are about smoking tobacco

5. Do you smoke cigarettes at all nowadays? Yes No (Source YRBS)
6. If you have smoked before, when was the first time you tried it? _____
7. If you have smoked or smoke, when was the last time you tried it? _____
8. Following are a group of short stories describing a social situation. Based on your experience or your understanding of a similar situation how would the following situations end?

A. Mary, Susan, and Stacey were invited to a house party. Everyone at the party had a cigarette in their hand. Mary smoked, but Susan and Stacey did not. Mary told her friends that they looked out of place without a cigarette. Based on your experience or your knowledge of a similar situation, what would happen next and why?

The Next Questions are about the use of alcohol

9. Have you ever had a proper alcoholic drink, not just a sip? Yes No

10. If you answered $\sqrt{\square}$ Yes to the question above, how often do you have an alcoholic drink (Beer, lager, cider, alcopops, wine)?

11. If you have consumed alcohol, have you ever had enough alcohol where you felt you were no longer in control of your actions. Yes No

12. If you answered yes to the prior question, have you ever done anything you regretted or would have done differently while under the effects of alcohol. Yes No

13. Following are a group of short stories describing a social situation. Based on your experience or your understanding of a similar situation how would the following situations end?

A. Lisa had never tried alcohol before, but her friends persuaded her to try some wine that was stored in their parent's house. She realised that after drinking one glass she was feeling pretty tipsy, and even though she did not want to have more she had two more glasses which made her very drunk. Based on your experience or your knowledge of a similar situation, what would happen next and why?

The Next Questions are about relationships with your friends

14. How many days do you usually spend with your friends right after school?

0days 1 2 3 4 5 6

15. How many evenings a week do you usually spend with your friends right after school?

0days 1 2 3 4 5 6

16. Following are a group of short stories describing a social situation. Based on your experience or your understanding of a similar situation how would the following situations end?

A. Matt and Chris were good friends. Chris noticed, however that his friend Matt was not treating his girlfriend with respect. He did not know whether to say something to him or not. Based on your experience or your knowledge of a similar situation, what would happen next and why?

The next questions are about relationships that are more personal in nature.

17. Have you ever had sexual intercourse (sometimes this is called “making love,” “having sex” or “going all the way”)? Yes No

18. The last time you had sexual intercourse did you or your partner use a condom?
 I have never had sexual intercourse. Yes No

19. Following are a group of short stories describing a social situation. Based on your experience or your understanding of a similar situation how would the following situations end?

A. Nelson was bragging to friends in the locker room about him having had sexual intercourse with someone he had just met. His best friend Nick knew that he was making this story up. Based on your experience or your knowledge of a similar situation, what would happen next and why?

The next questions are about food and eating

22. During a normal week, how often do you usually have breakfast (with cereal, bread, or cooked food)?

Every day 4 to 6 days a week 1 to 3 days a week Hardly ever/Never

23. At present are you on a diet or doing something else to loose weight?

No, my weight is fine No, but I should lose some weight No, because I need to put on weight Yes

24. Do you feel that you get a balanced diet with fruits, vegetables, meat, and dairy products? Yes No

25. Following are a group of short stories describing a social situation. Based on your experience or your understanding of a similar situation how would the following situations end?

A. Alex wants to put on more muscle in order for him to join the rugby team. He feels he does not weigh enough. His friends notice how putting on weight has become his sole concern, and he no longer is engaging in activities which he used to enjoy. Based on your experience or your knowledge of a similar situation, what would happen next and why?

The next questions are about drugs

26. Have you ever taken any drugs (other than those prescribed by a doctor or pharmacist)? Yes No

27. The last time you used drugs (if you have used them at all), were you also drinking alcohol? Yes No I don't use them at all

28. Where were you the last time you took drugs if you have taken drugs?

At home In someone else's home At a party At a club, disco, or rave
 At School Out on the street, in a park or outdoor area Elsewhere

29. Following are a group of short stories describing a social situation. Based on your experience or your understanding of a similar situation how would the following situations end?

A. In a group discussion about how drugs are harmful one of the questions asked was: "Why don't people who take drugs care about the harmful effects they have?" Someone else speaks up to give their opinion. Based on your experience or your knowledge of a similar situation, what would happen next and why?

The next questions are about gambling:

30. Have you ever gambled before (i.e Slot Machines, Scratch Cards, Betting Shop)?
 Yes No

31. If you have gambled before, how much money did you spend altogether?
 Less than £5 pounds Less than £10 pounds Around £20 pounds More than £50 pounds

32. Following are a group of short stories describing a social situation. Based on your experience or your understanding of a similar situation how would the following situations end?

A. Katie liked to play lottery scratch cards for she found it very exciting. She had used all her own pocket money buying them up. She decided to break her little sister's piggy bank in order to get some more scratch cards. She was caught doing this. Based on your experience or your knowledge of a similar situation, what would happen next and why?

Hello!

Thank you very much for taking the time to help us out with our survey!

By taking the time to answer these questions you will help us understand more about the ways that young people make decisions. This survey is being given out to High School Students in Scotland.

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Please remember to read the directions and only tick the appropriate boxes. Think about how you would answer these questions, and if a question is difficult think how you would answer it most of the time.



Youth Lifestyle (B)

Youth Lifestyle

First, a few details about yourself

1. Are you a boy or girl? Boy Girl

2. What Year are you in? Yr1 Yr2 Yr3 Yr4

3. What month were you born in?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
(01)	(02)	(03)	(04)	(05)	(06)	(07)	(08)	(09)	(10)	(11)	(12)

4. What year were you born in?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1985	1986	1987	1988	1989	1990	1991	1992	

The next questions are about gambling:

1. Have you ever gambled before (i.e Slot Machines, Betting Shop)? Yes No

2. If you have gambled before, how much money did you spend altogether?

Less than £5 pounds Less than £10 pounds Around £20 pounds More than £50 pounds

3. Following are a group of short stories describing a social situation. Based on your experience or your understanding of a similar situation how would the following situations end?

A. Les had spent all his money on slot machines. He did not have any more money to spend and was very keen on spending some more so asked to borrow some from Andrea. Andrea thought that perhaps he had had enough. Based on your experience or your knowledge of a similar situation, what would happen next and why?

The next questions are about drugs

4. Have you ever taken any drugs (other than those prescribed by a doctor or pharmacist)? Yes No

5. The last time you used drugs (if you have used them at all), were you also drinking alcohol? Yes No I don't use them at all

6. Where were you the last time you took drugs if you have taken drugs?

At home In someone else's home At a party At a club, disco, or rave

At School Out on the street, in a park or outdoor area Elsewhere

7. Following are a group of short stories describing a social situation. Based on your experience or your understanding of a similar situation how would the following situations end?

A. ***Jim's brother walks in on him as he was smoking some cannabis. His brother was very shocked by what he saw and asked how he got started with drugs. Based on your experience or your knowledge of a similar situation, what would happen next and why?***

The Next Questions are about the use of alcohol

8. Have you ever had a proper alcoholic drink, not just a sip? Yes No

10. If you answered Yes to the question above, how often do you have an alcoholic drink (Beer, lager, cider, alcopops, wine)?

9. If you have consumed alcohol, have you ever had enough alcohol where you felt you were no longer in control of your actions. Yes No

10. If you answered yes to the prior question, have you ever done anything you regretted or would have done differently while under the effects of alcohol. Yes No

11. Following are a group of short stories describing a social situation. Based on your experience or your understanding of a similar situation how would the following situations end?

A. Malcolm had been drinking heavily to celebrate his 17th birthday party. Though he was not of age to drink or be inside a pub, he thought it would be funny if they all went down to his local pub. His mates followed, and decided to continue the party inside the pub. Based on your experience or your knowledge of a similar situation, what would happen next and why?

The Next Questions are about relationships with your friends

12. How many days do you usually spend with your friends right after school?

0days 1 2 3 4 5 6

13. How many evenings a week do you usually spend with your friends right after school?

0days 1 2 3 4 5 6

14. Following are a group of short stories describing a social situation. Based on your experience or your understanding of a similar situation how would the following situations end?

A. Lara's friends are planning a sleep over party. Lara has asked her mum permission to sleep over. Her mother feels it is not a good idea for her to do so. Lara's friends encourage her to sneak out in order for her to join them at the slumber party. Based on your experience or your knowledge of a similar situation, what would happen next and why?

The next questions are about relationships that are more personal in nature.

15. Have you ever had sexual intercourse (sometimes this is called “making love,” “having sex” or “going all the way”)? Yes No

16. The last time you had sexual intercourse did you or your partner use a condom?
 I have never had sexual intercourse. Yes No

17. Following are a group of short stories describing a social situation. Based on your experience or your understanding of a similar situation how would the following situations end?

A. Susie and Henry had met each other at a party. They found each other mutually attractive. Henry brought Susie back to his room. Before they continued Susie and Henry realised they did not have any contraception. Susie was worried about getting pregnant. Based on your experience or your knowledge of a similar situation, what would happen next and why?

N/A

13 Any other relevant information (including any likely benefit to the Education Authority)

Our study seeks to compliment the 2002 SALSUS study which provided a rich statistical description of Scotland's youth and their lifestyle. Our study, is brief, though may provide a substantial amount of information on how adolescents make choices and solve problems in situations of risk. This information may prove valuable when targeting these behaviours in order to help eradicate them.

14 Criminal Convictions

Please give details of any prosecutions for which you, or any of the research team, have been found guilty. If NONE, please state "NONE".

Date	Details of Offence	Sentence
NONE	NONE	NONE

Rehabilitation of Offenders Act 1974 - Please read Note 5 in the Notes of Guidance.

15 Declaration by Applicant/Corporate Body

I certify that the information given in this application is accurate and complete and that I and all research staff working with young people in schools and educational establishments have been cleared through the Criminal Records System.



SCHOOL OF PSYCHOLOGY
UNIVERSITY OF ST ANDREWS
ST MARY'S COLLEGE
SOUTH STREET
ST ANDREWS
FIFE KY16 9JP

Signature _____ Date October 19th, 2004

Signature and name of officer of corporate body

Signature _____

Name _____ Date 12.10.04

To be completed by Dundee City Council

16 Approval of research request

- (a) Approved without conditions (b) Approved with conditions
- (c) Undecided (d) Refused

Please tick the appropriate box and give further details/reasons below for categories (b), (c) and (d).

conditions met

Signature of Authorised Officer _____ Date 29.10.04

Please return this form to: Lorna Ferry, Education Officer, Dundee City Council, Education Department, Floor 8, Tayside House, 28 Crichton Street, Dundee. Tele (01382) 433132 Fax (01382) 433080