

Fast-Food Consumption: Application and Extension of the  
Theory of Planned Behaviour to Incorporate Affective Responses  
and Implicit Associations.

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## **Thesis Overview**

### **Summary**

Brief overview of thesis

### **Chapter One**

Discussion of the issues surrounding obesity and links with fast food

### **Chapter Two**

Overview of the Theory of Planned Behaviour

### **Chapter Three**

Review of literature regarding beliefs about foods

Qualitative study investigating beliefs about fast foods

### **Chapter Four**

Review of literature applying Theory of Planned Behaviour to consumption behaviour

Quantitative study applying Theory of Planned Behaviour to fast-food consumption

### **Chapter Five**

Literature review regarding affect, dual attitudes, and Implicit Associations Test

### **Chapter Six**

Review of literature applying Implicit Associations Test to examine implicit associations with food and beverages

Quasi-experimental study applying Implicit Associations Test to examine implicit associations with fast food

### **Chapter Seven**

Summary chapter

## Table of Contents

Title Page	
List of Tables	
List of Figures	
Declarations	
Acknowledgements	
Dedication	
Thesis overview	
<b>Overview of Research</b>	<b>1</b>
<b>Chapter One: Obesity, Fast Food, and Understanding Eating Behaviour</b>	<b>3</b>
1.1 The Issue of Obesity	3
1.2 Obesity in Contemporary Lifestyles	4
1.3 Defining Fast Food	6
1.4 The Effect of Fast-Food Consumption	7
1.5 Explaining Food Choice	9
<b>Chapter Two: The Theory of Planned Behaviour</b>	<b>11</b>
2.1 Overview of the Theory of Planned Behaviour	11
2.2 Predicting Intention and Behaviour	12
2.2.1 Direct and Indirect Measures	12
2.2.2 Behavioural Beliefs and Attitude towards the Behaviour	13
2.2.3 Normative Beliefs and Subjective Norms	14
2.2.4 Control Beliefs and Perceived Behavioural Control	15
2.2.5 Intention	16
2.2.6 Behaviour	16
2.2.7 Actual Behavioural Control	16
2.2.8 Principle of Correspondence	

2.3	Comparisons of the Theory of Planned Behaviour with Alternative Attitudinal Theories	17
2.3.1	Cognitive Attitude	17
2.3.2	Affective Attitudes	17
2.3.3	Behaviour	19
2.3.4	Outcome Expectancies	19
2.4	Research Examining the Influence of Health-Related Expectancies	20
2.5	Summary	23

### **Chapter Three: A Qualitative Analysis of Beliefs Regarding Fast-Food Consumption** 25

Introduction		
3.1	Influence of Beliefs in Attitude Formation	25
3.2	Differences in Beliefs According to Food Group	25
3.3	Beliefs and the Theory of Planned Behaviour	27
3.4	Belief-Based Research within the Theory of Planned Behaviour Literature	30
3.5	Summary	29
Method		
3.6	Design	32
3.7	Participants	32
3.8	Procedure	35
3.9	Instruments	35
3.9.1	Letter of Introduction	
3.9.2	Questionnaire	
3.10	Data Analyses – Content Analysis	36
Results and Discussion		
3.11	How do People Define Fast Food?	37
3.12	A Prototype of Fast Food	38
3.13	Behaviour – Who Eats Fast Food?	39
3.14	Outcome Beliefs – Cognitive Reactions	41
3.15	Outcome Beliefs – Affective Reactions	42
3.16	Normative Beliefs – Social Influence	44

3.17	Control Beliefs	45
3.18	Key Conclusions	46
3.19	Applications	48

**Chapter Four: Determinants of Fast-Food Consumption: An Application of the Theory of Planned Behaviour** 49

Introduction

4.1	Meta-Analytic Research of the Theory of Reasoned Action and the Theory of Planned Behaviour Applied to Weight-Loss and Dietary Choices	49
4.2	Research using the Theory of Planned Behaviour to Understand Food Choice	52
4.2.1	Understanding Decisions to Choose Healthy Foods	52
4.2.2	Understanding Decisions to Choose Fast Food	57
4.3	Other Factors Contributing To the Explanation of Intention and Behaviour	59
4.3.1	Self-Identity	60
4.3.2	Affective Reactions	63
4.3.3	Consideration of Future Consequences (CFC)	66
4.3.4	Sensitivity to Reward (STR)	67
4.3.5	Fear of Negative Evaluation (FNE)	69
4.4	Possible Interaction Effects between Variables	69
4.5	Summary	73

Method

4.6	Design	75
4.7	Participants	75
4.8	Procedure	76
4.9	Instruments	77
4.9.1	Letters of introduction	77
4.9.2	Measures	78
4.9.2.1	Theory of Planned Behaviour	78
4.9.2.2	Consideration of Future Consequences	82

4.9.2.3	Sensitivity to Reward Sub-Scale	83
4.9.2.4	Brief Fear of Negative Evaluation Scale	83
4.9.2.5	Self-Identity Scale	84
4.9.2.6	Final Items	84
 Results		
4.10	Data Preparation and Preliminary Analyses	84
4.10.1	Variables	84
4.11	Descriptive Statistics	
4.11.1	Sample Outcomes for all Variables	86
4.11.2	Relationships Between all Dependent and Independent Variables	88
4.12	Predicting Fast-Food Consumption: Application of the ‘Traditional’ Theory of Planned Behaviour Model	91
4.13	Further Examination of the Two Measures of Behaviour	93
4.14	Constructing Direct and Indirect (Belief-Based) Measures	94
4.15	Predicting Intentions from Direct and Indirect Measures	95
4.16	Structural Examination of Attitudes and Perceived Behavioural Control	97
4.16.1	Behavioural Beliefs	97
4.16.2	Control Beliefs	98
4.17	Using the Factor-Based Variables to Predict Attitudes, Subjective Norm, and Perceived Behavioural Control	99
4.18	The Influence of Interaction Effects	101
4.18.1	Intention	101
4.18.2	Behaviour	103
4.19	Predicting Fast-Food Consumption: Application of the ‘Extended’ Theory of Planned Behaviour Models	103
4.20	Theory of Planned Behaviour and Fast-Food Consumption – The Effect of Body Mass Index and Consumption Frequency on Intention, Attitude, Subjective Norm and Perceived Behavioural Control	107
 Discussion		
4.21	Predicting Fast-Food Consumption: Application of the ‘Traditional’ Theory of Planned Behaviour Model	109
4.21.1	Predicting Fast-Food Consumption (Behaviour)	110

4.21.2	Predicting Intention to Consume Fast Food	111
4.22	Comparative Utility of Direct and Indirect Measures as Predictors of Intention	112
4.22.1	Direct Measures of Attitude, Subjective Norm, and Perceived Behavioural Control	112
4.22.2	Indirect Measures of Attitude, Subjective Norm, and Perceived Behavioural Control	113
4.22.3	Summary Comparison between Direct and Indirect Measures	113
4.23	Structural Examination of Attitudes and Perceived Behavioural Control	114
4.23.1	Behavioural Beliefs	114
4.23.2	Control Beliefs	114
4.24	Predicting Attitude, Subjective Norm, and Perceived Behavioural Control	114
4.24.1	Attitude	115
4.24.2	Subjective Norm	115
4.24.3	Perceived Behavioural Control	116
4.25	Predicting Fast-Food Consumption: Application of the 'Extended' Theory of Planned Behaviour Models	116
4.25.1	Predicting Self-Reported Retrospective Intake of Fast Food	116
4.25.2	Predicting Intake of Fast Food as Captured by Fast-Food Diaries	121
4.25.3	Influence of Interaction Effects	122
4.25.3.1	Significant Interaction Effects	122
4.25.3.2	Non-Significant Interaction Effects	123
4.26	Group Differences - Effects of Body Mass Index and Consumption Frequency on Intention, Attitude, Subjective Norm, and Perceived Behavioural Control	125
4.27	Summary	126
4.28	Future Attitudinal Research	126

## **Chapter Five: Implicit Association Test as a Tool for Investigating Affective**

	<b>Reactions</b>	129
5.1	The Role of Affect	129
5.2	Dual Attitudes	130
5.3	Measuring Implicit Attitudes	131

5.4	Validity of the Implicit Associations Test as a Measure of Implicit Associations	133
5.5	Implicit Associations Test and Health-Related Attitudes	137

**Chapter Six: Implicit Associations with Fast Food: Applications of the Implicit Associations Test** 142

Introduction

6.1	Research Applying the Implicit Associations Test to Examine Associations with Food and Beverages	142
6.2	Application of the Implicit Associations Test to Examine Associations with Fast Food	148

Method

6.3	Design	150
6.4	Participants	150
6.5	Procedure	150
6.6	Instruments	151
6.6.1	Letters of Introduction	151
6.6.2	Implicit Associations Test Tasks	152
6.6.2.1	Valence Adjectives	152
6.6.2.2	Arousal Adjectives	153
6.6.2.3	Stimulus Images Used Across Both Implicit Associations Tests	153
6.6.2.4	Implicit Associations Test Presentation Format	154
6.6.2.5	Scoring the Implicit Associations Test	158
6.6.3	Self-Report Measures	161
6.6.3.1	Theory of Planned Behaviour	161
6.6.3.2	Demographics	163
6.6.4	Final Items	164

Results

6.7	Data Preparation and Preliminary Analyses	164
6.7.1	Implicit Associations Test Variables	164
6.7.2	Theory of Planned Behaviour Variables	164



6.7.3	Other Variables	164
6.8	Descriptive Statistics	165
6.8.1	Sample Outcomes for All Variables	165
6.8.2	Relationships Between all Dependent and Independent Variables	166
6.9	Group Differences in Mean Scores from Implicit Association Test	168
6.10	Differences in Arousal Implicit Associations Test Scores across Body Mass Index and Frequency of Fast-Food Consumption	169
6.11	Retrospective Fast-Food Consumption - Modelling the Relationship between Implicit Associations and Theory of Planned Behaviour Variables	174
6.12	Fast-Food Consumption Measured by Fast-Food Diaries - Modelling the Relationship between Implicit Associations and Theory of Planned Behaviour Variables	173
Discussion		
6.13	Implicit Associations with Fast Food	175
6.14	Group Differences in Implicit Association Test Reaction Times	178
6.15	Predicting Fast-Food Consumption from Implicit Associations	179
<b>Chapter Seven: Conclusion</b>		183
7.1	The Relationship between Obesity and Fast Food	183
7.2	Framework of the Theory of Planned Behaviour	184
7.3	Framework of the Implicit Associations Test	185
7.4	Overview of the Studies	185
7.5	Key Findings from Application of Theory of Planned Behaviour and Implicit Associations Test to Fast-Food Consumption	186
7.6	Possible Applications, Limitations, and Methodological Considerations	188
7.6.1	General	188
7.6.2	Attitudes	190
7.6.3	Subjective Norms	193
7.6.4	Perceptions of Behavioural Control	194
7.7	Future Research	195
7.7.1	Potential Contributions from the Developmental Approach	195
7.7.2	Potential Contributions from the Psychophysiological Approach	198

7. 8	Concluding Comment	199
	<b>References</b>	201
	<b>Appendices</b>	216

### List of Tables

Table 3.1	Comparison of Demographic Information between Study Participants and NWAHS Group	34
Table 3.2	Frequencies for Fast-Food Definition	38
Table 3.3	Frequency of Fast-Food Consumption by Age Group	40
Table 3.4	Primary Cognitive and Affective Outcome Beliefs Regarding Frequent Fast-Food Consumption	42
Table 4.1	Comparison of Demographic Information between Study Participants and NWAHS Group	77
Table 4.2	Means and Standard Deviations	87
Table 4.3	Bivariate Correlations of Predictor and Criterion Variables	89
Table 4.4	Multiple Regression Predicting Intention from Direct and Indirect Measures	96
Table 4.5	Factor Loadings for Behavioural Beliefs	98
Table 4.6	Factor Loadings for Control Beliefs	99
Table 4.7	Multiple Regressions of Belief Factors Predicting Direct Attitude, Subjective Norm, and Perceived Behavioural Control	100
Table 6.1	Comparison of Demographic Information between Study Participants and NWAHS Group	151
Table 6.2	Stimulus Words for Valence Implicit Associations Test and Arousal Implicit Associations Test Tasks	153
Table 6.3	Sequence of Trial Blocks for Both Implicit Associations Tests	158
Table 6.4	Mean Scores and Standard Deviations for Entire Participant Groups and Diary Sub-Group	166
Table 6.5	Bivariate Correlations of Predictor and Criterion Variables	

for Entire Sample

167

Table 6.6 Bivariate Correlations of Predictor and Criterion Variables  
for Diary Sub-Group

## List of Figures

Figure 2.1	Schematic Representation of the Theory of Planned Behaviour	12
Figure 4.1.	Path Analysis for the Theory of Planned Behaviour with Retrospective Behaviour	92
Figure 4.2.	Path Analysis for the Theory of Planned Behaviour with Behaviour Captured by Fast-Food Diary	93
Figure 4.3.	Path Analysis for the Extended Theory of Planned Behaviour Model with Retrospective Behaviour	104
Figure 4.4.	Path Analysis for the Extended Theory of Planned Behaviour Model with Behaviour Recorded in the Fast-Food Diaries	105
Figure 5.1.	Example of Sorting Task from Implicit Associations Test	132
Figure 6.1	Stimulus Images Used Across Both Implicit Associations Test Tasks	154
Figure 6.2.	Schematic Illustration of Implicit Associations Test Format for Valence Outcome Expectancies	155
Figure 6.3.	Schematic Illustration of Implicit Associations Test Format for Arousal Outcome Expectancies	156
Figure 6.4	Mean Effects for Arousal and Valence Implicit Associations Tests	169
Figure 6.5	Path Analysis for the Theory of Planned Behaviour with Arousal Associations	171
Figure 6.6	Path Analysis for the Theory of Planned Behaviour with Valence Associations	172
Figure 6.7	Path Analysis Predicting Actual Behaviour with Arousal Associations	173
Figure 6.8	Path Analysis Predicting Actual Behaviour with Valence Associations	174

## — Declarations —

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For Thandi and Louise Murada

Show the world what can be achieved through dedication and  
quiet determination.

The two bravest people I will ever meet.

## Overview of Research

The consumption of energy-dense fast foods has been implicated as a causal factor in the development of obesity. The development of strategies to modify food choice behaviour requires an understanding of both the behaviour and the influencing factors (in particular, beliefs, attitudes, and social influences). The Theory of Planned Behaviour (TPB; Ajzen, 1988) is one of the most widely used and accepted models of the intention-behaviour relationship within the health literature (Bagozzi, Wong, Abe, & Bergami, 2000; Conner & Armitage, 1998; Sheppard, Hartwick, & Warshaw, 1988; Sutton, 1998). This thesis spans three studies, applying and extending the TPB to examine factors influencing fast-food consumption in an Australian population.

The first study is a qualitative analysis examining components of the belief stage of the TPB, including behavioural outcome, normative, and control beliefs in relation to frequent fast-food consumption. Aside from details of these beliefs, which were used to develop a quantitative measure for application in the second study, the key outcomes of this study were a definition of fast food which was applied throughout each of the studies, clarification of how fast food fits within Australian lifestyles, and generation of additional information regarding other possible influences on fast-food consumption beyond those addressed by the TPB. The additional variables included for examination were affective responses to fast food, individual differences in sensitivity to reward, and the extent to which both consideration of the future consequences of frequent fast-food consumption and fear of being negatively evaluated are influential on consumption rates.

The second, quantitative study applied both the TPB-based instrument developed from findings of the first study as well as the four additional measures with the aim of improving the explanatory ability of the TPB in terms of fast-food consumption. Structural equation modelling was used and although the model performed well overall, explaining up to 50% of the variance in both intention



and behaviour, there were some variables that did not perform strongly. In particular, the measure of affective responses captured with a semantic differential scale was not significantly predictive, and the third study was designed and conducted to test the performance of a more sophisticated measure in the hope that implicit, in addition to explicit, responses would provide greater explanatory value.

The Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998; Greenwald, Nosek, & Banaji, 2003) is said to provide some insight into more implicit attitudes by measuring the degree to which an individual associates conceptual categories through response latencies (or timed responses) whilst opportunities for introspection are minimised. Some have also suggested that the IAT may contribute well when it is combined with other measures, particularly in the prediction of behaviour, choice, or judgement (Brunel, Tietje, & Greenwald, 2004). Therefore, the third study combined measures based on the TPB with the IAT to investigate the nature of both implicit and explicit beliefs underlying attitudes towards fast foods. Overall, the associations captured by the IAT did not help to explain a great deal of variance in fast-food consumption, although there were differences in associations according to stimulus type with arousal-related stimuli generating stronger results than valence-related stimuli. Differences in associations with fast food were also found across groups divided according to Body Mass Index, with overweight people demonstrating more positive associations than either normal weight or obese people.

A summary discusses the potential application of the findings in the development and implementation of future intervention and obesity prevention strategies as well as directions for future research.

## Chapter One

### Obesity, Fast Food, and Understanding Eating Behaviour

#### 1.1 The Issue of Obesity

Although 'obesity' is a commonly used and widely understood term, it can be surprisingly awkward to both define and measure. This is due to its complex aetiology as well as the large number of measurement methods currently employed. Genetics, social influences, and energy expenditure have all been listed as factors contributing to obesity, although eating and nutrition receive much of the attention. Besides having multiple causes, obesity also varies across populations and cultures. Sometimes obesity is measured against population norms, although waist circumference and percentage of body-fat are often used. Body Mass Index (BMI) is the one of the most commonly used measurements of obesity in Australia. BMI is calculated using the equation of weight divided by height squared (Ogden, 2003). For Caucasian people, this calculation produces a figure which is then categorised as 'normal weight' for scores between 18.5 and 24.9, 'overweight' for scores between 25 and 29.9, and 'obese' for scores of 30 or more (Department of Health and Ageing, 2007).

As BMI scores increase, so do risks for some chronic diseases. Obesity has been associated with cardiovascular disease, certain cancers, type 2 diabetes, hypertension, arthritis, and early mortality (Ludwig & Ebbeling, 2001; Pereira et al., 2005; World Health Organisation. Technical Report Series 894, 2000; World Health Organisation. Technical Report Series 916, 2003). Obesity also carries psychological consequences such as low self-esteem, poor self-image, and depression, particularly in cultures where thinness is valued (Berg, Simonsson, & Ringqvist, 2005; Wadden & Stunkard, 1985; Zeller, Saelens, Roehrig, Kirk, & Daniels, 2004).

The prevalence of overweight is increasing rapidly in Australia with obesity rates rising from 9% to 16% in men and from 10% to 17% in women between 1989-90

and 2001 (Australian Institute of Health and Welfare, 2003). Almost 60% of Australian men and women are either overweight or obese, a rate 2.5 times higher than in 1980 (Cameron et al., 2003). The rising proportion of overweight and obese children is also noteworthy. In two national Australian samples, Magarey, Daniels, and Boulton (2001) found that between 1985 and 1995 the proportion of overweight and obese children aged between 5 and 17 years rose from 10.7% to 20% for boys and from 11.8% to 21.5% for girls. More recently, Sanigorski, Bell, Kremer, and Swinburn (2007) reported that 29.6% of girls and 23.9% of boys in a rural population were either overweight or obese and estimated that the prevalence of overweight and obesity are increasing in Australian children at a rate of one percent each year.

One of the consequences of this epidemic is that the current generation is the first to have a shorter expected life-span than their parents due to obesity-related health effects (Olshansky et al., 2005). The medical and economic costs of an overweight population are also considerable and, in Australia, are expected to escalate. Perhaps as a reflection of this, Davis et al. (2006) found the results of an Australian survey of 54 academic and health policy stakeholders indicated that a major recommendation for strategic priorities for children's health was in the examination of the determinants of obesity, including psychosocial and lifestyle factors.

## **1.2 Obesity in Contemporary Lifestyles**

In light of heightening obesity issues, modern lifestyles have been critically assessed, with public health research focussing on both the social and environmental determinants. In the United States, socio-economic status (SES) has been negatively associated with obesity, a trend also found in Australia (e.g. Salmon, Timperio, Cleland, & Venn, 2005). The fact that those living in poorer areas tend to have higher rates of obesity has sparked suggestions that environmental factors are likely to contribute in some way. The term 'obesogenic environment' has been coined to reflect environments that encourage the consumption of energy-dense food and discourage physical activity (Swinburn,

Egger, & Raza, 1999). For example, Reidpath, Burns, Garrard, Mahoney, and Townsend (2002) found differences in the number of fast-food outlets within various areas of Melbourne, Australia's second-largest city. Higher SES areas were found to have significantly fewer fast-food outlets (one per 14,256 residents on average) than lower SES areas (one per 5,641 residents on average). Furthermore, some research has found that higher SES areas are more likely to have local recreational facilities, thereby encouraging physical activity in residents (Gordon-Larsen, Nelson, Page, & Popkin, 2006) while others have found that neighbourhoods that are more conducive to walking are more likely to have residents who walk to access public transport (Owen et al., 2007). In Adelaide, the capital city of South Australia, many of the older, more expensive suburbs have tree-lined streets and are laid out in a grid-like fashion. This type of environment is much more attractive for walkers than some of the newer housing developments where streets change direction and often end in cul-de-sacs. Although these modern street plans are useful for reducing traffic in local areas, they also contribute to the obesogenic nature of the environment.

In addition to environmental factors, social change has also impacted on attitudes towards food and food choices. Family structures have altered with more women in the workforce and people working longer hours (Australian Bureau of Statistics, 2006), reducing the amount of time available for food shopping and meal preparation. Although convenience is important and more people are relying on fast, easy meal solutions, this should not be interpreted as a reduced focus on food. If anything, the importance of food has grown; once simply a fundamental, life-sustaining need, in contemporary Australia, food is the centre of most social interactions. Television cooking shows featuring chefs with celebrity-like status are popular and often scheduled during prime-time viewing, life-style programs almost invariably include a food-related segment, and reality-television has also made a move into the area. To most Australians, food provides pleasure and is to be enjoyed, and many use it as a reward.

Fundamental dietary changes coupled with increases in sedentary behaviour have been highlighted as key causal factors for obesity. A combination of

increasing consumer demand for food that is convenient, advertising encouraging hedonistic food choices, and a rapidly expanding fast-food industry all contribute to obesogenic environments. Some of the most appealing foods are those that are high in fat and sugar; foods that taste good, create a pleasant sensation in the mouth, and are satisfying. Fast food meets many of these criteria. In addition to being tempting, fast food also offers consumers a high level of convenience. Unfortunately, fast food is often energy-dense and is regularly highlighted as being a potential contributor to the increasing prevalence of obesity in developed countries (e.g. Duffey, Gordon-Larsen, Jacobs, Williams, & Popkin, 2007; Nelson, Gordon-Larson, North, & Adair, 2006; Nielsen & Popkin, 2003; Pereira et al., 2005; Rodriguez & Moreno, 2006)

### **1.3 Defining Fast Food**

Definitions of fast food vary within the literature. Some, including Harrison and Marske (2005) and Pereira et al. (2005) define it broadly as pre-packed meals or ready-to eat/convenience food. Similarly, Food Standards Australia New Zealand (2006) combine fast food and take-away food in a single category which spans foods from specific restaurants such as McDonalds through to commercially prepared pizzas, fried-fish, and salads. Others, such as Reidpath Burns, Garrard, Mahoney, and Townsend (2002), are more specific, describing fast food as that which is purchased from a major franchised chain. In Australia, the five major chains are McDonalds, Pizza Hut, Hungry Jack's, KFC, and Red Rooster. More specific defining criteria are not usually provided in the literature, although some authors refer to characteristics of the restaurants including features such as expedited service, take-away and drive-through options, lack of table-service, and payment prior to receipt of food (e.g. Austin et al., 2005; Zenk & Powell, 2008).

### **1.4 The Effect of Fast-Food Consumption**

In the United States, children's consumption of fast food has increased from two percent of total energy intake in the 1970s to ten percent of total energy intake in the 1990s. Despite this trend, Pereira et al. (2005) claimed that there are few, if

any, longitudinal studies tracing the effects of fast-food consumption on body weight. Over a 15-year period, they investigated the association between reported fast-food eating habits, weight changes, and insulin resistance in young Americans, controlling for a number of confounding variables such as consumption of other foods (fruit, vegetables, alcohol, fibre, refined and unrefined grains, saturated, unsaturated and trans-fatty acids, dairy, soft-drinks, etc.), smoking, physical activity, and television viewing. Pereira et al. found that those individuals with higher fast-food consumption rates tended to be younger. When comparing frequent patrons of fast-food restaurants with infrequent patrons over 15 years, those who dined more than twice a week gained an additional 4.5 kg in weight and acquired a two-fold greater increase in insulin resistance. Furthermore, these associations seemed to be relatively independent of other lifestyle factors such as physical activity and television viewing. Despite the reliance upon self-report data and measurement of fast-food consumption on frequency of ingestion rather than specific nutritional intake, Pereira et al. confidently concluded that fast-food consumption had a strong positive association with both weight-gain and insulin resistance in their sample.

In a study examining the link between changes in dietary habits and growing obesity levels in the United States, Binkley et al. (2000) suggested that although a large percentage of both adults and children report living sedentary lifestyles, there is little evidence to indicate that this has changed significantly in the last decade. They suggested, however, that there is some evidence indicating that energy intake levels have increased, although energy obtained from fat has shown a downward trend. Several other researchers have found comparable trends (e.g. Ebbeling et al., 2004; French, Harnack, & Jeffery, 2000). Cook, Rutishauser, and Seelig (2001) also found similar results in an Australian sample comparing national nutrition survey results from 1983, 1985, and 1995.

It must also be noted that whilst some fat consumption may have decreased, it has decreased significantly more in foods eaten at home than it has in Foods eaten Away From Home (FAFH) (Nielsen, Siega-Riz, & Popkin, 2002). American trends have shown an increase in total FAFH with the fast-food segment growing

at double the rate of table service restaurants between 1980 and 1995 (Binkley et al., 2000). Binkley et al. also found that even when controlling for factors known to affect obesity (demographic, lifestyle, and regional), food source was a significant determinant of BMI. Specifically, fast-food consumption was a significant determinant of female BMI and both fast food and eating at restaurants predicted male BMI. In their sample, men who ate fast food (measured as total grams of food bought at a fast-food outlet) were 0.8 kg heavier and women were 1.0 kg heavier than their counterparts who did not eat fast food.

Other research supports the suggestion that diet is a significant contributor to overweight (Bowman & Vinyard, 2004; French et al., 2000; Gillis & Bar-Or, 2003; Henderson & Kelly, 2005; Nielsen & Popkin, 2003; Rodriguez & Moreno, 2006; Swinburn, 2003; Woods, 2005) and although food-intake is only one part of the complex aetiology of overweight, it is nevertheless important to understand the social and attitudinal factors that influence eating behaviour, particularly those associated with weight gain, in order for the issue of overweight to be addressed effectively.

## **1.5 Explaining Food Choice**

There are three main psychological approaches to explaining food choice; developmental, psychophysiological, and cognitive (Ogden, 2003).

Developmental approaches argue that exposure to certain foods, social learning, and associative learning are all influential in food preferences. Social learning theory (Bandura, 1977) suggests that people learn by observing the behaviors, attitudes, and emotional reactions of others. Although family and peers provide much of the modeling for this learning, the media also provides a growing influence (Huston, Watkins, & Kunkel, 1989). The positive and negative outcomes associated with eating different foods, such as taste, satiation, and nausea, also act as strong reinforcement for food choices (Shanks, 1995). Much research has also focussed on the role of food in self-reward as well as rewards for young children (e.g. Birch, Zimmerman, & Hind, 1980). Although

developmental theories imply that most food choices depend upon exposure to foods and learning through childhood, the impact that these factors might have on older people with more established eating patterns should not be dismissed.

Psychophysiological models combine the influences of neuro-chemicals and chemical senses with factors such as mood and stress in their explanation of desire to eat and food choices (Ogden, 2003). Homeostatic regulation, where chemical signals act to maintain and moderate hunger drive, is offered as explanation for eating. However, it is the sensory properties of food such as its appearance, smell, texture, and flavour that are influential in choices between different foods (Mattes & Mela, 1986; Narine & Badrie, 2007; O'Dea, 1996; Pangborn, Bos, & Stern, 1985). Tendencies to find particular sensory properties appealing (or otherwise) might be based on early survival mechanisms through avoidance of poisonous foods (Taylor, 1999). However, in the context of contemporary Australian lifestyle, the same tendencies help to explain desire for sweet foods or foods that provide immediate satiation.

The third approach to explaining food choice is that from the cognitive school of thought. Cognitive theorists generally assume that most people are quite considered and rational in the choices that they make, although choices are said to be influenced on a number of fronts. Most theories incorporate attitudes as an important factor, and many describe both cognitive and affective attitudes. Other factors include social influences, ambivalent attitudes, and perceptions of personal control over choices (Ogden, 2003). Although there are a number of theories that have been developed, including the Health Belief Model (Becker & Rosenstock, 1984) and Protection Motivation Theory (Rogers, 1985), in terms of food choice and dietary behaviour, the Theory of Planned Behaviour (Ajzen, 1988) has been applied most frequently.

Considered together, these three approaches suggest that food choice is a complex behaviour likely to be influenced by factors such as learning, social influence, attitudes, perceptions of control, mood, stress, as well as anticipated enjoyment and convenience. Aside from being widely applied, the Theory



of Planned Behaviour allows ideas from both the developmental approach (through normative influence) and the psychophysiological approach (through affective responses to food) to be incorporated. In addition, results from Theory of Planned Behaviour research can be quite readily applied to the development of interventions and Aizen's (2002) website provides explicit instructions on how this can be achieved. For these reasons, the Theory of Planned Behaviour was chosen as the basis for this research, which aims to examine the factors contributing to fast-food consumption rates.

## Chapter Two

### The Theory of Planned Behaviour (Ajzen, 1988) <sup>1</sup>

#### 2.1 Overview of the Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) (Ajzen, 1988), based on the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980), is one of the most widely applied and accepted models of the belief-attitude-behaviour relationship within the health literature (Bagozzi et al., 2000; Conner & Armitage, 1998; Ogden, 2003; Sheppard et al., 1988; Sutton, 1998). The assumption behind the cognitive theory is that most conscious behaviour is rational and goal-oriented (Conner & Armitage, 1998). The theory is also based on expectancy-value theory, suggesting that before deciding upon action, individuals will consider the options available to them as well as the related consequences (Ajzen, 2002). Essentially, the model implies a causal link between attitudes and behaviour that is mediated by intentions.

According to the TPB (as shown in Figure 2.1), behaviour is directly related to behavioural intentions which are, in turn, influenced by three sets of considerations (Ajzen, 1988). First, beliefs about the outcome of the behaviour, as well as evaluations of these outcomes produce an 'attitude towards the behaviour'. Second, the beliefs an individual holds regarding the expectations held by others (about the behaviour) as well as the individual's motivation to comply with these expectations give rise to a 'subjective norm' (SN). Third, beliefs about any factors that may either impede or facilitate completion of the behaviour (such as skills, resources, opportunities, etc.), as well as the strength of each of these beliefs, determines 'perceived behavioural control' (PBC); beliefs about the levels of personal control over the specified behaviour. According to the theory, attitudes, subjective norms, and perceptions of control are, in turn, respective functions of intention and are also said to capture the motivational

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<sup>1</sup> Please note that Ajzen changed his name to Aizen with both spellings appearing in the published literature.

factors influencing behaviour. Aizen (2002) theorised that the more positive the attitude and subjective norm and the stronger the perceived control, the greater the intention will be for the individual to perform the behaviour. The model also allows for external factors that may be beyond the immediate control of the individual to be captured as these, in addition to intention, are likely to influence behaviour. Importantly, the theoretical constructs that are included in the TPB (except behaviour) are variables that need to be inferred rather than directly observed.

NOTE: This figure is included on page 12 of the print copy of the thesis held in the University of Adelaide Library.

*Figure 2.1.* Schematic Representation of the Theory of Planned Behaviour (Aizen, 2002).

## **2.2 Predicting Intention and Behaviour**

### **2.2.1 Direct and Indirect Measures**

Aizen (2002) stated that all six of the predictors can, and should, be measured ‘directly’ by questioning. In addition to this, the predictor variables of attitude towards the behaviour, subjective norm, and perceived behavioural control may also be captured ‘indirectly’ through responses to questions relating to the corresponding beliefs for each variable. That is, measurements of the belief variables can serve as ‘indirect’ measures of the corresponding variable. This is based on Fishbein’s summative model which posits that behaviour is a function

of the expected outcomes associated with the behaviour and evaluations of the outcomes (Ryan & Bonfield, 1975).

Beliefs play a central role in the TPB as they are assumed to reflect the foundations for attitudes, subjective norm, and perceived behavioural control; the belief-based measures provide indicators of the underlying constructs. Although the belief-based factors should be correlated with their respective measure of attitude, subjective norm, or perceived behavioural control, they should not be assumed to be the same thing. That is, behavioural beliefs for example, should explain *how* or *why* an individual comes to construct their attitude towards a particular behaviour. Aizen recommended that researchers wanting to employ the TPB should conduct qualitative, preparatory research with the aim of uncovering these beliefs. The modal beliefs can then be used as the basis for items used in the final qualitative measure. This recommendation is followed in the research here and results of the preparatory research are included in Chapter 3.

### 2.2.2 Behavioural Beliefs and Attitude towards the Behaviour

In a discussion regarding the fundamental principles of expectancy-value model of attitudes, Ajzen (1991) explained that, as a general rule, people form beliefs about certain behaviour based on the perceived outcome or consequence of that behaviour. He stated that as 'attributes' related to a behaviour are either positive or negative, this allows people to automatically generate an attitude toward the behaviour itself. Due to this process, people learn to prefer behaviours that result in favourable consequences and reject those that are associated with undesirable consequences.

Although a person may hold more than one attitude towards an object, Aizen (2002) argued that not all of these attitudes may be accessible at the same time. As the TPB is based on the expectancy-value model, the most available belief, in conjunction with an assessment of the outcomes of the behaviour, combine to generate an attitude towards a given behaviour. The model therefore assumes a

relationship between the person's salient beliefs about the behaviour and their attitude towards the behaviour.

According to the TPB, belief strengths ( $b$ ) and the outcome evaluations ( $e$ ) provide information about the attitude the individual has toward the behaviour ( $A_B$ ) (Aizen, 2002). In addition to this, belief strength and outcome evaluations may be used, as shown below, to calculate an indirect measure of the attitude towards the behaviour where the belief strength is multiplied by outcome evaluation with the resulting product summed over all possible behavioural outcomes:

$$A_B \propto \sum b_i e_i$$

Therefore, the individual's attitude toward the behaviour is reflected in both the perceived probability of a particular outcome (beliefs strength) and the value attached to that outcome (outcome evaluation).

### 2.2.3 Normative Beliefs and Subjective Norms

Normative beliefs are described as being behavioural expectations of other people, or groups of people, who are of importance to the individual, such as friends, family, co-workers etc. (Aizen, 2002). In conjunction with this, the person's level of motivation to comply with these expectations results in subjective norm. Subjective norm is specifically defined as being the perceived social pressure to engage (or not) in the behaviour. The strength of the normative belief in its effect on intention is proportional to the level of motivation that the individual feels to comply.

Again, a mathematical calculation, as shown below, involving both the strength of the individual's normative belief ( $n$ ) and their motivation to comply ( $m$ ) with these beliefs provide an indirect measure of subjective norm:

$$SN \propto \sum n_i m_i$$

That is, subjective norms are reflected in both the perceived social pressure from others as well as the individual's level of motivation to comply with these referents.

#### 2.2.4 Control Beliefs and Perceived Behavioural Control (PBC)

The measure of perceived behavioural control was added to the theory of reasoned action to allow for the prediction of behaviour that is not completely under the volitional control of the individual. Control beliefs are the perceptions of factors that may either facilitate or impede the performance of the behaviour (Ajzen, 2002). That is, these beliefs, and the power that each holds, combine to generate perceived behavioural control. These factors may be influenced by past experience with the behaviour or by second-hand information about the behaviour, as experienced by others such as friends and acquaintances (Ajzen, 1991). Theoretically, perceived behavioural control may moderate the effect of intention on behaviour in that a positive intention will only result in behaviour if perceived behavioural control is also strong.

Furthermore, results indicate that perceived behavioural control may predict behaviour directly as well as indirectly, through intention (Armitage & Conner, 1999, 2001). Therefore, the relative weight of attitudes, subjective norms, and perceived behavioural control on prediction of intention and on the prediction of behaviour varies across situations (Ajzen, 1991).

Through application of the calculation shown below, perceived behavioural control may be indirectly computed from the belief-based measures of control belief strength ( $c$ ) and control belief power ( $p$ ):

$$PBC \propto \sum c_i p_i$$

Therefore, an indirect measure of perceived behavioural control is combination of the perceived likelihood of inhibiting/facilitating factors having an influence as well as beliefs about the power each factor may have to influence.

#### 2.2.5 Intention

Intention is defined as the person's level of 'readiness' to perform the behaviour in question. Within the TPB, intention is based on the individual's attitude toward the behaviour, the subjective norm, and perceived behavioural control and is considered to be the direct antecedent of behaviour (Ajzen, 2002).

Armitage and Conner (1999) suggested that intention can be described as the motivation to engage in the behaviour; the stronger the intention, the more likely it becomes that the person will perform.

#### 2.2.6 Behaviour

Aizen (2002) described behaviour as being an observable response. Behaviour may be measured through single observations or self-reports, or, for a more representative measure, across a variety of contexts and times.

#### 2.2.7 Actual Behavioural Control (ABC)

Actual behavioural control refers to factors such as resources and prerequisite skills or competencies that may influence the individual's ability to perform the behaviour (Aizen, 2002). In some cases, actual behavioural control may be adequately reflected in perceived behavioural control, although this depends upon the accuracy of the individual's perception.

#### 2.2.8 Principle of Correspondence

In applying the TPB, it is important that the measures for each of the variables be directly structurally matched with regard to how the behaviour has been defined. Aizen (2002) recommended that any behaviour that is to be predicted firstly be defined in terms of its 'Target, Action, Context, and Time (TACT)' (p.2) as intentions and behaviour are most likely to be related when measured according to the same specificities. For example, in the case of fast-food consumption, the behaviour may be considered to be 'the number of meals purchased and consumed from a McDonald's restaurant within four-week period'. The target may be considered to be McDonald's restaurants, the action the purchase and consumption of the food, the context may be the meal or snack that is being fulfilled, and the time may be the number of meals/snacks purchased and consumed. Although each of these TACT elements may be defined somewhat arbitrarily, it is important that the definitions be consistent throughout the items in each measure.

## **2.3 Comparisons of the Theory of Planned Behaviour with Alternative Attitudinal Theories**

Aside from the TPB, there are a number of other theories that have been proposed to explain how attitudes develop and function (e.g. Eagly & Chaiken, 1993). The following section is a comparison of some alternative models of attitude formation. Many of the models overlap with the TPB, providing strong support for the basic premises. Others provide some distinctions in their theoretical descriptions. In their Multidimensional Model of Attitudes for example, Eagly and Chaiken provided an alternative description of the constructs underlying attitudes, suggesting that attitudes can be divided into three categories; cognitive, affective, and behavioural.

### **2.3.1 Cognitive Attitudes**

Like Ajzen (1991), Eagly and Chaiken (1993) argued that beliefs are evaluative responses reflecting cognitions and may fall on an evaluative continuum anywhere between positive and negative, including a neutral point. Beliefs falling at that neutral point are considered to express a degree of evaluation falling mid way between positive and negative, rather than being non-evaluative. Therefore, rather than suggesting that attitudes may reflect ambivalence, both Eagly and Chaiken and Ajzen proposed that generally, when people evaluate objects (or behaviour) favourably, they tend to associate them with positive attributes and not negative attributes and vice versa, according to their most salient belief.

### **2.3.2 Affective Attitudes**

Although most researchers (including Aizen) acknowledge the influence of affective reactions as well as cognitive assessments, historically, research surrounding human judgement and decision-making has focussed on the latter with little attention being paid to the role of affect (Damasio, 1994; Finucane, Alhakami, Slovic, & Johnson, 2000). Zajonc (1980) was one of the first to



maintain that initial reactions to stimuli are very often automatic and affective in nature.

The affect heuristic is a theoretical framework proposing that affect has significant influence on judgements and decision-making processes (Slovic, Finucane, Peters, & MacGregor, 2002). In terms of this theory, affect is seen to reflect an individual's experience of a state, either with or without consciousness, of 'goodness' or 'badness' regarding a stimulus. This state is accompanied by a related positive or negative attitude towards the object or behaviour. Damasio (1994) suggested that much human thought is represented by images which, with experience, become associated or 'marked' with either positive or negative feelings. Furthermore, these feelings are linked either directly or indirectly to somatic states with positively marked states acting as incentives and negatively marked states acting as deterrents. Finucane et al. (2000) suggested that relying on a readily available affective impression may be far simpler and more cognitively efficient than frequently engaging in a complex evaluation of issues that need to be solved quickly or where mental resources are limited. Damasio reported similar views, suggesting that affect is essential to rational action and that heuristics, along with their related somatic states, increase the accuracy of decision-making.

Eagly and Chaiken (1993) also described responses that are affective in nature suggesting that these include feelings, emotions, and moods as well as physiological reactions related to the sympathetic nervous system. As with cognitive responses, these affective reactions range anywhere from extremely positive to extremely negative and people experiencing positive affective reactions to an object or behaviour are unlikely to also experience negative affect (and vice versa).

Aizen's (2002) stance is that a person's overall evaluation of a behaviour may consist of two components, one being instrumental in nature (with evaluations such as valuable/worthless or harmful/beneficial) and the other being more experiential (with evaluations such as pleasant/unpleasant and

enjoyable/unenjoyable). It has been suggested that when attitudinal instruments are designed, a two-factor approach be taken to incorporate both types of evaluations through semantic differential-style items (Ajzen & Fishbein, 2005; Conner & Sparks, 2005). This is an area of particular importance, particularly given the experiential nature of food consumption.

### 2.3.3 Behaviour

Eagly and Chaiken (1993) described behavioural responses as being overt actions as well as reflecting intention to act in response to an attitude. Consistent with their views regarding cognitive and affective responses, Eagly and Chaiken suggested that positive evaluations of a stimulus result in supportive intentions and vice versa. Although Ajzen (1988) made a clear distinction between intention and behaviour, in general terms, this explanation fits with his description of the attitude-intention-behaviour relationship.

### 2.3.4 Outcome Expectancies

As mentioned earlier, the TPB is based on expectancy-value theory and outcome expectancies refer to the perception of the possible consequences of the chosen behaviour as well as the value placed on that outcome (Petosa, Suminski, & Hertz, 2003; Schwarzer & Fuchs, 1995). These expectations are formed primarily as a result of personal experience, education, and vicarious learning (Petosa et al.). Specifically, outcome expectancies may be categorised as either situational, reflecting consequences of environmental factors without any personal action being taken, or action based, reflecting outcomes that are directly related to personal action.

#### *Situation-Outcome Expectancies*

In terms of health behaviour, situation-based expectancies of health risks are perceived as being inevitable or otherwise, regardless of personal engagement. Individuals may also perceive these risks in a distorted manner; people may see themselves as being at more or less risk than others of developing a disease without having any direct evidence to support such a belief (Schwarzer & Fuchs,

1995). An example of such a belief may be; 'Due to familial history, I am at higher/lower risk of developing an obesity-related disease'.

#### *Action-Outcome Expectancies*

Action-outcome expectancies are influenced by self-efficacy and are a reflection of personal optimism (Schwarzer & Fuchs, 1995). The individual evaluates both their ability to carry out the behaviour (self-efficacy) and the consequences of engaging in the behaviour (action-outcome expectancy). For example, the individual will assess their ability to maintain a healthy diet ('I am capable of avoiding fast foods') and the outcome for their health by doing so ('If I avoid fast foods, it is less likely that I will become overweight').

#### **2.4 Research Examining the Influence of Health-Related Expectancies**

Several authors have argued that both outcome expectancies and efficacy beliefs play an important role in changing and maintaining health behaviour (D'Amico & Fromme, 1997; Petosa et al., 2003; Schwarzer & Fuchs, 1995). Schwarzer and Fuchs suggested that once the behavioural intention is formed, the outcome expectancies become redundant and that the actual performance and maintenance of the behaviour is controlled by self-efficacy. However, it is possible that outcome expectancies for healthy eating may be influenced over time by a re-assessment of the costs and benefits of the original outcome. For example, original long-term outcomes of reduced weight or health risks may become somewhat less essential when balanced with the shorter-term costs of giving up favourite or convenient foods. Therefore, given that the benefits of healthy food choices often take a significant period of time to be fully realised, it may be that maintenance of clear outcome expectancies is one of the factors that impacts on motivation to persist with behaviour changes. That is, when considering people embarking on a healthy diet, it is possible that individual differences in outcome expectancies and attitudes may assist in distinguishing those successful in maintaining a healthy diet from those who slip back into less healthy eating habits. Regardless, a clear understanding of outcome expectancies associated with various food groups should create greater ability to both predict

and influence food choices and a number of researchers have investigated this area.

Reynolds, Yaroch, Franklin, and Maloy (2002) conducted longitudinal research with the aim of identifying factors that may act as mediators between a school-based intervention and changes in fruit and vegetable consumption of both primary-school aged children and their parents. The mediators were drawn from social-cognitive theory and included knowledge about fruits and vegetables. The authors also included measures of outcome expectancies (either positive or negative) in their analyses as well as social norms which reflected both parental fruit and vegetable consumption and meals eaten with the family. Finally, a measure of self-efficacy for eating a certain amount of fruit and vegetables each day was included. Although the results for research were very complex, spanning a number of intervention stages not relevant to this research, the overall findings indicated that positive outcome expectancies, knowledge, self-efficacy, and parental consumption (social norms) were important mediators in the success of the intervention. This adds weight to the argument that positive outcome expectancies are likely to play a significant role in influencing the choices people make about the foods that they consume.

In a study examining the influence of health beliefs such as risk perceptions, outcome expectancies, and optimistic bias on food consumption, Renner, Knoll, and Schwarzer (2000) argued that factors such as age and body weight are likely to have an influence over such beliefs. They suggested that older and heavier people should have more negative beliefs as they are at greater risk of poor health. Contradictory findings, however, have indicated that although people are aware that those in an older age bracket are at more risk of health problems, a form of optimistic bias allows them to rate their own personal risk as below average (Hahn & Renner, 1998). Renner et al. found that overweight participants harboured significantly more positive outcome expectancies for eating a low-fat diet than did average weight participants across a range of age brackets. A possible explanation for this is that the health benefits of a low-fat diet would be likely to appear heightened if weight loss is considered an

additional benefit. They also found that the older participants in both the average and the overweight groups held greater perceptions of self-efficacy, although this trend was more pronounced in the overweight group. Presuming that the overweight participants in the study were unlikely to have maintained strict low-fat diets, these results indicate higher levels of self-efficacy are not necessarily positively correlated with long-term behaviour maintenance. Although the older and more overweight participants in this group admitted that they were at greater health-risk than those who were younger and lighter, they still considered themselves less vulnerable than their average peer. These are interesting findings as they point towards active biases in self-assessments for risk and lead the reader to wonder if the strong positive outcome-expectancies might play a part in the cognitive biases.

Armitage and Conner (1999a) reported significant differences in both beliefs and outcome evaluations between those who could be classified as 'intending' or 'not intending' to eat a low-fat diet. Specifically, those intending to eat a low-fat diet believed that they had more time and knowledge than did those not intending to eat low-fat foods. Furthermore, those with stronger intentions were not as negative about eating food with a poorer taste and were more positive about maintaining a lower body weight. These differences suggest the importance of investigating the beliefs underlying attitudes, subjective norm, and perceived behavioural control in terms of understanding the nature of attitudes, especially if the aim is to influence the attitudes. Therefore, it is worth highlighting the importance of the initial group discussion study that Armitage and Conner undertook to gather data to be content-analysed for preparation of a questionnaire specifically designed to measure attitudes regarding low-fat diets.

Incorporating age, gender and bodyweight, Schwarzer and Renner (2000) investigated the role of risk appraisals, outcome expectancies, and self-efficacy beliefs as factors influencing the types of food people choose. The study was longitudinal in nature (incorporating a six-month follow-up) and used a large sample of 524 residents of Berlin. They found that outcome expectancies were the strongest predictor of intention to follow a healthy diet, followed by self-

efficacy (to maintain a healthy diet) and perceptions of personal risk for threats to health such as heart disease and high blood pressure. Interestingly, when looking at variations between groups labelled as 'heavy' (BMI >24 for women and 25 for men) and 'slim' (those with lower BMIs), Schwarzer and Renner found that the health behaviour of the overweight group was more likely to be predicted by self-efficacious beliefs whereas outcome expectancies appeared to be more predictive for the slimmer group. Overall, they found that behavioural intention was well predicted by outcome expectancies and perceived self-efficacy, although the contribution of risk perception was less significant. The authors pointed out that further investigation of the nature of the relationships that outcome expectancies, self-efficacy, and risk prediction have with behaviour is warranted. Given these data, it appears that an examination of fast-food consumption related belief outcome expectancies, along with self-efficacy, and a measure of risk assessment might help to increase the clarity of understanding what motivates and maintains fast-food consumption.

## **2.5 Summary**

Ajzen's (1988) TPB provides a structure for capturing outcome-expectancies related to the behaviour in question. The model is sufficiently flexible that it can be applied to capture the influence of outcome expectancies as well as the cognitive and more experiential components of attitudes. Moreover, it provides a certain elegance in its simplicity to apply attitudes, along with perception of social norms and personal control, to predict both intention to engage in a behaviour as well as behaviour. The model has been successfully applied within the literature to predict a wide range of behaviour from voting and study through to health-related behaviour such as condom-use, drug-use, cigarette-smoking, exercise, and dietary choices, although it has been shown to explain more of the variance in some behaviour than others. Specifically, the theory has been somewhat less successful in explaining dietary and weight-loss behaviour (Bogers, Brug, van Assema, & Dagnelie, 2004; Margetts, Martinez, Saba, Holm, & Kearney, 1997; Reid & Hammersley, 2001; Williams et al., 1993), although it is

proposed that this might be improved with both careful application, including preparatory research prior to instrument development.

Although there is a large amount of educational material available to the Australian general public making specific dietary and physical activity recommendations, overweight and obesity remain problematic. Despite the warnings and recommendations, large numbers of people continue to make poor food choices and the fast-food industry continues to flourish (BIS Shrapnel, 2006). Some researchers have applied the TPB to dietary-choice, although most have focussed on the predictors of healthy dietary-choices, exploring the factors influencing people to eat fruit and vegetables, low-fat milk, etc. Less attention has been given to investigating the predictors or determinants for poorer dietary-choices or fast-food consumption. Finally, to the author's knowledge, no research applying the TPB specifically to fast-food consumption has been conducted within an Australian population. As the TPB is well documented as a useful model for examining health-related behaviour, it will be applied here, particularly as there may be different determinants that explain fast-food consumption from those predicting healthier dietary-choices.

## Chapter Three

### A Qualitative Analysis of Beliefs Regarding Fast-Food Consumption

#### 3.1 Influence of Beliefs in Attitude Formation

Expectancy-value theory suggests that a person's actions or choices are a reflection of the expectations that they hold for the outcomes associated with their behaviour (Ajzen & Sexton, 1999; Feather, 1992; Petosa et al., 2003; Schwarzer & Fuchs, 1995; Westaby, 2002). Applied to fast-food consumption, the theory would suggest that people form beliefs about fast food based on the attributes of the food and the outcomes associated with consumption. Values that are associated with those attributes then become associated directly with fast food. According to the theory, attitudes towards fast food are developed automatically, based on the most salient of the individual's beliefs. In accordance with recommendations by Aizen (2002) for implementation of the TPB, this study aims to examine these beliefs as an initial step towards better understanding of attitudes about fast food and related consumption behaviour.

#### 3.2 Differences in Beliefs According to Food Group

The expectancy-value theory of attitude development has been applied to a wide range of research topics, including the assessment of attitudes towards foods and food groups. Conner and Armitage (2006) reported that research findings support the proposal that differing outcome beliefs underpin attitudes towards specific food groups. Towler and Shepherd (1992) for example, interviewed 34 people asking them what outcomes they believed would be associated with eating four types of food, all high in fat (meat, meat products, dairy products, and fried food). They found three salient belief outcomes across the food groups; participants believed that all groups were 'healthy', 'high in fat', and 'tasted good'. Other salient beliefs indicated that the participants considered meat to be 'expensive', believed that meat and dairy contains 'protein', and considered meat and fried food to be 'convenient'. When testing the predictive power of these



beliefs in terms of overall attitudes, the authors found that taste and health were the primary determinants. The model has also been applied to predict attitudes to low-fat foods. Armitage and Conner (1999b) found participants held four salient beliefs predictive of eating a low-fat diet; 'feel good about myself', 'reduces enjoyment of food', 'helps to lower weight', and 'eating fat makes me feel guilty'. Although taste-related beliefs were common to both high and low-fat food groups, differences were also apparent and reflected in beliefs about convenience, cost, and health consequences.

Also investigating varying beliefs about food, Oakes (2005) asked participants to rate food pairs according to their propensity to promote weight-gain. Participants were provided with pairs of food, distinguished by reputation; foods with a 'reputable' stereotype such as peas, yoghurt, bananas, rice-cakes etc., and those with a 'disreputable' stereotype such as ice-cream, bacon, potato chips, etc. Despite the foods within each pair being of approximately equal caloric value, Oakes found that the disreputable food in each pair was always perceived to promote greater weight-gain than the more reputable calorie-related food. Moreover, in a few cases, the disreputable food held *fewer* calories than its pair, although participants still perceived that the reputable food would be less likely to promote weight-gain.

Oakes (2005) also collected qualitative data indicating that participants believed reputable foods to be 'nutritious', 'healthy', 'low-fat', and 'low in calories' and disreputable foods to contain high amounts of 'fat', 'carbohydrates', 'sugar', and 'calories'. Interestingly, participants believed that even small amounts of disreputable foods would contribute to higher weight gain than larger portions of reputable foods, indicating that although beliefs about foods may be based on nutritional fact, interpretations may not always be accurate. The overall results support the argument that attitudes vary according to fundamental evaluative beliefs about different food groups.

Interested in how beliefs about the healthiness of food groups might influence attitudes and food consumption, Aikman, Min, and Graham (2006) reported that

participants in their study had poor knowledge about the nutritional content of foods and that beliefs about the healthiness of foods did not relate to the frequency with which the food was eaten. Rather, it was how the food tasted that predicted both attitude and consumption rates. A combination of data collection methods was used in this study and they appear to have provided a conveniently straightforward explanation as to why people continue to eat unhealthy foods; firstly they are unaware that the food is not healthy, and secondly, they are mostly concerned with how the food tastes. Although taste consistently appears as an important belief in terms of food choice, overall findings of such nutritional naivety are not particularly consistent with other reports in the literature. Such beliefs about unhealthy food consumption need to be verified before further spending occurs on education campaigns to increase nutritional literacy.

Pettinger, Holdsworth, and Gerber (2004) also found differing outcome beliefs between food groups, as well as differences across cultures, with French participants more concerned with pleasure, social aspects of eating, food quality, and health compared to English participants who reported that concern about how food was grown, ethical issues, and convenience influenced their food choices.

### **3.3 Beliefs and the Theory of Planned Behaviour**

Aizen's (1988) TPB also identifies underlying, salient beliefs as being fundamental to individual differences in attitudes, subjective norms, perceptions of behavioural control, and, ultimately, behaviour. Although he stated that the belief-based measures can serve as underlying indicators of the main constructs (attitude, subjective norm, and perceived behavioural control), Aizen stressed that they are not measures of the main constructs. Rather, beliefs provide an insight into how attitudes, subjective norms, and perceptions of behavioural control are formed and maintained. He also pointed out that when researchers pose questions designed to measure these beliefs, it is only salient beliefs that are likely to be captured, rather than more unconscious or implicit beliefs. Capturing and understanding these beliefs is of vital importance, particularly in terms of

informing the development of intervention strategies to change attitudes and behaviour.

The manner in which instruments measuring TPB variables have been constructed varies between studies. Aizen (2002) recommended that preparatory research be conducted in order to gather qualitative data regarding individual beliefs about the behaviour. These fundamental beliefs should be extracted by asking participants to indicate what they believe to be the advantages and disadvantages of engaging in a particular behaviour, what normative influences they experience, and what factors influence the control that they have over their behaviour. Once collected, the modal beliefs should be used as the basis for items in the final, quantitative instrument. Some authors report relying on the findings of other researchers and re-use the reported questionnaire items in their own research in order to circumvent this time-consuming preparatory task.

Although much of the research applying the TPB does not include such qualitative research identifying relevant underlying beliefs, there are some studies that do compile a list of modal belief responses and this has allowed for greater understanding and discussion of the behaviour under examination. There does not appear to be any published research describing measurement of the underlying beliefs in terms of frequent fast-food consumption and this is an important first step to exploring the effectiveness of the TPB for predicting fast-food consumption.

Although Aizen (2002) suggested that the belief-based measures be used primarily as a basis for understanding the nature of the direct components, the relatively small number of researchers who have included measures of the underlying beliefs have measured and applied them to their analyses in a variety of ways. Some have used the findings to create attitude, subjective norm, and perceived behavioural control scores, which have then been applied to regression analyses to predict intention (e.g. Parker, Manstead, Stradling, Reason, & Baxter, 1992). Others have calculated the belief scores and compared the correlations between these and their direct counterparts (e.g. Hrubes, Ajzen, & Daigle, 2001),

while some have run regression analyses using the belief-based measures in one analysis and the 'direct' measures in a second set, then compared the two models for the greatest amount of variance explained (e.g. Ajzen & Madden, 1986). This research will incorporate a number of these approaches, including comparisons of correlations between the direct and indirect measures of attitude, subjective norm, and perceived behavioural control, examination of the predictive performance of each measurement method in regression analyses, as well as use of the belief-based measures in an attempt to explain some of the variance in 'direct' measures of attitude, subjective norm, and perceived behavioural control (see Chapter 3).

Aizen (2002) also suggested that items designed to measure the underlying nature of attitudes should include both evaluative, cognitive components as well as experiential, or more affective, components. Conner and Armitage (1998) suggested that affective reactions have the potential to influence attitudes, particularly if the behaviour is associated with negative or unpleasant outcomes (such as weight gain in the case of frequent fast-food consumption). This research will include a question, at the pilot stage, designed to explore the affective as well as cognitive beliefs that impact on attitude.

### **3.4 Belief-Based Research within the Theory of Planned Behaviour Literature**

Daigle, Hrubes, and Ajzen (2002) published a paper examining attitudes to hunting in which they compared groups with different hunting preferences (hunters, wild-life-viewers, and those engaging in other outdoor recreations). They were able to provide interesting comparisons between the three separate groups; the results indicated the underlying beliefs influencing attitude differed between the three groups. Research which shows how varying beliefs influence overall attitude between different groups offers greater detail in explanation of behavioural differences, possibly allowing for the development of more accurately targeted interventions.

In an investigation of lecture attendance and grade achievement in college students, Ajzen and Madden (1986) found, as was expected, that the belief-based and direct measures of attitude, subjective norm, and perceived behavioural control were significantly correlated. They were also able to show, through separately run multiple regressions, that the belief-based measures explained a virtually identical pattern of variance as the related direct measures. Although these findings provide support for the theoretical constructs of the model, additional analyses might have provided further information about how each set of beliefs specifically influenced the formation of attitude, subjective norm, and perceived behavioural control.

In an Australian study, White, Terry, Troup, and Rempel (2007) recruited 192 adults diagnosed with type 2 diabetes and/or cardiovascular disease with the aim of investigating the behavioural, normative, and control beliefs associated with physical activity and maintenance of a low-fat diet. The authors were able to use the detailed, belief-based measures to describe, with some accuracy, the factors influencing behaviour. For example, they were able to show that influence from family and peers was associated with low-fat food consumption and that behavioural costs were the strongest predictors of both physical activity and low-fat diet (specific details of the nature of the costs were not available in the pre-published document obtained from the authors). The belief-based measures accounted for a smaller proportion of the variance in physical activity (12%) and low-fat diet (6%) than would be expected from a traditional application of the TPB. However, the findings provide useful observations and specific details regarding the factors influencing the behaviours. This type of finding is more pragmatic and applicable than a report regarding the influence of broad categories such as 'subjective norms' or 'social influence', particularly in terms of developing interventions.

### **3.5 Summary**

Research applying the TPB to behaviours such as job searching, exercising, voting, committing offences, problem drinking, and other behaviour have

revealed strong predictive validity (Ajzen, 1991). In a recent meta-analytic review including 185 studies, Armitage and Conner (2001) reported that the TPB explained an average of 39% of the variance in intention and 27% of the variance in behaviour. The amount of variance explained tends to be lower when the model is applied to weight loss and dietary behaviour. Therefore, it seems fair to say that the predictive power of the model for understanding dietary choice could be improved and Aizen (2002) states that the TPB is, in principle, open to the inclusion of additional predictors. It is possible that there are other psychological factors that may add further explanation to the variance of food choice behaviour and some potential factors may be exposed if beliefs about frequent fast-food consumption are carefully examined.

Although taste seems to be an important factor in food choice, the apparent variations in salient (and cultural) beliefs about different food-groups highlights the need to explore and understand what drives attitudes towards fast food, particularly if Australian consumption behaviour is to be influenced in any way.

The present study is the first in a two-part application of the TPB to fast-food consumption. As the predictive framework of the TPB rests on relevant outcome beliefs, and because the unique nature of the fast-food environment suggests that beliefs regarding fast food are likely to differ from beliefs regarding foods more generally, the purpose of this study was threefold. The primary aim is to identify the underlying behavioural and outcome beliefs, beliefs regarding subjective norms, and perceptions of behavioural control relevant to frequency of fast-food consumption. This information will provide the basis for the development of quantitative measures for use in the subsequent predictive TPB study, reported in Chapter 4. The second aim is to use qualitative data collection methods to enable generation of additional information regarding perceptions of fast food and other possible influences on intentions and behaviour beyond those addressed by the TPB. The third aim is to provide insight into the place of fast-food consumption in people's lives. Greater understanding of these determinants is likely to help in the development and implementation of future interventions and obesity prevention strategies.

## Method

### 3.6 Design

A qualitative approach was employed and telephone interviews were conducted.

### 3.7 Participants

Participants involved in the North West Adelaide Health Study were available for recruitment to the researcher through her involvement with the Nutrition Obesity Lifestyle and Environment Study group.

#### *The Nutrition Obesity Lifestyle and Environment (NOBLE) Study*

The NOBLE study (<http://www.noblestudy.com.au/>) is funded by an Australian Research Council (ARC) linkage grant investigating the problem of obesity in the South Australian population. Partners in the research include the South Australian Department of Health, Central Northern Adelaide Health Service, Commonwealth Scientific and Industrial Research Organisation (CSIRO), University of Adelaide, and University of South Australia. The study uses population data from the North West Adelaide Health Study (NWAHS) cohort as well as other population studies. The researcher is a member of NOBLE.

#### *North West Adelaide Health Study (NWAHS)*

The NWAHS is a collaboration between the North Western Adelaide Health Service (the Queen Elizabeth Hospital and the Lyell McEwin Health Service campuses), the South Australian Department of Health, The University of Adelaide, and the University of South Australia. The sample ( $n=4060$ ) was recruited in 2 phases; the first between November 1999 and December 2000, and the second between August 2002 and July 2003. All households in the north-western area of Adelaide with a telephone connected and a number listed in the Electronic White Pages (EWP) were eligible for selection. The sample was stratified into 2 groups; those in the western and northern Adelaide regions. Households were randomly selected from the EWP and the resident who had most recently had a birthday and was over the age of 18 was recruited via a

computer-assisted telephone interview. The NWAHS participants were recruited for the purpose of investigating the incidence and prevalence of asthma, diabetes, and cardiovascular disease as well as relevant risk factors (including obesity). Biomedical information, including Body Mass Index (BMI), was obtained at a clinic appointment.

### *The Present Study*

Ethics approval for this study was granted by the University of Adelaide, School of Psychology Human Ethics Subcommittee, the CSIRO Human Research Ethics Committee, and the Ethics of Human Research Committee, Queen Elizabeth Hospital and Lyall McEwn Hospital.

One hundred people (2.5% of the NWAHS group) were randomly selected by identification number and invited to participate in the present study on the assumption of a 50% response rate. Sixty-nine people returned signed consent forms. A total of 66 people were interviewed as three were not contactable at the specified times. Each interview was conducted over the telephone and took approximately 25 minutes. Participants ranged from 21 to 85 years of age ( $M = 43.98$  years,  $SD = 17.3$  years) compared to a range between 20 and 95 years ( $M = 54.24$  years,  $SD = 15.87$  years) across the whole NWAHS group. BMI ranged between 18.5 and 45.3 ( $M = 26.68$ ,  $SD = 5.61$ ). Table 3.1 provides a breakdown of sex, education, income, and BMI levels within the selected group.

Comparison data show that the sample was reasonably representative of the larger NWAHS group, although they were more highly educated. Ethnicity data were not collected, although 0.5% of participants in the NWAHS are of Aboriginal or Torres Strait Islander origin.

### **3.8 Procedure**

Participants were contacted by the researcher and completed the interview over the telephone. Any participant interested in the final results was asked to provide either an email or postal address.



Table 3.1

*Comparison of Demographic Information between Study Participants and NWAHS Group*

	<u>Participants in Current Study</u>	<u>NWAHS Participant group</u>
Sex	n (%)	(%)
Female	35 (53)	(51)
Male	31 (47)	(49)
<b>Education</b>		
Secondary	22 (33.3)	(43.1)
TAFE*	25 (37.9)	(40.4)
University degree	19 (28.8)	(11.7)
<b>Income**</b>		
Under \$30,000	18 (27.3)	(22.2)
\$30,000 - \$50,000	19 (28.8)	(24.8)
\$50,000 - \$80,000	19 (28.8)	(22.2)
Over \$80,000	8 (12.1)	(24.4)
<b>Body Mass Index (BMI)***</b>		
Normal	28 (42.5)	(35.3)
Overweight	21 (31.9)	(36.6)
Obese	17 (25.6)	(28)

\*or other accredited qualification; \*\*some participants in both groups chose not to disclose; \*\*\*BMI was divided according to the following criteria; normal weight < 24.9, overweight 25 to 29.9, and obese > 30.

### **3.9 Instruments (see Appendix A)**

#### **3.9.1 Letter of Introduction**

A letter of introduction detailed the confidentiality with which all responses would be treated and advised participants that they were free to withdraw from the study at any stage. An offer was also made to make available the results of the study to any interested participant. Participants were provided with contact details for both the researcher and the Acting Convener of the Human Research Ethics Subcommittee, School of Psychology, University of Adelaide, to whom they could direct any queries regarding the study.

### 3.9.2 Questionnaire

A list of foods was compiled by the researcher to reflect the largest fast-food retailers as well as a sample of comparison convenience foods readily available in the local area. Participants were read the list of foods and asked to indicate which types they would categorise as fast food (see Table 3.2). Participants were also asked to indicate the frequency with which they consumed fast food, from 1 = 'never eat it' through to 9 = 'eat it more than once a day'.

The central interview questions were designed according to the format specified by Aizen (2002) and were intended to capture underlying beliefs relevant to fast-food consumption. For example, participants were asked what they believed to be the advantages and the disadvantages of eating fast food frequently (behavioural beliefs), who would approve and who would disapprove of them eating fast food frequently (normative beliefs), and what factors would make it easier and more difficult for them to eat fast food frequently (control beliefs). In an attempt to gather information about affective reactions that could be differentiated from cognitive responses, participants were asked to imagine that they were eating a fast-food meal and to describe how the food made them feel. Participants were also asked to describe the thoughts that came to mind regarding the food when they were eating a fast-food meal (cognitive responses).

### 3.10 Data Analysis - Content Analysis

The data were analysed using conceptual analysis, a form of content analysis.

As described above, the interviewer asked a series of pre-prepared questions, the majority of which were designed to elicit responses related to TPB variables (i.e. behavioural, normative, and control based-beliefs). During the interviews, the interviewer made extensive notes, as close as possible to verbatim. The researcher and a one supervisor separately examined the transcripts for concept occurrences, coding these by hand.

The first stage of analysis was to aggregate the individual interview data into a contextual database, initially according to question number. The second stage

was to code the material where fast food-related concepts and labels were generated and sorted to broader categories. Some of these categories reflected general concepts such as 'what is fast food' and 'how is fast food perceived'. Other categories were more specific and reflected TPB variables such as 'beliefs about perceptions of fast food held by others (friends, family, youth, people of low socio-economic status, etc.)', 'beliefs about the outcomes associated with frequent fast-food consumption', and 'beliefs about control over consumption rates'. Items falling within these categories included nouns, adjectives, and adverbs used by participants in their responses.

Although the data were initially sorted according to question number, in a final stage of analysis, much of the data used for each of these broader categories was subsequently drawn from a cross-section of responses to different interview questions.

Lastly, comparisons were made between the categories generated by the researcher and supervisor. Few differences were found due to the relatively straightforward nature of the data. Therefore, the categories were readily agreed and are described in the following section.

## **Results and Discussion**

### **3.11 How Do People Define Fast Food?**

Most people were quite inclusive in their definitions, confirming that they believed that the majority of the foods listed by the interviewer could be described as fast food. The exceptions to this were sandwiches/rolls, bakery items, restaurant take-away meals, and perhaps frozen meals.

The food types could be divided into three distinct categories on the basis of the percentage of participants who identified them with fast food (see Table 3.2). Without exception, participants felt that food prepared by larger chains or franchises, Group 1, could be regarded as 'fast'. Although reflecting less

concurrency between participants, the results within Group 2 foods also indicated that most participants described convenience foods purchased through smaller or privately-owned establishments as 'fast'. Included in this group is Subway, which is exceptional in that it is a much larger chain. It is worth noting that many participants who excluded Subway as a fast food justified their decision by referring to perceptions of relative freshness and healthiness of the food, thus revealing the absence of these attributes as part of their definition of fast food. It is possible that it is this perception that distinguishes Subway from other major chains. Finally, Group 3 reflected the foods that most people did not consider to be 'fast'. These foods seem to share a resemblance to foods that are more likely to be prepared in the home.

### **3.12 A Prototype of Fast Food**

Many participants were initially quite inclusive when classifying individual food types (Table 3.2). A different tendency emerged when people answered subsequent questions requiring them to put fast food into a context, or when asked to clarify their definition of fast food. In those circumstances, people's spontaneous associations were with food that is high in fats, low in nutritional value, and purchased from large chains (exclusively pizza, burgers, chips/fries, and fried chicken). In other words, despite applying a broad definition of what constitutes a fast food, when asked to complete a case-by-case classification of individual foods, participants held quite a strong prototypic belief about fast food that differed from their more considered opinion and to which they quickly reverted when discussing fast food more generally. People's spontaneous associations with and applications of the term 'fast food' were food that is high in fats, low in nutritional value, and generally purchased from large chains. This tendency was pervasive. Although participants were asked to think of fast food in terms of their own personal definition when answering all subsequent questions, on each occasion that clarification of individual definitions was sought by the interviewer, participants confessed that they had been thinking of fast food as being a burger, fried chicken, hot chips/French fries, or pizza. Further evidence of this tendency came from the unanimous response given by

participants indicating that frequent fast-food consumption would be a poor choice in terms of health. Finally, any descriptions of fast food given by participants during this phase of the questionnaire fell into one of above four categories. It was therefore clear that, despite the broad definitions of fast food provided by participants at the beginning of the interview, the subsequent responses were based on a different prototypic image of fast food.

Table 3.2  
*Frequencies for Fast-Food Definition*

Food type	Percentage of sample who classified food type as fast
<b>Group 1</b>	
Take-away or delivered pizza	100.0
Food from Hungry Jack's	100.0
Food from McDonalds	100.0
Food from KFC	100.0
Food from local fish and chip shops	97.0
<b>Group 2</b>	
Food from food courts	72.7
Pies, pasties and sausage rolls	71.2
Food from noodle bars	71.2
Food from Subway	68.2
BBQ chicken (e.g. from chicken shop)	66.7
<b>Group 3</b>	
Frozen meals (e.g. from supermarket)	48.5
Restaurant take-away meals	42.4
Bakery items (such as cakes or quiche)	31.8
Sandwiches or rolls	16.7

### 3.13 Behaviour - Who Eats Fast Food?

Only three of the 66 interviewed indicated that they never eat fast food at all and over 75% of the group reported eating it at least once a fortnight. Table 3.3 details the differences in consumption rates between age groups; more of the older participants reported using fast food as an 'occasional' meal, whereas more of the younger participants reported consumption rates within the frequent usage categories (2-6 times a week).

Table 3.3

*Frequency of Fast-Food Consumption by Age Group*

Frequency	Reported consumption rates (%)			
	n	≤ 38 years	n	> 38 years
Never	1	2.9	2	6.3
Occasionally	0	0.0	7	21.8
Monthly	3	8.8	2	6.3
Fortnightly	7	20.6	5	15.6
Weekly	12	35.3	11	34.4
2-3 times weekly	9	26.5	5	15.6
4-6 times weekly*	2	5.9	0	0.0

\* No participants reported eating fast food more frequently than 4-6 times weekly

As preliminary analyses indicated that these consumption rates may have varied with age, further analyses were conducted to investigate the association. For this purpose, the sample was divided into two groups at the median age of 38 years. A one-way between groups ANOVA showed that participants in the younger group ate fast food significantly more frequently [ $M = 4.88$ ,  $SD = 1.25$ ;  $F(1, 64) = 6.75$ ,  $p < .05$ ] than the older group ( $M = 3.97$ ,  $SD = 1.60$ ). This finding is consistent with other observations indicating that fast-food consumption rates tend to drop away from age 40-45 (Mohr, Wilson, Dunn, Brindal, & Wittert, 2007; Nielsen et al., 2002; Pereira et al., 2005).

There was also a non-significant, positive relationship between self-reported frequency of fast-food consumption rates and BMI,  $r = .13$ .

### 3.14 Outcome Beliefs - Cognitive Reactions

People had quite varied responses to the thought of fast-food consumption. Just over half of the group replied with predominantly negative responses while others were either quite positive or balanced in their responses, listing both the pros and cons of a fast-food meal. Positive responses most commonly reflected factors related to convenience and taste, whilst the most common concerns about frequent fast-food consumption were health-related. Table 3.4 summarises both

cognitive and affective responses. Nobody described fast food as a healthy, essential part of their diet.

### *Negative Beliefs*

Those with concerns about fast food commonly said that they believe that the food tends to lack freshness and is of poor nutritional value; high in fat, salt, and sugar and low in essential nutrients with too few vegetables. Many people also questioned the levels of hygiene maintained by many fast-food outlets, expressing fears that the food may have been dropped on the floor or handled with unwashed hands. Of those with negative reactions, most also said that fast food is expensive, does not taste good, and is related to weight-gain. Consistent with findings by Lea and Worsley (in press), several participants voiced concern regarding the environmental impacts of excessive packaging. Although participants in the study by Lea and Worsley listed 'eating less meat' as a factor unlikely to help the environment, participants in this study seemed to believe that land damage caused by cattle farming, ultimately for meat consumption, was quite a strong environmental concern.

### *Positive Beliefs*

Those with a more positive view of fast food thought of it as being tasty as well as a quick, convenient solution to hunger; a handy 'stop-gap' or snack when in a hurry; or as something that they would use to 'treat' or 'spoil' themselves. Many also thought that the increases in variety (especially with salad, healthy, or vegetarian options) were pleasing. Although these people were more positive on the whole, most also mentioned concerns about the 'unhealthiness' of fast food and how they were careful either to choose healthier options or to use it infrequently.

## **3.15 Outcome Beliefs - Affective Reactions**

Although people reported experiencing a wide range of feelings while eating fast food, just over two thirds of the people reported positive emotions or feelings at least in the initial stages of their fast-food meals (see Table 3.4). A small number

of people reported no distinguishable emotional responses to fast food, displaying rather a utilitarian attitude towards all food.

Table 3.4

*Primary Cognitive and Affective Outcome Beliefs Regarding Frequent Fast-Food Consumption*

Positive Beliefs	n (%)	Negative Beliefs	n (%)
Convenience	64 (97)	Health costs	
Taste	43 (65)	• Poor nutrition	66 (100)
Reduced preparation	27 (41)	• Weight gain	46 (70)
Time saved	26 (39)	• Increased fat/cholesterol	38 (58)
Gratification*	25 (38)	Financial costs**	35 (53)
Obtain and consume food quickly	24 (36)	Social costs	
Reduced clean-up	24 (36)	• Encourages sedentary/lazy lifestyle	16 (24)
Variety	7 (11)	• Children do not learn to cook/poor example	9 (14)
Low cost	7 (11)	• Habit forming	8 (12)
Children like it	3 (5)	• Loss of traditional family meal time	3 (5)
		Other	
		• Physical symptoms***	31 (47)
		• Psychological symptoms#	27 (41)
		• Taste	11 (17)
		• Atmosphere in restaurant	9 (14)
		• Risks associated with poor hygiene	9 (14)
		• Persistent advertising strategies	4 (6)
		• Excessive packaging/land damage	3 (5)

n = 66; \*feeling full and satisfied; \*\* although cheaper than restaurant food, more expensive than fresh foods; \*\*\* nausea, bloatedness, rapid return to hunger; # regret, guilt, rushed

*Positive Feelings Evoked*

Half of the group reported feelings of enjoyment associated with either the taste or the sensations experienced as they eat, while almost a third described feelings of happiness, satisfaction, contentment, and fulfilment. Of those with positive reactions, almost one quarter mentioned that they also experience some feelings of guilt, usually after they have finished eating.



### *Negative Feelings Evoked*

Eighteen percent of the group described specific, negative feelings, using adjectives ranging from laziness and lethargy through to disappointment and inadequacy, with a couple of more extreme responses incorporating disgust and repulsion. Interestingly, just over 10% reported feeling rushed when eating fast food and accredited that feeling to the ambience of the restaurant as well as the need to eat the food very quickly before it becomes cold. It is possible that this need to eat quickly could lead people to eat more than they otherwise would. A small number of parents mentioned that they might feel a little irresponsible if they allowed their children to eat fast food. Approximately 5% of the participant group also reported experiencing some self-consciousness when either purchasing or eating fast food, believing that other people may judge them, perceiving them as being “too fat to eat that”. These beliefs might influence people to obtain fast food using alternative methods, such as drive-through or home delivery.

Overall, the role of emotion and physiological feedback in people’s decisions about eating fast food appears to be a complex one. For example, almost one third of the total group reported feeling guilty and nearly half complained about feeling physically poor after consuming fast food, yet three quarters of the group reported eating fast food quite frequently. It seems that enjoyment of the flavours and textures along with almost instant feelings of satiation are likely to be important factors influencing people to eat fast foods, even though they are likely to be aware of at least some of the longer-term associated health risk.

### **3.16 Normative Beliefs – Social Influence**

Participants were asked who they thought might approve of fast-food consumption. Many suggested that young children (due to playgrounds and the common gift of a small toy included with children’s meals), adolescents (using fast-food restaurants as a meeting place), and young families (where the parents both work) would be most likely to approve. Only a small number of participants suggested that their friends would approve and these were all

people in their early 20s. Thirty-six percent of participants referred to people who are overweight, poorly educated, or of lower socio-economic status as those who would probably approve of frequent fast-food consumption. Such responses suggest the existence of a stereotype of the fast-food consumer as a lesser individual, lacking in knowledge or self-control, and possibly driven by hedonistic, physiological, or economic factors. Almost every participant believed that anybody working as a medical professional (dietician, nutritionist, GP, etc.) as well as anybody from their immediate family, would disapprove of their eating fast food frequently. These beliefs appear to be quite consistent with the concerns regarding health described in Table 3.4.

When asked who had the greatest influence over their dietary choices, 77% of people reported being influenced by their partner, children, or parents. Other less frequent sources of influence were friends, medical practitioners, dietary advisers, sporting role models, and various media sources (such as advertising, current affairs programs, documentaries, magazines, and diet books).

These responses provide some support for the generally negative stereotype that people seem to hold about fast food. Participants generally felt that fast food is consumed by those who are naïve, easily influenced, or those with little education about nutrition. Ironically, the findings of this research provide some contradictory evidence to these apparent beliefs as all participants in the research voiced an awareness that fast food is not usually a healthy choice even though over half of the group reported eating it at least once a week and a quarter of the group reported eating it anywhere between two and six times a week. These patterns suggest the operation of an optimistic bias, with people assessing their personal risk for negative health-outcomes as being lower than the risks faced by others. Regardless, what is clear is that frequent fast-food consumption cannot be attributed simply to a poor understanding of nutrition and diet. Given that the immediate benefits of both convenience and enjoyment were the most commonly reported driving factors, it is worth examining to what extent these override concerns about health consequences in addition to the other factors captured by the TPB.

### 3.17 Control Beliefs

In response to a question regarding the factors either facilitating or impeding their fast-food consumption rates, participants tended to report influences that were very similar to their outcome beliefs (for example, taste, convenience, health concerns, and financial constraints).

#### *Facilitating Factors*

Other facilitating factors that were mentioned occasionally were meal-deals (perception of value for money), advertising of new products, or some form of incentive. In terms of personal circumstances, people referred to working long hours, eating alone, and being unable to prepare meals as facilitating their fast-food consumption. Several people also mentioned that their physiological or emotional state might impact on their decision to eat fast food, particularly if they are feeling exhausted or depressed, or if they are experiencing cravings.

#### *Impeding Factors*

Although people frequently referred to feelings of guilt and regret, typically they reported experiencing these emotions after a fast-food meal had been consumed, suggesting that such feelings may not actually impede behaviour *per se*. Several women described a fear of getting fat as a factor that prevents them from eating fast food frequently, and a few people also indicated that information they were introduced to through the media might also influence them, with current affairs programs and the documentary *Supersize Me* being mentioned on several occasions.

### 3.18 Key Conclusions

Definitions of fast food vary in the literature with some referring, in general terms, to convenient, ready-to-eat meals (Harrison & Marske, 2005; Pereira et al., 2005) while others refer to food from specific restaurants (Reidpath et al., 2002). Results from this study indicate that most laypeople seem to concur more with the latter definition, differentiating between fast foods and other convenience foods based on how healthy they perceive the food to be.

Consistent with previous findings (e.g., Aikman et al., 2006), it appears that although education about the potential health consequences of poor food choices has been successful in terms of improving knowledge, knowledge alone is not necessarily enough to curb poor food choices. Responses drawn from the TPB-based questions (outcome, normative, and control beliefs) provide some insight into this, suggesting that the influence of education is hindered on a number of fronts. The responses to the social influence questions indicate that people are more influenced by their family members than they are by medical or nutritional experts. It is also likely that the outcomes of both enjoyment and satisfaction that people expect from fast food is an important determinant of consumption, as is the high level of convenience.

These beliefs were captured with the specific aim of developing an appropriate measure, based on the TPB, in order to qualitatively measure attitudes towards fast foods and how they influence both intention and behaviour. Having a clear picture of what factors influence attitudes towards fast foods will allow a comparison of the influence of salient beliefs between high and low-consumers of fast food and the modal beliefs will be used for this purpose. Another noteworthy point is that the beliefs uncovered in this study differ from findings investigating beliefs about low-fat or healthier food choices that indicate nutritional benefits, satisfaction, and healthiness are often salient (Backman, Haddad, Lee, Johnston, & Hodgkin, 2002; Kyungwon, Reicks, & Sjoberg, 2003; Verbeke & Vackier, 2005). This is important as it highlights the need to investigate attitudes towards foods according to more exclusive categories rather than as a whole.

Many consider fast food to be a poor choice of food to the extent that it carries a label and stereotype to differentiate it from all other foods. Moreover, frequent consumers of fast food are seen to be poorly-educated and often driven by hedonistic motivators. Despite reporting these negative stereotypes, participants were consuming fast food quite frequently. It appears people have become proficient at overcoming dissonance, relying on cognitive processes and biases to justify their own regular consumption of fast food and convince themselves that

their personal health risks are relatively low. For example, a small number of people stated that they would exclude some foods (in particular, pies, pasties, and sausage rolls) from the category of 'fast' because these particular foods formed a part of their weekly diet. Such a selective application of the term 'fast food' is supported by the historical fact that the typically Australian pie or pasty pre-dates the more recent introduction of a fast-food type with American origins. Nonetheless, it illustrates both the ease with which self-serving cognitions can be sustained and how the use of labels such as 'fast food' can be simultaneously an aid and an obstacle to effective communication and implementation of interventions.

In conclusion, the data indicate that nutritional education has made an impact on the salient, overt beliefs that people hold about frequent fast-food consumption. What is also apparent is that these beliefs do not necessarily exert a strong or consistent influence over behaviour.

### **3.19 Applications** (see Chapter 4)

These findings were used as the basis for developing a specific tool to examine specific outcome beliefs and attitudes towards fast-food consumption, related beliefs regarding social norms and perceptions of control, intentions to eat fast food, and consumption behaviour, via both retrospective questions and a food diary. The tool was employed with a population sample drawn from the same population as this qualitative study, with the aim of examining factors underlying unhealthy food choices as well as investigating the specific role and influence of beliefs in attitude formation.

## Chapter Four

### **Determinants of Fast-Food Consumption: An Application of the Theory of Planned Behaviour**

The TPB has been applied successfully to predict a number of behaviours, including many that are health-related. The first section of this chapter outlines the meta-analytic research that has been conducted to examine the performance of the TRA and TPB across a range of behaviours. Some researchers have applied the TPB to investigate food-consumption, although most of these studies focus on healthy choices such as low-fat foods, fruit and vegetables, and whole-grained foods and this will be discussed in the second section. Many research projects applying the theory have included additional variables in the hope of explaining more of the variance in intention or behaviour, or both. As the main aim of this study is to develop a model that utilises the TPB to help explain individual differences in fast-food consumption, the third and fourth sections will review research for strategies or additional variables that might also be applied to improve understanding of fast-food consumption. The possible interactions between some of these variables and related effects will also be covered.

#### **4.1 Meta-Analytic Research of the Theory of Reasoned Action and the Theory of Planned Behaviour Applied to Weight-Loss and Dietary Choices**

In a relatively early meta-analysis of research using the Theory of Reasoned Action, Sheppard et al. (1988) concluded that although the theory had demonstrated relatively good predictive power for explaining behaviour across a number of domains, there were also a number of situations in which the model did not hold quite so well. Sheppard et al. suggested that there were three factors typically found in research that may help to explain poorer performance of the model. They stated that the Theory of Reasoned Action struggles to

predict behaviour accurately when; the behaviour is not completely under the volitional control of the individual, the behaviour involves a choice problem for the individual (for example, product choice), or when the individual is not sufficiently well informed in order that they be able to form a confident intention.

Sheppard et al. (1988) reported that the average correlation between intention and behaviour was 0.53, equating to an explanation of about 28% of the variance in behaviour. Included in these analyses were intention-behaviour relationships for losing weight and eating only non-fattening foods with correlations averaging 0.16 and 0.25 respectively. These were among the weakest associations across the range of behaviours tested. The strongest associations were found for behaviours such as using contraception (.89), voting for a specific candidate (.92), and having an abortion (.96). Sheppard et al. suggested that both losing weight and eating non-fattening foods might be described as *goals* rather than *behaviour* as it could be argued that there are some major obstacles impeding their attainment.

Although it would seem logical that relationships between intention and behaviour would be considerably weaker for goals than direct behaviour, precisely what behaviours are more accurately defined as a goal is a matter for debate. Ajzen and Fishbein (1980) recommend that researchers wanting to use the model to investigate goal attainment do so by focussing on the behaviour involved in reaching the goal rather than the goal itself. 'Eating only non-fattening foods' would seem to be a behaviour appropriate for the goal of weight loss rather than being a goal itself (although it could not be considered to be an exclusive path towards weight loss). Although intentions such as 'I intend to eat healthily' might be sufficiently broad to be considered a goal, more specific dietary plans such as 'I intend to eat fast food twice this week' are sufficiently narrow that they could be considered a behaviour.

In a later summary of studies using the TPB to predict behaviour from both intention and perceived behavioural control, Ajzen (1991) also found that overall, the weakest predictions were with respect to weight loss. Ajzen proposed that the relatively poor predictive power was because the act of losing weight is more problematic in terms of volitional control than are some other behaviours. This

argument seems rational when losing weight is considered against behaviour such as voting and playing video games, however, seems to lose a little validity when compared with behaviour such as performance on cognitive task.

Although there is a powerful biology that defends fat-mass, it is difficult to accept that individuals would perceive that they hold greater volitional control over their intellectual capacity than over their ability to lose weight. Volition control is certainly a mediating factor in the successful application of the TPB, although the argument that the TPB performs more strongly when applied to behaviour rather than goals (Sheppard et al., 1988) is just as convincing.

Application of the TPB to a behaviour (fast-food consumption) related to the goal of weight-control may help to clarify this.

More recently again, Armitage and Conner (2001) published a review of 185 independent TPB studies. It appears that some of the more recent work with the TPB has been more successful than earlier work. Armitage and Conner found that, on average, the studies were able to account for 27% of the variance in behaviour and 39% of the variance in intention.

Through their review, Armitage and Conner (2001) noted that the theory predicted more of the variance in self-reported behaviour than behaviour that had been measured objectively, explaining, on average, an additional 11% of the variance. They suggested that a potential explanation is that (later) objective measures of behaviour may not map as cleanly onto self-reported intentions as do subjective measures of behaviour. Two measures of fast-food consumption will be taken in this research as it seems likely that the TPB will perform differently with a retrospective measure than it will with a more objective measure (in this case, a fast-food diary).

Armitage and Conner (2001) reported that generally, subjective norm was found to be a weaker predictor of intention than either attitude or perceived behavioural control. They suggested that methodological issues might explain this. They believe that single-item measures commonly adopted by researchers are unlikely to be sufficient given that normative influence can be complex and



multidimensional. This research will include items designed to capture both descriptive norms (perceptions of how others behave) and injunctive norms (perceptions of what others believe). In addition, norms will be also be investigated according to the influence cast by various referent groups as recommended by Louis, Davies, Smith, and Terry (2007).

Armitage and Conner (2001) also proposed that perceived behavioural control may not be as similar in nature to self-efficacy as Ajzen (1991) suggested. They argued that research they reviewed had found differences in the predictive ability of the two constructs and suggested that self-efficacy better reflects perceptions of personal or internal control whereas perceived behavioural control captures external or situational factors. Again, measures used in the research here will be selected cognisant of these recommendations.

## **4.2 Research using the Theory of Planned Behaviour to Understand Food Choice**

### **4.2.1 Understanding Decisions to Choose Healthy Foods**

In a longitudinal study, Conner, Norman, and Bell (2002) showed that the TPB could be successfully applied to healthy eating behaviour and was also predictive over a significant period of time. In addition to the standard TPB variables, they included measurement of past behaviour. As questionnaires were administered at three different points in time (at study commencement, six months, and six years), Conner et al. were also able to capture stability of intention. The rationale for this was that both past behaviour and stability of intention have been shown to be influential over future behaviour. Drawing their participants from patients attending health clinics at a general practice, Conner et al. found that attitudes and perceived behavioural control were predictive of intention to eat healthily, explaining 43% of the variance in intention after six months and 20% after a six-year interval. They also found that past behaviour was predictive of intention at six months, but not at six years, and subsequently argued that intention was more influenced by the cognitive factors operationalised in the TPB rather than 'simple reflection on past behaviour' (Conner, Norman et al., p. 199). Overlaps

between measures of past behaviour and measures of attitude and intention may also have contributed. Overall, the finding is a positive one, indicating that a history of poor dietary choices need not be an indication of poor future choices. The research also indicates the TPB is well equipped to capture eating behaviour and performs strongly even over significant periods of time, although measures of past behaviour may not always be valuable.

Bogers, Brug, van Assema, and Dagnelie (2004) examined the effectiveness of the TPB as well as the tendency that some people have to over-estimate the amount of fruit and vegetables that they consume. Behaviour was captured using self-report measures of fruit and vegetable consumption on the Food Frequency Questionnaire (FFQ) as well as objectively through blood-testing examining biomarkers for nutrient intake. Results indicated that participants almost always overestimated the amount of fruit and vegetables they consumed. In terms of the TPB performance, the model explained variation in fruit and vegetable intake better for those who were realistic about their intake than for those who overestimated. Nonetheless, the model performed well overall, explaining 46% of the variance in fruit consumption and 33% of the variance in vegetable consumption. Although all three TPB variables predicted intention, perceived behavioural control was the strongest predictor of both intention and behaviour. Subjective norm was the poorest predictor with the suggestion being made that alternative factors, such as direct social pressure or descriptive norms (family modelling), might be a better predictor of food choice. Bogers et al. also reported that perceived behavioural control was the only TPB variable to predict fruit consumption as intention was non-significant. They argued that eating behaviour is often habitual and that this may have weakened the intention-behaviour relationship. This does not explain however, why other eating-related studies find that intention predicts behaviour quite strongly. The poor performance of subjective norm is surprising given that social nature that surrounds most meals and this study will attempt to investigate of descriptive versus injunctive norms as suggested by Bogers et al.

Bogers et al. (2004) also reported a direct correlation between objective fruit and vegetable consumption (as measured by FFQ) and attitude. They suggested that this finding could be explained by the influence of *habitual* attitude on behaviour rather than attitudes simply predicting intention as suggested by the TPB. This explanation is interesting, suggesting that attitude may comprise factors that do not influence behaviour through intentions. This seems likely to occur when food consumption is unmediated by cognitive process, such as choices motivated by taste or a purely emotional/hedonic experience.

Bogers et al. (2004) also conducted analyses to investigate the differences between people with realistic perceptions of their fruit and vegetable intake and those who overestimated their intake. They found that perceived behavioural control only predicted behaviour for the realists. As correlations between control and behaviour are purported to reflect the extent to which the participants hold perceptions of control that are closely aligned with actual control (Aizen, 2002), Bogers et al. deduced that realists held more accurate perceptions of the level of control they had over their fruit and vegetable consumption. Due to these findings, this research will investigate differences in perceptions of control between a retrospective measure of fast-food consumption as well as a more objective fast-food diary to see if perceived behavioural control is a better predictor of the more 'realistic' measure. Also, frequent and infrequent consumers of fast food who are of normal weight and those who are overweight will be compared for differences in perceived behavioural control scores; it may be that false or poor perceptions of control over amounts of high-energy dense food consumed contributes to weight problems.

Interested in affective responses to food, Payne, Jones, and Harris (2004) examined the attitudinal predictors of healthy eating, dividing their measure of attitude into cognitive and affective semantic differential items. Although they used the measures to predict intention only (no direct relationship between attitude and behaviour was explored), the authors did find that the affective measure was the strongest predictor of intention to eat healthily. The finding indicated that intention to eat food is influenced by the extent to which

consumption is anticipated to be a 'pleasant' and 'enjoyable' experience. Payne, Jones, and Harris (2005) had similar findings, revealing affective attitude to be a strong predictor of intention to consume fruit and vegetables with cognitive attitude failing to reach significance. Interestingly, they found a very different trend for intentions to eat sweets and snack foods with cognitive attitude predictive and no contribution from affective attitude. Given that fast food was often associated with feelings of satisfaction and enjoyment at the qualitative stage of this research, the possible influence that attitudes, particularly affective attitudes, have directly on both intention and behaviour will be examined.

In a study drawing on the TPB framework to examine adolescent eating (and activity), Baker, Little, and Brownell (2003) focussed specifically on expanding the factors associated with social influence and perceived behavioural control. They suggested that the standard operationalisation of subjective norms may serve to diminish certain sub-elements, particularly when considering adolescent behaviour. That is, rather than aggregating the normative beliefs across a range of referent groups, they believed it would be more beneficial to examine the influence of each of these groups individually. Participants were 279 students drawn from two middle-class schools. Baker et al. reported that peer and parent norms influenced attitude and although peer norms were stronger, parental norms were also significant. It is likely that normative influence over fast-food consumption could vary according to referent group and, following the argument of Baker et al., these will be operationalised separately.

In another study using the TPB with an adolescent population, Backman, Haddad, Lee, Johnston, and Hodgkin (2002) tested the predictors of healthy dietary practices. Their questionnaire was developed following the guidelines offered by Aizen (2002) and the results showed that all three TPB variables were significant independent predictors, combining to explain 42% of the variance in intention to follow a healthy diet. Intention alone explained 17% of the variance in behaviour as perceived behavioural control did not contribute directly to prediction of healthy dietary behaviour.

From preparatory research generating lists of salient behavioural, normative, and control beliefs, Backman et al. (2002) were able to determine the nature and importance of factors influencing attitudes, subjective norm, and perceived behavioural control. That is, they reported that (in order of strongest correlations); 'knowledge about a healthful diet', 'availability of healthful foods', 'motivation', and 'access to enough money' were significantly correlated with perceived behavioural control, 'taste', 'feeling healthy', and 'looking good' were correlated with attitude, and that there were a number of individual referent groups such as 'mother', 'sibling', and 'teacher' correlated with subjective norm. These findings add valuable information, increasing understanding of the development and maintenance of attitude, subjective norm, and perceived behavioural control. Therefore, similar analyses will be conducted to examine each of the belief components influencing attitudes, subjective norm, and perceived behavioural control in terms of fast-food consumption.

In an Australian study examining the negative aspects of extreme dieting, Nejad, Wertheim, and Greenwood (2004) applied the TPB along with additional predictor variables including prior behaviour, descriptive norms (how often close relatives diet) representative norms (perceived thinness of a celebrity role model), self-efficacy, susceptibility to weight gain, health-value, body-satisfaction, and decision-making style. They found that intention to diet mediated the effects of all other TPB variables. They also found that the strongest predictors of intention were direct attitude and indirect perceived control combining to explain 69% of the variance in intention. Nejad et al. highlighted that, in terms of normative influences, behaviour *modelled* by close friends and family was of greatest significance; more so than levels of *perceived approval* from the same people or a desire to look like a favourite celebrity. In line with reports from other researchers (e.g. Backman et al., 2002; Baker et al., 2003), it appears that dietary behaviour modelled by friends and family is one of the most influential normative factors and it is expected that a similar tendency will be found with fast-food consumption.

#### 4.2.2 Understanding Decisions to Choose Fast Food

In a cross-cultural study using the Theory of Reasoned Action, Bagozzi et al. (2000) investigated the usefulness of the theory along with the additional predictors of social setting, cultural orientation, and past behaviour to explain fast-food restaurant patronage. Undergraduate population samples from the United States, Italy, China, and Japan were employed. Arguing that subjective norm frequently fails to predict intentions, the authors elected to treat this as an independent variable separate from the model and manipulate it across situations to reflect scenarios where participants might feel varying degrees of 'peer pressure' to eat at or avoid a fast-food restaurant. The method employed resulted in the collection of some normative data, although no items were used to capture motivation to comply with the expectations of others.

Bagozzi et al. (2000) concluded that the Theory of Reasoned Action was quite robust when applied to fast-food consumption. As predicted, the model explained more variance in intention for the American (58%) and Italian (27%) groups than for the Japanese (24%) or Chinese (17%) groups. It was proposed that the difference in predictive ability of the theory across cultures was a reflection of the greater importance of norms as a determinant of social behaviour in collectivist cultures, whereas attitudes are more influential in individualistic cultures. However, it could be argued that differences in the extent to which participants were influenced by norms or attitudes would be captured by the traditional 'subjective norms' and 'attitudes' variables. Consistent with this, the results showed that the intentions of Chinese participants were most influenced by subjective norms and intentions of American participants were most influenced by attitude, although the difference was not balanced out across the two variables and far more of the American intention was explained. This finding suggests that the model may be most appropriate for use within the United States, where it was developed, although it is also likely to be suitable for use in other individualistic cultures such as that of Australia.

Bagozzi et al. (2000) followed a method that may also have impacted on the attitudinal findings. They captured attitudes to eating in a fast-food restaurant with a five item, 7-point semantic differential scale. The authors did not describe how the adjective pairs were selected and some appear to lack validity for the behaviour in question. The pairs included; pleasant-unpleasant, wise-foolish, attractive-unattractive, beautiful-ugly, and rewarding-punishing. These adjectives may have translated to Italian, Japanese, or Chinese quite well, although it is likely that most Australians would struggle to relate foods to adjectives such as 'attractive' and 'ugly'. Certainly, these adjectives were not used by participants in the qualitative stage of this research and the scales to be designed for use in this follow-up study will reflect adjectives commonly reported in the preparatory stage.

Taking a marketing perspective, Mahon, Cowan, and McCarthy (2006) investigated what motivates British consumption of ready-meals and take-away food. They applied the TPB and found that attitudes predicted intention for both behaviours, subjective norm was only predictive of intention to consume ready-meals (not take-away), and perceived behavioural control was not a predictor for either behaviour. Overall, the results explained 22% of the variance in intention and 43% in behaviour. This result indicates a moderate TPB performance, although the method of application may not have been ideal. Despite the study being large and apparently well funded (interviews were conducted in over 1000 homes and participants were all paid £10), underlying beliefs were not identified for use in the model and questionnaire items were developed from secondary sources. Furthermore, subjective norm, perceived behavioural control, intention, and behaviour were measured with one item each. Although Mahon et al. included a measure of habit and found that it was a significant predictor of intention, its inclusion reduced the amount of variance explained by attitude. Although many researchers have included past behaviour or habit as an additional variable to TPB applications, the results are not particularly convincing. Furthermore, past behaviour is limited in what it can add to the conceptual understanding of behaviour; knowing that an individual or group has

consumed fast food in the past does not explain *why* they initially chose fast food. Nonetheless, these results indicate some validity for the TPB in the prediction of fast-food consumption, a behaviour that has otherwise received little attention.

### **4.3 Other Factors Contributing To the Explanation of Intention and Behaviour**

Making note that Aizen (2002) stated the TPB may better predict some behaviours if extended to include additional relevant variables, many researchers, including those investigating dietary behaviour and food choice, have experimented with additions. The following section reviews some of the research conducted with variables considered potentially important to understanding fast-food consumption.

#### **4.3.1 Self-Identity**

One of the functions of attitudes is that they often act as a vehicle for the expression of values and beliefs; a reflection of individual identity. Several researchers have included measures of behaviour-specific self-identity (for example, identification of the self as health-conscious) in their attempts to better predict intention and behaviour.

Armitage and Conner (1999a) proposed that the TPB, extended to include self-identity, may explain additional variance in intention to engage in a certain behaviour above that explained by the TPB alone. Defining self-identity as 'the salient part of the actor's self which relates to a particular behaviour' (p. 73), Armitage and Conner measured the construct with questions such as 'I think of myself as a healthy eater' and found it to be a significant, individual predictor of intention to eat a low-fat diet. By including the measure of self-identity in their application of the TPB, Armitage and Conner were able to explain as much of 65% of the variance in intention to eat a low-fat diet.

In a related study, Armitage and Conner (1999b) again investigated the efficacy of the TPB in the prediction of consumption of a low-fat diet. They found that the TPB was an effective predictor (although perceived behavioural control did



not contribute significantly), explaining 57% and 61% of the variance in behaviour and intention respectively. Self-identity was also an independently significant predictor, contributing 4% to the explanation of intention. Although the authors also investigated the influence of questionnaire format and social desirability on the model, they found that the impact of these was minimal, concluding that the TPB may be considered quite robust when applied to food choice, although it was aided by the inclusion of self-identity.

Sparks and Shepherd (1992) argued that proper operationalisation of the TPB components would render an additional measure of self-identity obsolete, theorising that it is unlikely there is a causal link between self-identity and intention that is independent from attitudinal evaluations. That is, they proposed that self-identity is largely expressed through attitude and that researchers finding predictive validity in measures of self-identity were doing so because of methodological flaws in their research. However, Sparks and Shepherd found that a measure of identification as a 'green consumer' contributed toward prediction of intention to consume organic vegetables and was independent of attitude. One explanation they offered for this is that the methods recommended for measuring attitude within the TPB are inadequate. Sparks and Shepherd suggested that decisions to engage in some behaviour may require moral (or affective) deliberation which may not be tapped by attitudinal measures and recommended that further research include careful measures of both attitudes and self-identity and examine the relationship closely. A later, related study by Sparks and Guthrie (1998) examining intentions to eat a diet low in animal-fats showed that a measure of health-conscious identity was not only predictive, it was also independently so when included in a regression along with a measure of moral obligation.

In a New Zealand study extending the TPB to include measures of self-identity and past behaviour, Cook, Kerr, and Moore (2002) investigated factors influencing people's intentions to purchase genetically modified (GM) foods. Based on recommendations by Eagly and Chaiken (1993), Cook et al. included a measure of self-identity as a potential influence on intention arguing that it

would serve to account for dispositional influences. They suggested that factors such as environmental concern or self-identification as a 'green' consumer may influence individual intentions to purchase GM foods. Cook et al. also included two additional measures of past behaviour (purchase of food perceived to be environmentally friendly and purchase of food for personal health benefits) in an attempt to better explain intention for future behaviour.

Cook et al. (2002) found that prior behaviour was related to both self-identity and attitude and reported that self-identity, attitude, subjective norm, and perceived behavioural control were all significant predictors of intention. However, closer inspection of the results showed that attitude and self-identity were not strongly significant predictors. Moreover, a comparison regression using only the TPB variables showed that the beta value for attitude was significantly reduced with the inclusion of self-identity. Despite the apparent overlap between attitude and self-identity, the overall model was stronger with the inclusion of self-identity. Similar results were reported by Smith et al. (2007) who found that the TPB model significantly predicted intention to purchase a preferred brand of beer. When added as an additional predictor, self-identity predicted intention strongly, outperforming all other variables. Although the overall predictive ability of the model was improved, the beta value for attitude again lost considerable strength with the inclusion of self-identity.

Louis, Davies, Smith, and Terry (2007) applied the TPB to predict healthy eating intentions with a specific interest in social influence. They suggest that the global, aggregated measures of social norm advocated by Aizen (2002) are insufficient when compared to the referent informational influence model which demonstrates how behaviour is moderated by the norms of relevant referent groups with whom individuals identify. Using university students as a referent group, Louis et al. investigated how group norms influence eating behaviour beyond the TPB variables. They found that attitude, subjective norm, and perceived behavioural control all contributed significantly to explain 50% of the variance in intention to eat healthily, although identification with the referent student group added a further 7% to the variance explained. These findings are

supported by other studies conducted by Terry and her colleagues indicating that, within Australian culture, self-identification can influence intention and behaviour across a range of behaviours including exercise and sun-protection (Terry & Hogg, 1996), recycling (Terry, Hogg, & White, 1999), and safe-sex (White, Terry, & Hogg, 1994). Specifically, these findings not only add important weight to the argument that self-identification is useful in improving the predictive power of the TPB, but also suggests that the measurement of subjective norm may be more effective if specific referent groups are considered individually rather than in an aggregated manner.

Overall, the research applying self-identity indicates that there may be a component of attitude that is not effectively captured by the methods advocated by Aizen (2002) and attempts to incorporate self-identity may go some way to filling this gap as it has been shown to be independently predictive. However, some findings indicate that there may be some overlap between measures of attitude and self-identity and it would also seem sensible to examine the interaction effects between the two variables as a cautionary step. Specifically, the instrument used by Armitage and Conner (1999) seems particularly relevant to this research and the same instrument will be applied here to test the extent to which self-identification as a healthy-eater reduces fast-food consumption.

#### 4.3.2 Affective Reactions

Many have argued that emotional or affective responses are as influential in processes underlying assessment and decision-making as are more rational, cognitive responses. By way of theoretical explanation, Finucane, Alhakami, Slovic, and Johnson (2000) referred to common financial or economic models of risk and benefit where the two are positively correlated; an increase in risk in investment terms is usually equated with an increase in return (over a longer term period at least). However, Finucane et al. suggested that this *mathematical* version of risk-benefit relationships is reversed when applied to *human* decision-making where a negative correlation is reported between risk and reward; people usually perceive greater risk to be equated with negative outcomes. For example,

being overweight is generally perceived as being high in risk as well as being relatively low in benefits. Finucane et al. suggested that the role of affect in the judgements people make is the key to explaining this relationship; that is, people base their judgments not only on what they think about the object or activity, but also on how they feel about it. Therefore, affect plays a strong role in this process, tending to direct judgements of risk and benefit. In sum, the authors argued that if a person feels positively towards a behaviour, they tend to judge the benefits of the behaviour as being high and the risks being low (and vice versa).

Finucane et al. (2000) examined the impact of affect on the judgements made by people regarding the risks and benefits associated with a series of specific hazards relevant to Australian society (such as surfing, food preservatives, mobile telephones, chemical fertilisers, microwave ovens, etc.). When asking participants to make judgements about the risk-level associated with each of the listed hazards, Finucane et al. employed a method that allowed for comparison of results both with, and without, time pressures. That is, half of the group responded under time pressure trial whilst the other half had no time pressures at all, in order to control for reliance on cognitive, rather than affective, processes. The findings indicated that affect influenced judgements in both groups with largely negative correlations between perceived risk and benefit. However, the correlations for the time-restricted group were generally stronger suggesting that affect may have a significant effect on decision-making, especially where cognitive effort is low or restricted.

In a second study, Finucane et al. (2000) attempted to manipulate the overall affective state of participants by providing specific information regarding the benefit or the risk of a stimulus object. They hypothesised that if participants were primed with information highlighting the benefits of the object (in this case, nuclear power), then their judgements should reflect a lower perceived risk. Their findings across four groups confirmed their prediction of a causal relationship between perceptions of risk and benefit. Although, even with restricted time, it would seem rather difficult to accurately differentiate between

affective and cognitive responses, it is possible that any positive short-term affective reactions that people experience when consuming food, particularly foods high in fat and sugar, may influence perceptions of the longer-term risks of such foods.

Acknowledging the importance of both the cognitive or evaluative component of attitudes as well as the affective component, Ajzen and Driver (1991) described research they conducted to assess both evaluative judgements (perceived costs and benefits) as well as affective judgements (positive or negative feelings) associated with leisure activities such as jogging, climbing, cycling, spending time at the beach, etc. using semantic differential scales. Factor analyses revealed two (expected) factors, one evaluative and the other affective in nature for each of the individual leisure activities. A matter of particular interest is that the affective components did not correlate with the evaluative components and were presumably tapping separate constructs. However, Ajzen and Driver reported that using the two separate measures of attitude did not help to explain more of the variance in leisure intention, and suggested that those making positive evaluative assessments about a leisure activity were also likely to be making positive affective judgements. It would be interesting to examine the evaluative and affective judgements that people make about fast foods to see if similar, congruent attitudes are found. Given that other literature findings often suggest ambivalence in attitudes towards foods, particularly those high in fat and sugar (e.g. Urland & Ito, 2005), differences between affective and evaluative attitudes towards fast foods are worthy of exploration.

Thompson, Zanna, and Griffin (1995) also argued that, rather than reflecting a uni-dimensional index of a person's thoughts and feelings, attitudes tend to be ambivalent. They cited Festinger's 1957 Dissonance Theory, suggesting that the premise that an individual's cognitions may be dissonant is widely accepted and should have more influence in attitudinal research than it does (or did at the time). In addition, they suggested that there is some indication that affective experiences, as well as cognitions, towards attitude objects may also be concurrently positive and negative. Although some research into ambivalence in

attitudes has been conducted (Conner, Povey, Sparks, James, & Shepherd, 2003; Conner, Povey et al., 2002; Sparks, Conner, James, Shepherd, & Povey, 2001) since Thompson et al. were published, it is interesting to note that prevalent theories (such as TPB) have not been specifically extended to capture the idea.

If both positive and negative evaluations exist, then it is unlikely that the relationship between reported attitude and behaviour will be very strong. Of particular relevance to the study of attitudes towards fast food is the concept of cognitive/affective ambivalence where there is a theoretical conflict between beliefs and feelings. An understanding of these conflicts may help to explain differences in the extent to which individuals consider the future consequences of their behaviour. That is, a person may be cognitively aware that a particular food is not particularly good for them and that frequent consumption may affect their longer-term health, yet be influenced by the affective responses, such as enjoyment and fulfilment, they have to fast food to the point that they consume it regularly. In addition to highlighting the importance of capturing affective responses, this reasoning leads to the consideration of time as a variable of interest, as ambivalence could occur due to positive short-term outcome expectancies of fast-consumption paired with negative longer-term expectancies.

#### 4.3.3 Consideration of Future Consequences (CFC)

There is a significant body of research examining the extent to which individual differences exist in 'future time perspective' or the extent to which behaviour or decisions are weighted by longer-term, future implications. Strathman, Gleicher, Boninger, and Edwards (1994) differentiated between individuals with strong or weak tendencies to consider the future consequences of their actions. Those high in CFC are those who tend to consider future consequences to the point that they forgo immediate benefits (such as convenience or pleasure) as a matter of routine. On the other hand, those low in CFC tend to have trouble delaying gratification and display little concern about the longer-term effects of their behaviour. The Consideration of Future Consequences Scale (Strathman et al.) was developed to

measure these individual differences and has become one of the most widely used tools in the area (Petrocelli, 2003).

Examining the relationship between procrastination and intention to engage in health-related behaviour, Sirois (2004) proposed that CFC might play a moderating role, arguing that many health-promoting behaviours (such as diet and exercise) tend not to produce positive outcomes in the short-term. Sirois suggested that the ability to foresee the future consequences of health-related behaviour is likely to play a part in the formation of related intention. It could also be hypothesised that, within the context of the TPB, CFC might interact with intention to influence behaviour, rather than influencing intention directly.

Consumption of energy-dense food has a positive short-term consequence of providing an immediate feeling of satiation as well as hedonic pleasure for many. However, the long-term consequences of regular energy-dense food consumption are generally assumed to be negative. It is possible that a trade-off between immediate and long-term costs and benefits may explain why people continue to eat food that they know is not particularly good for them.

#### 4.3.4 Sensitivity to Reward (STR)

Davis, Strachan, and Berkson (2004) suggested that some foods, especially those high in fat and sugar, have the capacity to enhance mood in a manner normally associated with addictive substances. They proposed that over-use of some foods can produce neuro-adaptations, such as withdrawal symptoms seen in rats following withdrawal of a diet high in sugar, and stated that under certain conditions, some foods may be likened to drugs with some people becoming dependent.

Describing *hedonia* as an “enhanced motivation to approach naturally pleasurable behaviour”, Davis et al. (2004, p.132) reported that ‘Sensitivity to Reward’ is a key concept in addiction research. Sensitivity to Reward is described as a psychobiological trait associated with dopamine pathways and dopamine has been shown to play an important role in sexual, drug-seeking, and eating behaviour. Davis et al. further suggested that the biological basis for STR is also

linked with personality characteristics such as personal detachment and indifference to others, as well as increased risk for addictions. In a particularly pertinent example, Loxton and Dawe (2001) found that adolescent girls, high on measures of STR, were more likely to engage in binge-eating. By comparison, Davis and Woodside (2002) found that patients with anorexia nervosa tended to have very low STR scores. Consistent with their expectations, Davis et al. found that STR was positively correlated with measures of emotional over-eating, which was also associated with measures of Body Mass Index (BMI). Interestingly, they also found that overweight women were more sensitive to reward than either normal-weight or obese women. The explanation proposed for this is that excessive over-eating can also perturb brain function; so high STR can induce over-eating which, over time, reduces dopamine availability to compensate for over-stimulation. This state is then compared to drug addiction where the need for the drug (or food) increases, even though the reward state decreases. More recent, similar results come from research conducted by Davis, Curtis, Tweed, and Patte (2007) who found that obese participants who were high in STR tended to underestimate portion-sizes of food.

Given these findings, it seems reasonable to consider that STR might play a role in frequent consumption of fast foods, especially given the high fat and sugar content of most meals. Davis et al. (2004) suggested that future research should explore the links between STR, BMI, and food preferences and this will be addressed in terms of fast-food consumption.

#### 4.3.5 Fear of Negative Evaluation (FNE)

Fear of Negative Evaluation (FNE) refers to individual differences in concern or anxiety about being judged by others in a disapproving manner (Carleton, McCreary, Norton, & Asmundson, 2006; Leary, 1983). This fear may span many social situations, including those where food consumption is involved.

Research among non-clinical populations has found positive correlations between increased fear and restrictive behaviour. Specifically, Gilbert and Meyer (2005) found a link between restrictive eating attitudes, such as a desire to be



thin, with fear of being evaluated negatively by people in general as well as close friends and relatives. This finding is supported by concerns voiced by participants in the qualitative stage of this research. Some participants (all women) said that they might avoid eating or being seen purchasing fast foods for fear that others might consider them 'too fat to eat that'.

Incorporating FNE with the TPB to predict exercise behaviour, Latimer and Martin-Ginis (2005) found that subjective norms were a predictor of exercise behaviour only for those high in FNE and suggested that these results indicated that the subjective norm-intentions relationship may be moderated by individual differences in FNE (for exercise-related behaviour). Exercise participation and food choice are both behaviours that impact on health and investigation of fast-food consumption could usefully explore the influence of FNE. In particular, the interaction effects between subjective norm and FNE on intention will be examined.

#### **4.4 Possible Interaction Effects between Variables**

Examination of the effectiveness of the variables incorporated in the TPB in explanation of health-related behaviour suggests that they; operate independently and interactively as proposed by Aizen (2002), may be moderated or mediated by other variables not included in the original model, and may vary in their influence between behaviour and samples. As a consequence, a number of extensions and modifications to the theory have been suggested. Conner and McMillan (1999) for example, suggested that criticisms of the linear nature of TPB may be overcome by the inclusion of examination of the interaction effects between the variables. They also argued that examination of interaction effects has the potential to elucidate both the extent and limit to which variables accurately reflect the operation of social processes, as well as the relationships between the variables.

McMillan and Conner (2003) examined factors underlying intention to use various recreational drugs and argued that when the behaviour in question is low in social approval, control is less likely to be associated with intention than

when the behaviour carries strong social approval. That is, when the behaviour is positively evaluated and the individual perceives high levels of control, their intention to engage in the behaviour is likely to be greater. On the other hand, if the behaviour is negatively evaluated, the more control the person perceives that they hold, the less likely they are to engage in the behaviour. This indicates that there may be an interaction between the overall evaluation (attitude) and perception of control on intention. Using a belief-based measure of perceived behavioural control (capturing facilitating and impeding factors for drug use), McMillan and Conner reported that when attitudes towards drug-use were more positive, perceptions of control reflected more facilitating factors rather than impeding factors and perceived behavioural control was ultimately more closely related to intention. Conner and McMillan (1999) found a similar trend in their application of TPB to cannabis use; when attitudes were neutral or negative, perceived behavioural control negatively predicted intentions and, as attitudes became more positive, the predictive power of perceived behavioural control decreased, becoming non-significant when attitudes were strongly positive.

In a study exploring the structure of the TPB applied to regular exercise and recycling behaviour, Kraft, Rise, Sutton, and Røysamb (2005) found that affective and evaluative facets of attitudes were distinguishable and that the affective component was the stronger predictor of intention. The authors argued that although the TPB captures both affective and cognitive components in the measurement of attitudes, there is some indication that affective reactions may also influence perceptions of behavioural control as their results showed that affective attitude was associated with perceived difficulty in engaging in the behaviour. A combination of these results highlights the need to explore the interaction between attitude and perceived behavioural control. The results also provide further indication of the importance of capturing affective reactions within attitude measures.

Ajzen (1991) suggested that perceived behavioural control and intention could interact to influence behaviour, arguing that as perceptions of control over behaviour increased, the predictive power of intention over behaviour should

also increase. That is, as an individual feels more personal control over their behaviour, both in terms of ability and resources, the more likely it is that their intention will be reflected in their behaviour. Investigating travel mode choice in Frankfurt, Yang-Wallentin, Schmidt, Davidov, and Bamberg (2004) also estimated the interaction effects between perceived behavioural control and intention on behaviour as well as conducting a meta-analysis on the results of 14 similar studies. The authors found differing results depending upon the methods applied, although overall, some support for the theoretical argument of an interaction was found. Based on the same argument, McMillan and Conner (2003) examined drug-use behaviour. Drawing on a belief-based measure of perceived behavioural control, they expected to find that perceptions of more facilitating factors than inhibitors would increase the intention-behaviour relationship. In support of this, they found that the interaction increased the amount of variance explained in behaviour, indicating that as people perceived factors to be facilitating rather than impeding their drug-use, their intention to use drugs became more predictive of their behaviour. Although a similar study (Conner & McMillan, 1999) found what appears to be a contradictory negative interaction effect between perceived behavioural control and intention on cannabis use, the authors point out that this is likely to be a reflection of the structure of the items used. That is, the items did not ask respondents to indicate how much control they had over *avoiding* cannabis use, rather how much control they had over whether they used cannabis or not. It is likely that similar interaction effects between perceived behavioural control and intention could be found with fast-food consumption. Specifically, the more people perceive that facilitating factors make it easier for them to choose a fast-food meal, the more likely it is that their intentions will predict their behaviour and this possibility will be examined.

Conner and McMillan (1999) also examined the extent to which the level of support derived from the social environment resulted in attitudes that were more predictive of intention to use cannabis. That is, they proposed that social influences may interact with attitudes (as well intention). Although their

findings were non-significant, this relationship is worth exploring within the framework of fast-food consumption. Theoretically, it is likely that there will be an interaction between perceptions of norms (particularly from family given the likely influence of observational or social learning on individual food choices) and attitudes towards frequent fast-food consumption.

Aside from the literature discussed in this section, there were also some findings related to interactions between TPB variables discussed in previous sections. Specifically, in section 4.3.5 discussing potential application of the Fear of Negative Evaluation, findings by Latimer and Martin Ginis (2005) suggest that there may be some interaction between FNE and social norm when applied to exercise behaviour. It is plausible that a similar effect may also apply to fast-food consumption; those with stronger fears of being negatively evaluated may be more influenced by social pressure to consume (or avoid) fast foods.

Findings discussed in section 4.3.3, regarding potential application of the Consideration of Future Consequences Scale, included theoretical propositions made by Sirois (2004) who suggested the presence of interactions between CFC and both attitude and intention when applied to health-related behaviour. Applying this proposal to the current study, the intention-behaviour relationship could be weakened for those with little concern regarding the longer-term costs of fast-food consumption. Similarly, CFC may also interact with attitude; those with lesser appreciation of the future consequences of their behaviour may hold attitudes that more strongly predict intention to consume fast food.

Section 4.3.1 discussed the potential application of a measure of self-identity, and Sparks and Shepherd (1992) suggested a causal relationship between self-identity and attitude. Although Sparks and Shepherd did not find empirical evidence to support their argument, results from Cook et al. (2002) suggest that attitude and self-identity may be related in their influence on intention. Application of this theory to fast-food consumption would suggest that strong self-identification as a healthy-eater could interact with attitude, negatively influencing the prediction of intention. A similar interaction might also occur between self-identity and

intention. That is, strong self-identification as a healthy-eater may also interact with intention, influencing the prediction of fast-food consumption. Therefore, analyses will be conducted to examine the potential interaction between self-identity and intention with behaviour as well as self-identity and attitude with intention.

#### **4.5 Summary**

There is a good deal of empirical validation for the TPB (Conner & Sparks, 2005; Godin & Kok, 1996) with research indicating that attitudes, subjective norm, and perceived behavioural control, when considered together, reliably explaining between 40 and 50% of the variance in intention, and intention consequently explaining between 20 and 40% of the variance in behaviour (Ajzen, 1991; Armitage & Conner, 2001; Sheeran & Orbell, 1999). Furthermore, the extension of the TRA to include perceptions of control allows application of the theory beyond easily controlled, volitional behaviour to those that are more complex (Conner & Armitage, 1998). Nonetheless, the predictive power of the TPB is still generally weaker for intentions and behaviour surrounding dietary choices and weight loss (Bogers et al., 2004; Margetts et al., 1997; Reid & Hammersley, 2001; Williams et al., 1993). This may be explained, in part, by the complex nature of food consumption; in reality it often involves a range of behaviours such as purchasing, preparing, and cooking the foods. Therefore, although the TPB is well accepted as an important framework for predicting behaviour generally (Sheeran & Orbell), and health behaviour especially, it may not necessarily capture all of the predictors of food choices. There have been a number of variables that have been shown to be useful in the investigation of health-related behaviour, contributing without duplicating the traditional TPB variables. Therefore, although this study will be based on the TPB, the additional variables of Fear of Negative Evaluation, Sensitivity to Reward, Consideration of Future Consequences, and self-identification as a healthy eater will all be included with the aim of improving the predictive success of the theory. Furthermore, Conner and Sparks (2005) highlighted that there are often problems encountered with the prediction of self-reported behaviour and recommended that objective measures

be used wherever possible. Because of this recommendation, participants will be asked to complete a 7-day diary detailing all fast foods consumed as well as a retrospective measure of behaviour.

Aizen (2002) argued that measuring underlying beliefs is of utmost importance when designing an intervention. He suggested that attitudes, intentions, and behaviour are most successfully changed when the underlying beliefs contributing to the attitudes are changed. Many of the research projects discussed did not report measuring beliefs underlying attitudes, subjective norms, and perceived behavioural control with many drawing questionnaire items used in other research. Although these studies are interesting and add to the body of knowledge regarding attitudes towards food choices, without an understanding of the beliefs underlying the key TPB variables, they are limited in their usefulness to those designing interventions to change consumption rates. Therefore, the belief-based TPB variables will also be incorporated and used to provide greater description of attitude, subjective norm, and perceived behavioural control. In addition, as suggested by several groups of authors (Backman et al., 2002; Baker et al., 2003; Bogers et al., 2004; Terry et al., 1999), the normative, attitudinal, and control referents (including self-efficacy) will be kept separate to analyse the influence cast by each individually.

Further to the results of the qualitative stage of this research, attitudinal measures will be separated in an attempt to capture both cognitive and affective attitudes towards fast-food consumption. Although many authors have incorporated measures of habit and past behaviour, this will be excluded due to the findings of Conner et al. (2002) and the theoretical argument that, measured correctly, attitude is likely to reflect their past experiences (and therefore past behaviour).

Finally, the possible interaction effects between some of the TPB variables as well as the additional variables will be examined to investigate the extent to which the effects influence the explanation of fast-food consumption.

## Method

### 4.6 Design

The study was a cross-sectional survey design using both prospective and retrospective measures.

### 4.7 Participants

All participants in the North West Adelaide Health Study (NWAHS) between the ages of 18 and 45 years of age ( $n = 914$ ) were invited to participate. Invitations were restricted to this age group as findings from the first study indicated that younger participants consumed fast food more frequently than those over 45 years. A total of 404 people took part. There were no significant demographic differences between respondents and non-respondents.

Participants ranged from 21 to 45 years of age ( $M = 37.74$  years,  $SD = 5.88$  years). Table 4.1 below provides a breakdown of sex, education, income, and BMI levels within the sample. Comparison of the characteristics of the study sample showed that the sample was better educated and had higher income than the overall NWAHS group. The sample was also less likely to be overweight. Participants were encouraged to complete and return the questionnaire to make them eligible for a small cash prize of a \$20 shopping voucher.

### 4.8 Procedure

Over a one-month period (between 25.7.06 and 28.8.06), 914 potential participants from the NWAHS group were sent a letter inviting them to participate in a study investigating thoughts and feelings about fast food. Potential participants were also sent an information sheet, a copy of the questionnaire, and an anonymous, reply-paid envelope for return of the materials. Participants were informed that if they did take part in the research, their name would be entered into a draw for a one-in-twenty chance to win a \$20 shopping voucher. Any participant requiring a copy of the final results was asked to provide either an email or a postal address to be returned separately. Between two and four weeks after the initial invitation was sent (28.8.06 to 14.9.06), a follow-up letter was sent to all

participants who had not responded to the initial letter. A total of 404 responses were received, with a final response rate of 43.96%.

Table 4.1

*Comparison of Demographic Information between Study Participants and NWAHS Group*

Participants in Current Study		NWAHS Participant group
Sex	n (%)	(%)
Female	247 (61)	(51)
Male	157 (39)	(49)
Education		
Secondary	149 (36.9)	(43.1)
TAFE*	158 (39.1)	(40.4)
University degree	95 (23.5)	(11.7)
Income**		
Under \$30,000	72(17.9)	(22.2)
\$30,000 - \$50,000	78 (19.3)	(24.8)
\$50,000 - \$80,000	146(36.1)	(22.2)
Over \$80,000	101 (25)	(24.4)
Body Mass Index (BMI)***		
Normal	169(42.2)	(35.3)
Overweight	136 (33.9)	(36.6)
Obese	96 (23.9)	(28)

\*or other accredited qualification; \*\*some participants in both groups chose not to disclose; \*\*\*BMI was divided according to the following criteria; normal weight < 24.9, overweight 25 to 29.9, and obese > 30.

## 4.9 Instruments (see Appendix B)

### 4.9.1 Letters of Introduction

A letter of introduction was provided, detailing the confidentiality with which all responses would be treated and advising participants that they were free to withdraw from the study at any stage. Participants were also provided with contact details for both the researcher and the Acting Convener of the Human Research Ethics Subcommittee, School of Psychology, University of Adelaide, to whom they could direct any queries regarding the study.



## 4.9.2 Measures

As suggested by Aizen (2002), questions pertaining to the TPB were based on results of earlier qualitative research (see Chapter 3). The literature review also yielded some additional factors that were not necessarily captured comprehensively by TPB, so a further four scales were added (as described below). In addition, a brief 7-day fast-food diary was incorporated as an additional measure of behaviour.

### 4.9.2.1 Theory of Planned Behaviour

#### *Behaviour (Fast-Food Consumption) - Retrospective Measure*

Past consumption was measured with two items; 'On average, how often do you eat fast food?' and 'In the last week, how many times have you eaten fast food?' Cronbach's  $\alpha$  for this scale was .78.

#### *Behaviour (Fast-Food Consumption) - Actual Consumption*

Actual consumption was captured with a self-report 7-day fast-food diary where participants were asked to report the content and time of any fast-food meals or snacks they consumed.

#### *Intention to Consume Fast Food*

Intention was assessed using two items. The first, 'Given my lifestyle and/or taste preferences, it is likely that I will eat fast food regularly over the next four weeks' was measured on a scale from 1 (strongly disagree) to 7 (strongly agree). The second, 'I am likely to eat fast food regularly over the next month' was measured on a scale from 1 (definitely false) to 7 (definitely true). Cronbach's  $\alpha$  was .79.

#### *Attitude to Consumption of Fast Food (Direct)*

Attitude was assessed using semantic differential scales. As might be expected, some of the cognitive attitude items were closely related to the belief items which

provided a foundation for their creation. Cronbach's  $\alpha$  for the overall scale was .83.

### Cognitive

In order to measure cognitive attitude, participants were presented with the sentence 'To me, eating fast food frequently is...' followed by five pairs of adjectives rated on a 7-point scale; harmful - beneficial, quick - time consuming, convenient - inconvenient, unpleasant - pleasant, and cheap - expensive. The mean of the five scores was used as a composite index of cognitive attitude where low scores reflected negative attitudes. Cronbach's  $\alpha$  for the overall scale was .73.

### Affective

In order to measure affective attitude, participants were presented with the sentence 'When I eat fast food, I feel...' followed by twelve pairs of adjectives rated on a 7-point scale; happy - unhappy, self-conscious - self-assured, inadequate - capable, enticed - disgusted, guilty - carefree, lethargic - energetic, unashamed - ashamed, disappointed - gratified, well - unwell, content - discontent, worried - calm, and unenthusiastic - enthusiastic. The mean of the twelve scores was used as a composite index of affective attitude where low scores reflected negative attitudes. Cronbach's  $\alpha$  for the overall scale was .86.

### Direct Attitude

A composite variable reflecting overall attitude was created by totalling scores on both the cognitive and affective scales.

### *Attitude (Indirect) - Behavioural Beliefs and Outcome Expectancies*

From the beliefs listed in Table 3.4, seventeen possible consequences of frequent fast-food consumption were evaluated in terms of the strengths of the behavioural beliefs and the related expected outcome (questions 5 through 38 in the questionnaire at Appendix B). Beliefs such as 'Fast food tastes good' were measured on a 7-point scale between 1 (strongly disagree) and 7 (strongly agree).

Expectancies, directly related to the above beliefs, were also measured on a 7-point scale with participants responding to a sentence such as 'Eating tasty food is...' with a score anywhere between 7 (extremely unimportant) and 1 (extremely important). The measure of belief strength was multiplied by the corresponding evaluation and the sum over the 17 products served as a belief-based measure of attitude towards frequent food consumption. As Aizen (2002) suggested that beliefs tend to be quite ambivalent, internal consistency was not measured for any of the belief-related measures.

#### *Subjective Norms (Direct)*

Subjective norms were measured with four items. Each item was presented on a 7-point scale from 1 (definitely false) to 7 (definitely true). Cronbach's  $\alpha$  for the overall scale was .78.

#### Injunctive

Injunctive items measured what the individual perceived others *think*. These items were; 'Most people who are important to me think that I should eat fast food regularly' and 'Those close to me expect me to eat fast food regularly'.

#### Descriptive

Descriptive norms measured what the individual perceived others *do*. These items were; 'The people in my life whose opinions I value eat fast food regularly' and 'Those who are close to me eat fast food regularly'.

#### Direct Subjective Norm

A composite variable reflecting overall subjective norm was created by totalling scores on both the injunctive and descriptive scales.

#### *Subjective Norms (Indirect) - Normative Belief Strengths and Motivation to Comply*

Three items were asked to measure normative belief strengths; 'Generally, members of my family think that I should eat fast food regularly', 'Generally, my friends think that I should eat fast food regularly', and 'Health experts think that

I should eat fast food regularly'. Three items measuring motivation to comply were also measured; 'I like to do what these members of my family think I should', 'I like to do what these friends think I should', and 'I like to do what health experts think I should'. All six items were measured on a 7-point scale between 1 (definitely false) and 7 (definitely true). The measure of normative belief strength was multiplied by the corresponding motivation to comply and the sum over the three products served as a belief-based measure of subjective norm.

#### *Perceived Behavioural Control (Direct)*

Perceived behavioural control was measured in terms of self-efficacy and perceptions of control.

##### Self-Efficacy

In order to capture self-efficacy, two items, both on a 7-point scale between 1 (definitely false) and 7 (definitely true) were asked. They were; 'It would be impossible for me not to eat fast food regularly over the next month' and 'If I wanted to, I could avoid eating fast food regularly over the next month'.

Cronbach's  $\alpha$  for the scale was .73.

##### Control

In order to capture perceptions of control, two items, both on a 7-point scale between 1 (definitely false) and 7 (definitely true) were asked. They were; 'I have complete control over the number of times I will eat fast food over the next month' and 'How often I will eat fast food over the next month is mostly up to me'. Cronbach's  $\alpha$  for the scale was .76.

##### Direct Perceived Behavioural Control

A composite variable reflecting overall perceived behavioural control was created by totalling scores on both the self-efficacy and control scales.

#### *Perceived Behavioural Control (Indirect) - Belief Strength and Belief Power*

Eight items, such as; 'Sometimes I experience cravings for some foods', and 'I have to be careful about how much money I spend' were asked to measure belief strengths. A further eight items (directly related to the above beliefs), such as; 'Experiencing cravings for fast foods makes it more likely that I will eat it frequently' and 'The cost of fast food prevents me from eating it frequently' were also asked to capture perceptions of belief power. All items were measured on a 7-point scale between 1 (strongly disagree) and 7 (strongly agree).

#### *Actual Behavioural Control*

Two items were included to capture resource constraints or the actual control participants had over fast-food consumption rates. These items were; 'I am unable to prepare my own food because of an illness or disability' and 'Because of where I live, I have no access to fast-food outlets'. All items were measured on a 7-point scale between 1 (strongly disagree) and 7 (strongly agree). As these two items would not be expected to be related, internal consistency was not measured.

#### 4.9.2.2 Consideration of Future Consequences (Strathman et al., 1994)

The Consideration of Future Consequences Scale examines the extent to which individual differences exist in 'future time perspective'. It is a 12-item measure that has been shown to have acceptable reliability and internal validity across a number of sample populations (Strathman et al., 1994). Items, such as; 'I consider how things might be in the future, and try to influence those things with my day-to-day behaviour' and 'I only act to satisfy immediate concerns, figuring the future will take care of itself', are designed to measure individual differences in tendency to consider the immediate or the distant consequences of behaviour.

Two additional items were added to enable a specific examination of Consideration of Future Consequences in terms of attitudes to diet. These items were 'I often avoid certain foods because I am concerned about my health' and 'I usually choose food because it is convenient or tasty rather than because it is

good for my health'. All 14 items were measured on a 7-point scale between 1 (extremely uncharacteristic of me) and 7 (extremely characteristic of me). Cronbach's  $\alpha$  was .84.

#### 4.9.2.3 Sensitivity to Reward Sub-Scale

This scale was created based on a 24-item sub-scale as part of a broader 48-item questionnaire called the Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ) (Torrubia, Ávila, Moltó, & Caseras, 2001). The Sensitivity to Reward sub-scale was designed to capture individual differences in impulsivity based on Gray's model of personality. For the purposes of this study, the five top loading items from factor analyses by Torrubia et al. were selected (loadings  $\geq .45$ ) and re-worded to better suit an Australian audience. The final items were; 'Do you often do things to be praised?', 'Do you like being the centre of attention at a party or a social gathering?', 'Would you be tempted to do something unfair if it meant that you would get something for your own benefit?', 'Would you like to be described as someone who has influence over others?', and 'Do you often find yourself strongly motivated by money?' Items were measured simply by yes/no responses. Cronbach's  $\alpha$  was .71.

#### 4.9.2.4 Brief Fear of Negative Evaluation Scale (Leary, 1983)

This 12-item measure based on Watson and Friend's (1969) original 30-item measure and has been shown to correlate highly with the original scale as well as offering good reliability. Items such as; 'I am unconcerned even if I know people are forming an unfavourable impression of me' and 'I am usually worried about what kind of impression I make' were included in order to measure individual differences in tendency to be concerned about making unfavourable impressions upon others. Items were measured on a 7-point scale between 1 (extremely uncharacteristic of me) and 7 (extremely characteristic of me). Cronbach's  $\alpha$  was .93.

#### 4.9.2.5 Self-Identification Scale (Armitage & Conner, 1999a)

This 4-item scale is designed to measure the extent to which an individual identifies themselves as being a healthy eater. This scale was based on a similar scale created by Sparks and Shepherd (1992) who used 2 items to measure identification with green-consumerism. The items were; 'I think of myself as a healthy eater', 'I think of myself as someone who is concerned with healthy eating', 'I think of myself as someone who is concerned with the health consequences of what I eat', and 'I think of myself as someone who enjoys the pleasures of eating'. Items were measured on a 7-point scale between 1 (strongly disagree) and 7 (strongly agree). Cronbach's  $\alpha$  was .87.

#### 4.9.2.6 Final Items

Finally, participants were invited to pass any comments they wished and were thanked for taking part in the research.

## Results

### 4.10 Data Preparation and Preliminary Analyses

All data analyses were performed using SPSS version 14.0 with an alpha level of .05 (except where specified). Structural equation models were specified and tested using AMOS version 5.

#### 4.10.1 Variables

Scores were recoded and variables were created to reflect fast-food consumption on the following (direct) measures from the TPB; attitude - 3 variables in total, named *attitude (cognitive)*, *attitude (affective)*, and the sum of these 2, *direct attitude*; subjective norms (SN) - 3 variables in total named *injunctive norms*, *descriptive norms*, and the sum of these 2, *direct subjective norm*; perceived behavioural control (PBC) - 3 variables in total named *control*, *self efficacy* and the sum of these 2, *direct perceived behavioural control*; actual behavioural control (ABC); intention;

and behaviour - 2 variables named *retrospective behaviour* and *actual behaviour* (reflecting total scores from the food diary).

A second set of variables reflecting the indirect measures from the TPB were also created. These variables reflected behavioural beliefs, subjective beliefs, and control beliefs and were named *indirect attitude*, *indirect subjective norm*, and *indirect perceived behavioural control* respectively. A third and final set of variables were created to reflect Consideration of Future Consequences (*CFC*), Fear of Negative Evaluation (*FNE*), self-identification as a healthy eater (*self-identification*), and Sensitivity to Reward (*STR*). Body Mass Index (BMI) data were available to the researcher from the NWAHS database. These data were based on clinical measurements of height and weight.

A comparison between original means and trimmed means revealed no substantial influence from outlying values. As recommended by Tabachnick and Fidell (2001), histograms with normal probability plots were used to check distributions and assumptions of analyses. Nine of the twenty variables were skewed, but transformations failed to improve the distribution so were not applied.

A search for univariate outliers was conducted through examination of z-scores. One case (id 11505) with a high z-score on indirect subjective norm and direct attitude (6.38 and 4.43 respectively) was deleted. Five cases had z-scores between -4.08 and 4.43 on direct attitude. Each of these z-scores was related to a participant error in responding to the scale items. These participants had marked only one response (and an extreme response) on the entire semantic differential scale. These responses were all scaled to a less extreme point (plus or minus one point).

An examination for multivariate outliers was also conducted with all dependent variables (intention, actual behaviour, and retrospective behaviour) entered into a regression in which Mahalanobis distance was calculated. Using a criterion of  $p < .001$ , a maximum value of 81.55 was obtained which exceeded the critical value of 16.27 for three variables. Two cases (id 4367 and 4946) were deleted.



Two other cases exceeded the criterion with distances of 38.3 and 55.13. These scores reflected relatively high consumption rates as recorded in the participant fast-food diaries. As these scores were related to actual behaviour rather than an estimation of behaviour, the cases were retained in the data unaltered.

## **4.11 Descriptive Statistics**

### **4.11.1 Sample Outcomes for all Variables**

A description of mean responses on all variables is presented in Table 4.2.

The means indicated a trend away from frequent fast-food consumption with low intention scores and consumption rates, although these reflected consumption rates averaging one fast-food meal a week. Both cognitive and affective attitudes reflected a slightly positive trend. All the subjective norm scores were quite low indicating that participants perceived that few people important to them ate fast food frequently and even fewer would expect them to consume it frequently. Scores for control and self-efficacy were relatively high indicating strong perceptions of ability to avoid fast foods. Mean scores on actual behavioural control were low indicating few participants were restricted in their ability to access fast food by either proximity or disability. Scores on the Consideration of Future Consequences scale indicated that most participants tended to be concerned about the longer-term consequences of their behaviour although Fear of Negative Evaluation was not a concern for most. Measures of self-identification indicated that participants tended to identify themselves as being healthy eaters. Finally, the measure of Sensitivity to Reward suggests that participants tended not to be strongly motivated by prospects of reward. Although these results combine to form quite a promising overview in terms of health education and focus, they should be interpreted within the context created by a clinical measure of BMI showing on average, the participants were overweight.

Table 4.2

*Mean Scores and Standard Deviations*

Variable	Range	N	Mean (SD)
Intention	1-7	401	2.03 (1.51)
Behaviour			
• Actual (fast-food diary)	0-10	401	1.12 (1.44)
• Retrospective	0-8.5	401	.84 (0.96)
Attitude			
• Affective	1-7	401	3.77 (.81)
• Cognitive	1-7	400	3.95 (.91)
• Direct measure*	2-14	401	7.73 (1.38)
• Indirect measure	1-49	401	20.59 (3.94)
Subjective Norm			
• Injunctive	1-7	401	1.79 (1.09)
• Descriptive	1-7	401	2.06 (1.42)
• Direct measure**	2-14	401	3.85 (2.44)
• Indirect measure	1-49	401	4.15 (2.95)
Perceived Behavioural Control			
• Controllability	1-7	401	6.08 (1.19)
• Self-efficacy	1-7	401	6.17 (1.25)
• Direct measure***	2-14	401	12.24 (1.98)
• Indirect measure	1-49	401	15.48 (6.65)
Actual Behavioural Control	1-7	401	1.51 (1.08)
Consideration of Future Consequences	1-7	401	4.78 (.86)
Fear of Negative Evaluation	1-7	401	4.05 (1.30)
Self-Identification	1-7	401	5.33 (1.11)
Sensitivity to Reward	1-7	401	2.86 (1.61)
Body Mass Index (BMI)	14.7-60.1	401	27.05 (5.75)

\* Sum of affective and cognitive scores; \*\* Sum of injunctive and descriptive scores; \*\*\* Sum of controllability and self-efficacy scores

#### 4.11.2 Relationships Between all Dependent and Independent Variables

The relationships between all dependent and independent variables were initially assessed using Pearson Correlations. The results are reported in Table 4.3.

Table 4.3

*Bivariate Correlations of Predictor and Criterion Variables*

	Att(i)	Att(aff)	Att(cog)	Att(d)	SN(i)	SN(inj)	SN(des)	SN(d)	PBC(i)
Att(aff)	.127*								
Att(cog)	.241***								
Att(d)	.229***	.767***	.801***						
SN(i)	.099*	.119*	.099*	.137**					
SN(inj)	.152**	.037	.170**	.134**	.440**				
SN(des)	.128*	.004	.153**	.094	.334***	.883***			
SN(d)	.143**	.019	.165**	.115*	.391***	.962***	.978***		
PBC(i)	-.377***	-.123*	-.147**	-.027	-.163**	-.299***	-.250***	-.280***	
PBC(d)	-.042	-.072	-.111*	-.112*	-.269***	-.470***	-.400***	-.444***	.100*
Cont	-.050	-.010	-.043	-.025	-.192***	-.264***	-.221***	-.247***	.054
Selfeff	-.114*	-.122*	-.134**	-.153**	-.242***	-.490***	-.421***	-.464***	.106*
ABC	-.090	-.008	-.059	-.034	.037	.043	.044	.045	.099
Int	.243***	.170**	.331***	.317***	.384***	.637***	.574***	.619***	-.203***
CFC	-.088	-.092	-.200***	-.191***	-.225***	-.389***	-.353***	-.380***	.022
FNE	.147**	-.222***	-.023	-.139**	.133**	.098	.075	.087	-.422***
Selfid	-.100*	-.147**	-.264***	-.264***	-.138**	-.343***	-.313***	-.336***	.117*
Reward	.096	-.015	.089	.047	.105*	.070	.081	.078	-.213***
Retro	.231***	.205***	.272***	.294***	.248***	.450***	.387***	.427***	-.108*
Diary	.217***	.107*	.195***	.189***	.242***	.389***	.347***	.376***	-.130**
BMI	.146**	-.037	.112*	.065	.080	.103*	.057	.079	.234***

\*p&lt;.05, \*\*p&lt;.01, \*\*\*p&lt;.001 (2-tailed)

Att (i) = attitude (indirect), Att (aff) = attitude (affective), Att (cog) = attitude (cognitive), Att (d) = attitude (direct), SN (i) = SN (indirect), SN (inj) = SN (injunctive), SN (des) = SN (descriptive), SN (d) = SN (direct), PBC (i) = PBC (indirect), control = PBC (control), Self eff = PBC (self-efficacy), ABC = actual behavioural control, Int = intention, CFC = Consideration of Future Consequences, FNE = Fear of Negative Evaluation, selfid = self-identification as a healthy eater, Reward = Sensitivity to Reward, Retro = behaviour (retrospective), Diary = behaviour (fast-food diary)

Table 4.3 (cont)

*Bivariate Correlations of Predictor and Criterion Variables*

	PBC(d)	Cont	Selfeff	ABC	Int	CFC	FNE	Selfid	Reward	Retro	Dary
Att(aff)											
Att(cog)											
Att(d)											
SN(i)											
SN(inj)											
SN(des)											
SN(d)											
PBC(i)											
PBC(d)											
Cont	.796***										
Selfeff	.818***	.303***									
ABC	.177***	.142**	.143**								
Int	-.505***	-.245***	-.563***	.036							
CFC	.402***	.259***	.388***	-.053	-.482***						
FNE	-.108*	-.142**	-.035	-.060	.049	-.095					
Selfid	.362***	.205***	.376***	-.083	-.517***	.590***	-.017				
Reward	-.032	-.023	-.029	-.010	.042	-.057	.158**	-.005			
Retro	-.441***	-.265***	-.443***	-.057	.693***	-.367***	.009	-.398***	.082		
Diary	-.401***	-.222***	-.421***	.026	.631***	-.361***	.051	-.400***	.039	.690***	
BMI	-.085	-.045	-.091	.101*	.180***	-.221***	.093	-.216***	.127*	.171**	.118*

\*p<.05, \*\*p<.01, \*\*\*P<.001 (2-tailed)

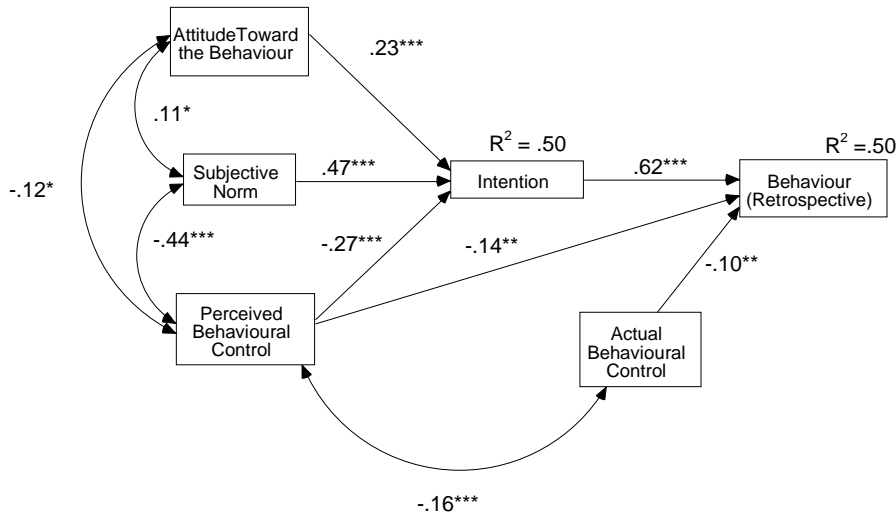
Att (i) = attitude (indirect), Att (aff) = attitude (affective), Att (cog) = attitude (cognitive), Att (d) = attitude (direct), SN (i) = SN (indirect), SN (inj) = SN (injunctive), SN (des) = SN (descriptive), SN (d) = SN (direct), PBC (i) = PBC (indirect), control = PBC (control), Self eff = PBC (self-efficacy), ABC = actual behavioural control, Int = intention, CFC = consideration of future consequences, FNE = fear of negative evaluation, selfid = self-identification as a healthy eater, Reward = Sensitivity to Reward, Retro = behaviour (retrospective), Diary = behaviour (fast-food diary),

Results reflected previous findings applying the TPB. Specifically, they showed expected correlations between the attitudinal, normative, and control items. Also as expected, intention and behaviour correlated strongly with each other and both of these also correlated moderately with most of the predictor variables in the matrix. Exceptions to this were actual behavioural control, Fear of Negative Evaluation, and Sensitivity to Reward. As would be anticipated, actual behavioural control correlated positively with perceived behavioural control, control, and self-efficacy, although the correlations were small. Fear of Negative Evaluation was most strongly associated with perceived behavioural control indicating that individuals with poorer perceptions of control were more fearful of negative evaluations as well as being more sensitive to rewards. Consideration of Future Consequences and self-identification as a healthy eater demonstrated the most consistent relationships with the TPB predictors and other variables. Thus, individuals who were more concerned about future consequences had fewer intentions to eat fast food and ate less fast food. They also identified themselves as healthy eaters. These results provide promising preliminary validation for the model as a predictor of fast-food consumption. The correlations also support the suggestion that fast-food consumption may be related to obesity.

#### **4.12 Predicting Fast-Food Consumption: Application of the 'Traditional' TPB Model**

The relationship between the TPB variables and the outcomes were examined using Structural Equation Modelling (SEM). Although multiple regression allows examination of the influence of several independent variables on one dependent variable, the final results do not clearly indicate the accuracy with which the variables have been measured, a benefit offered by SEM (Hankins, French, & Horne, 2000). Furthermore, SEM allows more complex modelling all in one analysis. Therefore, SEM was used in two sets of analyses examining the structure of the TPB; the first the 'traditional' model as suggested by Aizen (2002) and the second, an 'extended' analysis of the interactions between a number of variables added to the TPB.

Two SEM analyses using AMOS version 5 were conducted in order to examine the traditional TPB model applied to fast-food consumption frequency. The first model (Figure 4.1) applied the theory to predict retrospective recall of consumption as captured by the retrospective measure and the second model (Figure 4.2) applied the same predictors to consumption measured with a fast-food diary.

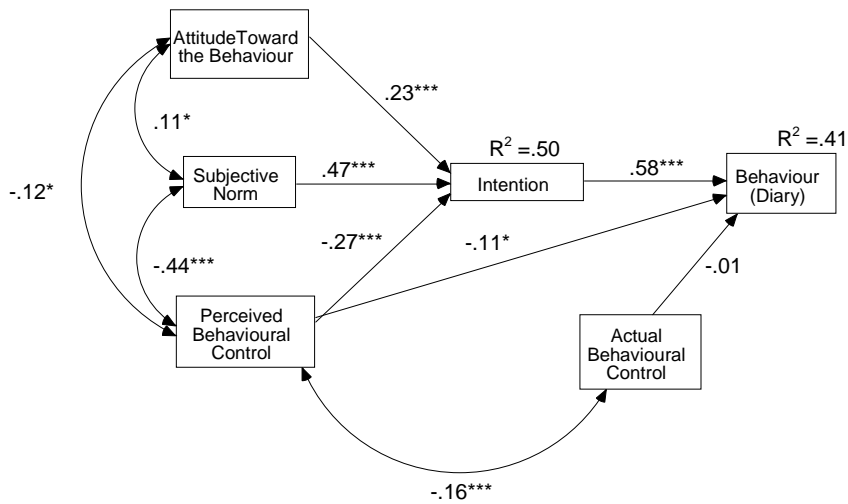


\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Figure 4.1. Path Analysis for the TPB with Retrospective Behaviour<sup>2</sup>.

The analysis indicated that attitude, subjective norm, and perceived behavioural control were all significant independent predictors and combined to explain 50% of the variance in intention. In turn, intention, actual behavioural control, and perceived behavioural control are significant predictors of retrospective behaviour, combining to explain 50% of the variance. The fit of the model was good with the chi-square test non-significant,  $\chi^2(5) = 7.44$ ,  $p = .190$ , GFI = .99, NFI = .99, RMSEA = .04.

<sup>2</sup> Relationships between attitude, subjective norm, perceived behavioural control, and actual behavioural control (shown by double-arrows) are correlations. All other relationships are beta coefficients.



\*p<.05, \*\*p<.01, \*\*\*P<.001

Figure 4.2. Path Analysis for the TPB with Behaviour Captured by Fast-Food Diary.

As in Figure 4.1, the analysis indicated that attitude, subjective norm and perceived behavioural control were all significant independent predictors and combined to explain 50% of the variance in intention. Although actual behavioural control adds no significant explanatory variance, intention and perceived behavioural control combine to explain 41% of the variance in retrospective behaviour. The fit of the model was strong with the chi-square test non-significant,  $\chi^2(5) = 2.992, p = .701, GFI = .99, NFI = .99, RMSEA < .001$ .

#### 4.13 Further Examination of the Two Measures of Behaviour

Results from these two path analyses indicated that the TPB appears to have superior ability to explain variance in self-reported estimates of behaviour rather than actual behaviour. This is not particularly surprising as the model captures variables by self-report and these are likely to be more closely related to perceptions of behaviour rather than actual behaviour. Comparison of participant perceptions of fast-food intake and actual behaviour

as measured by diary using a paired-samples t-test indicated that recall of consumption (retrospective measure) ( $M = .84, SD = 0.96$ ) was significantly lower than consumption rates captured by the fast-food diary ( $M = 1.12, SD = 1.44; t = 5.37, p < .001$ ) suggesting that participants underestimated the amount of fast food that they consumed.

#### 4.14 Constructing Direct and Indirect (Belief-Based) Measures

As recommended by Aizen (2002), scores on beliefs were subjected to the following calculations in order that the final product be correlated with the corresponding direct measure.

Belief strength and outcome evaluations were used to calculate an indirect measure of the attitude towards the behaviour ( $A_B$ ). Belief strength ( $b$ ) was multiplied by outcome evaluation ( $e$ ) with the resulting product summed over all possible behavioural outcomes.

$$A_B \propto \sum b_i e_i$$

A similar calculation was completed involving both the strength of the individual's normative belief ( $n$ ) and their motivation to comply ( $m$ ) with these beliefs. The sum provided an indirect measure of perceived subjective norm.

$$SN \propto \sum n_i m_i$$

An indirect measure of perceived behavioural control was computed from the belief-based variables of control belief strength ( $c$ ) and control belief power ( $p$ ).

$$PBC \propto \sum c_i p_i$$

Aizen (2002) stated that the indirect measures should provide substantive information about the considerations that have guided the individual's decision-making. Thus, it would be expected the belief-based items would capture a similar construct (but not exactly the same) to that of the direct items. Bivariate correlations were run to examine the relationship between each of the belief-based and direct measures and, as expected, correlations were positive and significant for attitude measures ( $r = .229, p < .001$ ), subjective norm measures



( $r = .391, p < .001$ ), and perceived behavioural control measures ( $r = .100, p < .05$ ). It is important to note how low these correlations are. This suggests that the different approaches to measurement of attitude result in different variables being operationalised. The relative validity of the different indices rests in their respective ability to predict intention to consume fast food.

#### **4.15 Predicting Intentions from Direct and Indirect Measures**

Two hierarchical regressions were run to examine the ability of both the direct and the indirect measures to predict intention. The additional measures of CFC, FNE, self-identification as a healthy eater, and STR were also included. Results are summarised in Table 4.4 below.

The first analysis used the direct measures to predict intention. Attitude was divided into cognitive and affective responses, subjective norm was divided into injunctive and descriptive responses, and perceived behavioural control was divided into controllability and self-efficacy. At the first step, attitude (cognitive and affective), subjective norm (injunctive), and self-efficacy were the significant predictors explaining 53.9% of the variance. Consideration of Future Consequences and self-identification were significant at the final step although attitude (affective) lost significance. The final equation explained 58.6% of the variance in intention to eat fast food.

For the second analysis predicting intention, indirect measures of attitude, subjective norm, and perceived behavioural control were used. At the first step, attitude and subjective norm were significant explaining 19.5% of the variance. At the final step, all variables (except FNE and STR) were significant explaining a total of 42.8% of the variance in intention to eat fast food.

Thus, the relative contribution of the additional variables (beyond the TPB) to the explanation of variance in intention to consume fast food varied depending on the manner in which the TPB was operationalised. The results suggested that the standard operationalisation of the TPB through direct measures captured broader and more inclusive

underlying determinants of intention than the indirect (belief x evaluation) approach. Moreover, they suggested the additional variables CFC, FNE, and self-identification may be partially captured in the direct measures of attitude and perceived behavioural control.

Table 4.4

*Multiple Regression Predicting Intention from Direct and Indirect Measures*

Predictors	Adjusted R <sup>2</sup>	R <sup>2</sup> Change	F Change	β	t
<b>Direct Measures</b>					
Step 1	.532	.539	76.323***		
Attitude (affective)				.056	1.602
Attitude (cognitive)				.151	4.313***
SN (injunctive)				.342	4.655***
SN (descriptive)				.057	.815
PBC (control)				-.001	-.023
PBC (self-efficacy)				-.239	-5.984***
Step 2	.575	.047	11.051***		
CFC				-.087	-2.049*
FNE				.010	.277
Self-Identification				-.192	-4.545***
Reward				-.013	-.400
<b>Indirect Measures</b>					
Step 1	.189	.195	31.908***		
Attitude				.140	3.373**
SN				.271	6.797***
PBC				-.099	-2.131*
Step 2	.418	.233	39.924***		
CFC				-.224	-4.582***
FNE				-.072	-1.691
Self-Identification				-.323	-6.704***
Reward				-.024	-.597

\*p<.05, \*\*p<.01, \*\*\*p<.001 (2-tailed); β (standardised coefficients)

#### **4.16 Structural Examination of Attitudes and Perceived Behavioural Control**

One of the aims of this study was to be able to indicate some of the specific factors influencing the development and maintenance of attitudes, perceptions of normative influence, and perceptions of control related to fast-food consumption. The qualitative data revealed a number of behavioural and control beliefs that were deemed likely to be useful for this purpose, once the individual responses had been reduced to parsimonious factors. Therefore, in order to obtain a clearer view of the individual factors influencing attitude and perceived behavioural control, behavioural beliefs and control beliefs were examined using two separate factor analyses. It was not deemed necessary to include subjective beliefs in these analyses as the initial qualitative data clearly indicated that normative influence for fast-food consumption was generated by family, friends, and health-experts. As the goal of the analyses was to obtain theoretically meaningful constructs, principal axis factor analyses were conducted. Varimax rotation was used as item correlations were not strong (up to  $r = .4$ ). Factor loadings are detailed in Tables 4.5 and 4.6.

##### **4.16.1 Behavioural Beliefs**

These data were suitable for factor analyses as the Kaiser-Meyer-Okin value of .8 exceeded the recommended value of .6 and Bartlett's Test of Sphericity reached statistical significance. Although the eigenvalue > one rule suggested a five-factor solution, analyses forcing a four-factor solution were used for a cleaner explanation. The four rotated factors explained a total of 34.12% of the variance (12.237%, 10.35%, 7.87%, and 3.67% respectively) and were represented by loadings in alignment with determinants of convenience, social issues (such as disrupting traditional family meals and reducing opportunities for children to learn about cooking and nutrition), feelings of satisfaction, and physical/psychological health.

Table 4.5

*Factor Loadings for Behavioural Beliefs*

Item number and description	Factor loadings			
	1	2	3	4
<b>1. Convenience</b>				
21. Fast food saves me time	.787			
19. Fast food reduces the amount of work I have to do	.692			
17. Fast food is very convenient	.629			
23. Fast food allows me to eat wherever I want	.539			
<b>2. Social Issues</b>				
33. Fast food is habit forming		.615		
31. Fast food reduces opportunities children have to learn about food		.580		
29. Fast food disrupts traditional family meal times		.524		
35. Fast food encourages an inactive lifestyle		.456		
37. Fast food is detrimental to the environment		.392		
<b>3. Satisfaction</b>				
5. Fast food tastes good			.636	
9. I feel satisfied after eating fast food			.596	
7. I get good value for money from fast-food meal deals			.402	
11. I treat/reward myself with fast food			.380	
<b>4. Health</b>				
27. Eating in fast-food restaurants allows me to 'get out'				.538
13. Fast food is good for my health		-.304		.439
15. Fast food is likely to result in weight gain				.324

## 4.16.2 Control Beliefs

Kaiser-Meyer-Olkin analysis returned a value of .69 and a statistically significant Bartlett's Test of Sphericity. Using the eigenvalue > one rule, two rotated factors explained a total of 38.45% of the variance (20.287% and 18.17% respectively). The factors were represented by loadings in alignment with items representing factors either impeding or facilitating frequent fast-food consumption.

Table 4.6

*Factor Loadings for Control Beliefs*

Item number and description	Factor loadings	
	1	2
<b>1. Facilitating Factors</b>		
57. I am more likely to eat fast food if I have cravings	.750	
53. I am more likely to eat fast food if I have little spare time	.735	
59. Eating alone makes it easier for me to choose fast food	.586	
61. I eat fast food as I cannot cook	.374	
<b>2. Impeding Factors</b>		
66. Concern about my weight prevents me from eating fast food		.828
69. Concern about my health prevents me from eating fast food		.618
55. I feel guilty if I eat fast food		.469
63. The cost of fast food prevents me from eating it		.330

During factor analyses, a command was given in order to create variables reflecting the factors outlined in Tables 4.5 and 4.6 above. These variables were named *convenience*, *satisfaction*, *social issues*, and *health* (derived from behavioural beliefs), and *impeding factors* and *facilitating factors* (derived from control beliefs). An additional three variables were also created to reflect the three factors reflected in the nature of the questions for subjective norms. These variables were named *family*, *friends*, and *experts*.

**4.17 Using the Factor-Based Variables to Predict Attitudes, Subjective Norm, and Perceived Behavioural Control**

In order to indicate some of the specific factors influencing the development and maintenance of attitudes, perceptions of normative influence, and perceptions of control related to fast-food consumption, three regressions were run to test the predictive ability of each of the factor analysed variables with the respective direct measures of attitude, subjective norm, and perceived behavioural control. Results of the regressions with each of the direct measures as the dependent variable are summarised in Table 4.7.

For the first analysis, the combination of the four predictor variables (convenience, satisfaction, social issues, and health) explained 25.7% of the variance in attitude to fast

food with all variables contributing significantly except for health. For the second analysis, the combination of the three predictor variables (family, friends, and experts) explained 17.9% of the variance in perceived social norms although the factors of family and friends were the only significant predictors. For the third analysis, the combination of the two predictor variables (impeding and facilitating factors) explained 10.8% of the variance in perceived behavioural control although the facilitating factor was the only significant predictor.

Table 4.7

*Multiple Regressions of Belief Factors Predicting Direct Attitude, SN, and PBC*

Predictors	Adjusted R <sup>2</sup>	R <sup>2</sup> Change	F Change	β	t
<b>Direct Attitude</b>					
Step 1	.257	.257	34.165***		
Convenience				.137	3.128**
Satisfaction				.314	7.170***
Social issues				-.329	-7.555***
Health				.042	.968
<b>Direct Subjective Norm</b>					
Step 1	.260	.266	47.923***		
Family				.289	5.495***
Friends				.296	5.652***
Experts				-.006	-.128
<b>Direct Perceived Behavioural Control</b>					
Step 1	.103	.108	24.038***		
Impeding factors				.091	1.913
Facilitating factors				-.322	-6.782***

\*p<.05, \*\*p<.01, \*\*\*P<.001 (2-tailed), β (standardised coefficients)

These findings indicate that participant attitudes towards fast foods may have been somewhat ambivalent with feelings of satisfaction mediated with equally as strong concerns about social issues. Convenience also significantly predicted attitudes although

concern about personal health was less important. Influence over fast-food consumption from family and friend referent groups was significant, outweighing influence from health professionals. Finally, factors facilitating fast-food consumption significantly predicted perceptions of control (or lack thereof) with impeding factors having little impact.

#### **4.18 The Influence of Interaction Effects**

There are a number of findings indicating that the TPB variables may operate independently and interactively (Aizen, 2002) and they may be moderated or mediated by the additional variables of self-identification as a healthy eater, Consideration of Future Consequences, and Fear of Negative Evaluation. In order to investigate the influence of possible interaction effects, intention, direct attitude, direct subjective norm, direct perceived behavioural control, FNE, self-identification, and CFC variables were all centred by subtracting individual scores from the overall mean (Aiken & West, 1991). Interaction variables were then created by multiplying the relevant scores from the centred variables (attitude x perceived behavioural control, attitude x subjective norm, attitude x CFC, FNE x subjective norm, perceived behavioural control x intention, attitude x self-identification, intention x self-identification, and CFC x intention).

##### **4.18.1 Intention**

Researchers have proposed and found interaction effects between attitude and perceived behavioural control, attitude and subjective norm, FNE and subjective norm, CFC and attitude, and attitude and self-identification on intentions to engage in various behaviours. In order to test for similar influences on fast-food consumption, a regression was run to predict intention using direct measures of attitude, subjective norm, perceived behavioural control as well as CFC and FNE. At the third and final step, the interaction variables were included. Significant effects were found from the attitude x self-identification interaction ( $t = -2.6, p = .01$ ), and FNE x subjective norm interaction ( $t = -2.68, p < .01$ ) variables.

Following recommendations by Aiken and West (1991), the nature of these interactions was examined by simple slope analysis.

#### *Interaction between Attitude and Self-Identification as a Healthy Eater*

Regression lines were examined at two levels of self-identification (one standard deviation above and below the mean) and simple slope analyses showed how the relationship between attitude and intention varied as a function of self-identification. When identification as a healthy eater was low, attitude positively predicted intention ( $B = .679, t = 3.467, p = .001$ ). Attitude also predicted intention positively when self-identification as a healthy eater was high ( $B = .505, t = 3.889, p < .001$ ), although the beta value was smaller indicating that with greater identification as a healthy eater, attitude became less predictive of intention to consume fast food.

#### *Interaction between Fear of Negative Evaluation and Subjective Norm*

Regression lines were examined at two levels of FNE (one standard deviation above and below the mean) and simple slope analyses showed how the relationship between subjective norm and intention varied as a function of FNE. When FNE was high, subjective norm positively predicted intention ( $B = 1.003, t = 6.47, p < .001$ ). Although subjective norm still predicted intention positively when FNE was low ( $B = .819, t = 9.38, p < .001$ ), the beta value was smaller indicating that subjective norm was less predictive of intention with lower levels of fear of being evaluated negatively. That is, for participants who were less concerned about being evaluated negatively, subjective norm was less predictive of their intention to consume fast food.

#### 4.18.2 Behaviour

##### *Fast-Food Consumption Measured Retrospectively*

A regression was run to predict retrospective behaviour using intention, direct perceived behavioural control, as well as CFC, self-identification, and FNE. At the third and final step, interaction variables reflecting CFC x intention, self-identification x intention, and perceived behavioural control x intention were included. No significant effects were found from the interaction variables and the overall amount of variance explained was not improved.

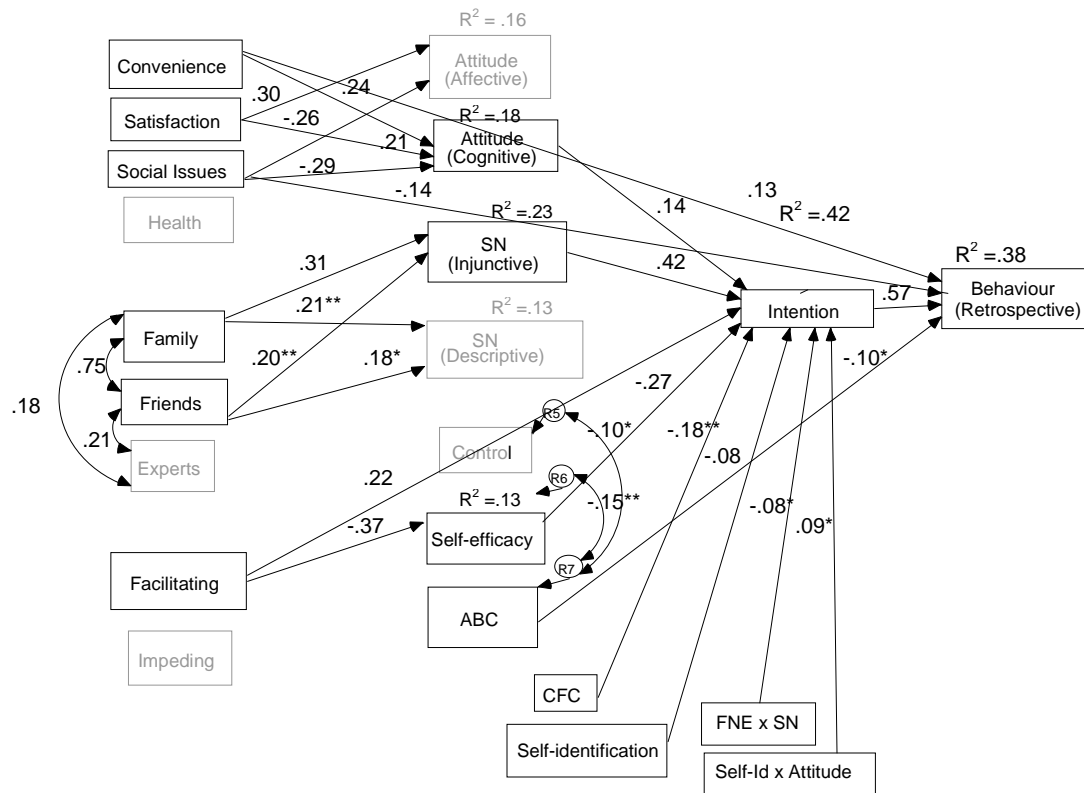


### *Consumption Measured with a Fast-Food Diary*

A further regression was run to predict behaviour (as measured by the food diary) using intention, direct perceived behavioural control, as well as CFC, self-identification, and FNE. At the third and final step, interaction variables reflecting CFC x intention, self-identification x intention, and perceived behavioural control x intention were included. No significant effects were found from the interaction variables although the overall amount of variance explained was improved slightly (from the previous regression) from 41.3% to 43%.

#### **4.19 Predicting Fast-Food Consumption: Application of the 'Extended' Theory of Planned Behaviour Models**

Two SEM analyses using AMOS version 5 were conducted in order to examine the extended TPB model, including the predictors of attitude, subjective norm, and perceived behavioural control created through earlier reported factor analyses, and the significant interaction terms. Through consideration of the correlation/covariance matrix, it was found that a number of variables did not contribute significantly. Because of the lack of variance explained by Fear of Negative Evaluation, Sensitivity to Reward, and some of the interaction terms in the exploratory analyses, they were not included in the final model (although all were initially considered simultaneously). The first model (Figure 4.3) applied the extended TPB to fast-food consumption as captured by the retrospective measure and the second model (Figure 4.4) applied the extended TPB to fast-food consumption as captured by the fast-food diary. The variables that were not significantly predictive are represented in grey.

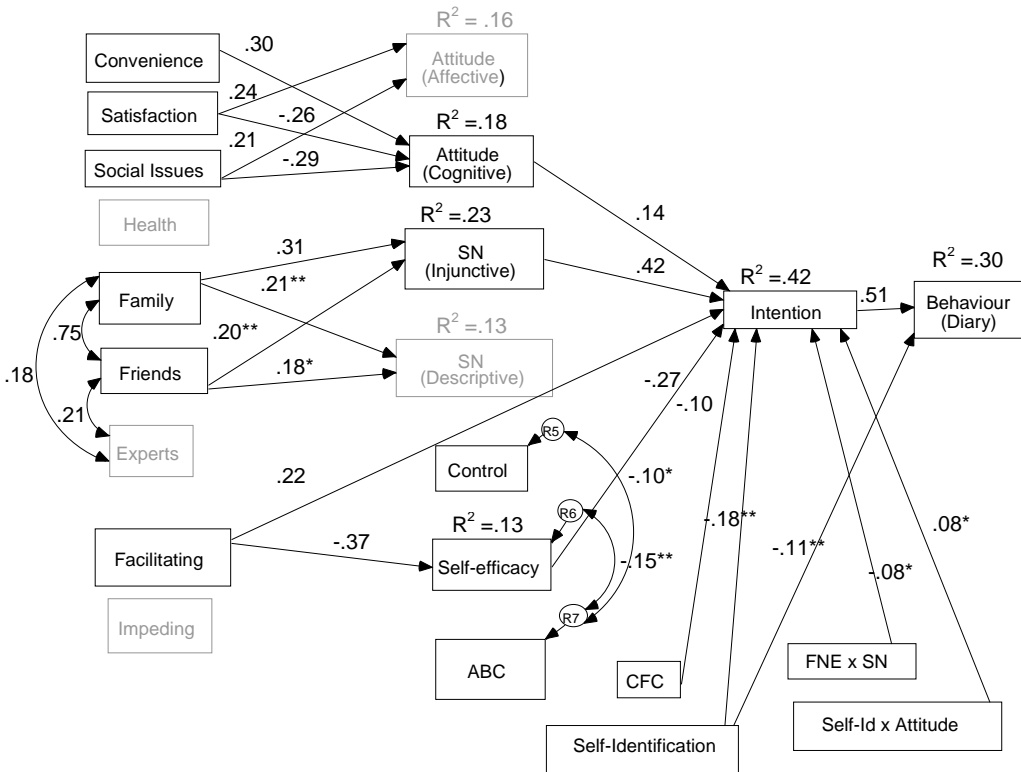


All correlations and beta coefficients significant at the  $p < .001$  level except where an asterisk appears. Then, \* $p < .05$ , \*\* $p < .01$

Figure 4.3. Path Analysis for the Extended TPB Model with Retrospective Behaviour

The fit of the model was poor with the chi-square test significant,  $\chi^2 (203) = 1686.79, p < .001$ , GFI = .73, NFI = .50, RMSEA = .144.

The model appeared only slightly different when it was applied to the alternative measure of behaviour. As with the analyses of the traditional TPB model, the variables in the extended model of actual behaviour combine to explain a smaller amount of the variance in behaviour (30% as opposed to 38% of retrospectively measured behaviour).



All correlations and beta coefficients significant at the  $p < .001$  level except where an asterisk appears; then, \* $p < .05$ , \*\* $p < .01$ .

Figure 4.4. Path Analysis for the Extended TPB Model with Behaviour Recorded in the Fast-food Diaries

The fit of the model was again poor with the chi-square test significant,  $\chi^2 (206) = 1695.29$ ,  $p < .001$ , GFI = .73, NFI = .49, RMSEA = .14.

These high chi-square results (in relation to the number of degrees of freedom) indicate that the population co-variation matrix differs significantly from the model-implied co-variation matrix. Although not ideal, this was not considered sufficient reason to entirely dismiss the models as hierarchical regressions were also run as a point of comparison with the ultimate findings being almost identical. Schermelleh-Engel, Moosbrugger, and Müller (2003) reported that when applying maximum likelihood (ML), the chi-squared model of fit is likely to produce an inflated Type I error rate for model rejection under conditions of non-

normality. Several of the variables used in the extended models were quite skewed with transformation making no improvement. Although the chi-square is the only goodness-of-fit measure with an associated significance level, there are other descriptive measures which have been reported as well. Although the models are not a strong fit according to any additional measures, Schermelleh-Engel et al. (2003) stated quite clearly that the cut-off criteria for all the fit measures are 'quite arbitrary and should not be taken too seriously' (p. 52) with one of the main issues being violation of normality (Hankins et al., 2000; Hu, Bentler, & Kano, 1992).

Hankins et al. (2000) also suggested that one of the important uses of the model fit is to allow comparisons between competing models. Although the traditional TPB models are obviously the best fit, the extended models still provide a richer source of information regarding the nature of the variables within the TPB (particularly useful for development of intervention/prevention programs) although they can not be regarded as developments of the theory per se.

As a final point, Hankins et al. (2000) also stated that the TPB assumes uni-dimensionality in each of the constructs and suggested that the use of SEM serves to highlight this as an issue. That is, if questionnaire items are measuring two different aspects of an attitude for example, then the fit of the model will be poor. Therefore, it seems likely that a combination of skewed variables along with multi-dimensional measures of attitude, subjective norm, and perceived behavioural control combine to render the model an apparently poor fit for the dataset against what have been reported to be 'arbitrary' measures. Although the results need to be interpreted with appropriate caution, they do provide a number of interesting points.

Some of the main findings (across both models) are that attitudes towards fast food were driven by convenience and anticipated satisfaction while concerns about the health effects were non-significant. This lack of concern about health was also reflected in the normative influence, with health experts having less influence than family and friends. However, it should be noted that the attitudinal variable related to 'health' is somewhat limited as the

factor analysis revealed that the items were reflective of psychological as well as physiological health. Facilitating factors were also significant, providing further explanation as to why participants choose fast food. Both models also indicate that measures of affective attitude were non-significant, suggesting intention to eat fast food tended to be based on rational, considered decisions, although it is also possible that this result is due to methodological issues in capturing affective responses. Intention to eat fast food was also influenced by participant perceptions of what family and friends think about fast food as well as self-efficacy, or participant confidence in their ability to avoid fast foods. Other significant predictors of intention across both models were CFC, self-identification as a healthy eater and the interactions between FNE and subjective norm as well as self-identification and attitude. Significant predictors of the two measures of behaviour differed slightly with retrospective measures of fast-food consumption predicted by intention, convenience, satisfaction, and actual behavioural control. Fast-food consumption captured by the food diaries was predicted by intention and self-identification only.

#### **4.20 Theory of Planned Behaviour and Fast-Food Consumption – The Effect of Body Mass Index and Consumption Frequency on Intention, Attitude, Subjective Norm and Perceived Behavioural Control**

Although one of the main aims of this research was to apply the TPB in an attempt to explain fast-food consumption, other exploratory analyses also uncovered differences between groups divided according to both BMI and frequency of fast-food consumption. It was found that participants in these weight and consumption groups differed on TPB constructs of intention, subjective norm, and perceived behavioural control (but not on either cognitive or affective attitude). There were also differences in self-identification and CFC. Therefore, further analyses were conducted to examine the differences in intention, subjective norm, perceived behavioural control, self-identification, and CFC between weight and consumption-frequency groups. As there was a small but significant correlation between BMI and consumption frequency ( $r = .118, p < .05$ ), and to check for an interaction between the two variables, a two-way between-groups multivariate analysis of variance was conducted to explore the impact of BMI and frequency of fast-food

consumption on the aforementioned variables. Participants were divided into 3 groups according to their BMI; 1 - normal weight, 2 - overweight, 3 - obese and 2 groups according to consumption frequency; 1 - low consumption rates (less than once a week) and 2 - high consumption rates (once a week or more). Levene's Test highlighted a violation within one variable so a more stringent alpha level of .01 was applied.

Results indicated a significant difference between people within the consumption groups on the combined dependent variables,  $F(5, 391) = 16.78, p < .001$ ; Wilkes' Lambda = .82, partial eta squared = .18. When the results for the dependent variables were considered separately (using a Bonferroni adjusted alpha level of .01), the consumption groups differed significantly on intention;  $F(1, 400) = 80.95, p < .001$ , partial eta squared = .17. An inspection of the mean scores indicated that people who consumed fast food more often had greater intention to eat fast food frequently ( $M = 5.69, SD = .97$ ) than did the infrequent consumers ( $M = 1.91, SD = 1.37$ ).

Group differences were also found for subjective norm;  $F(1, 400) = 17.60, p < .001$ , partial eta squared = .04. An inspection of the mean scores indicated that people who consumed fast food more often perceived greater social pressure to consume fast food frequently ( $M = 7.08, SD = 3.01$ ) than did the infrequent consumers ( $M = 3.74, SD = 2.35$ ).

Similarly, group differences were found for perceived behavioural control;  $F(1, 400) = 21.07, p < .001$ , partial eta squared = .05. An inspection of the mean scores indicated that people who consumed fast food more often perceived less control over their fast-food consumption ( $M = 9.46, SD = 3.14$ ) than did the infrequent consumers ( $M = 12.33, SD = 1.86$ ).

A comparison also showed group differences for CFC;  $F(1, 400) = 11.38, p = .001$ , partial eta squared = .03. An inspection of the mean scores indicated that people who consumed fast food more often gave less consideration to the future consequences of their behaviour (in general) ( $M = 3.78, SD = 1.03$ ) than did the infrequent consumers ( $M = 4.81, SD = .08$ ).

Final group differences were also found for self-identification as a healthy eater;  $F(1, 400) = 21.93, p < .001$ , partial eta squared = .05. An inspection of the mean scores indicated that people who consumed fast food more often identified themselves as being less healthy eaters ( $M = 3.95, SD = 1.46$ ) than did the infrequent consumers ( $M = 5.38, SD = 1.07$ ).

There was no statistically significant difference between the BMI groups on the combined variables (intention, subjective norm, perceived behavioural control, self-identification, and CFC);  $F(10, 782) = .782, p = .647$ ; Wilkes' Lambda = .98, partial eta squared = .01, nor was there was a statistically significant interaction effect between consumption frequency and BMI on the combined variables;  $F(10, 782) = 1.06, p = .392$ ; Wilkes' Lambda = .97, partial eta squared = .01.

## Discussion

### 4.21 Predicting Fast-Food Consumption: Application of the 'Traditional' Theory of Planned Behaviour Model

The results of the two structural equation models testing the TPB variables provided strong support for the traditional model proposed by Aizen (2002). Fifty percent of the variance in intention and retrospective reports of behaviour was explained, although a lesser amount of the variance was explained in actual behaviour (41%). These figures compare well with other research applying the theory where the combined variables reliably predict about 40 to 50% of the variance in intention and about 20 to 40% of the variance in behaviour. Moreover, the results should be considered in light of other studies predicting food consumption and weight loss where the results have been considerably weaker (Bogers et al., 2004). Some of the difficulty in predicting food choices is likely to be attached to the complexity of the behaviour and it could be expected that initial, exploratory work that attempts to uncover beliefs that drive behaviour would enhance the fit of the TPB model. Although the complexity of meal choice is very much simplified in the case of fast-food, it is likely that the careful construction of the instrument incorporating modal beliefs as suggested by Aizen, aided in the production of a better-fitting model.

#### 4.21.1 Predicting Fast-Food Consumption (Behaviour)

Fast-food consumption was measured through two forms of self-report. The fit was slightly enhanced when behaviour was measured retrospectively rather than through diary entries. This finding is not isolated; Armitage and Conner (1999a) reported comparable findings and Bogers et al. (2004) argued that the TPB explains self-report behaviour better than objective measures, stating that participant “misconceptions of their own consumption rates would be expected to reduce the explained variance in behaviour” (p. 158). Armitage and Conner (2001) made similar observations in their meta-analytic review of the TPB. Perceived behavioural control performed slightly better in the prediction of retrospective behaviour than the diary measure although the difference was very small. This finding fails to support the suggestion made by Bogers et al. (2004) that perceived behavioural control might perform differently when used to predict more accurate or realistic measures of behaviour.

Although it seems that fast-food-related beliefs and perceptions predict perceptions of intake better than actual intake, it is also important to note that the value of the predictions is limited by the extent to which participant perceptions are accurate. Comparison between the diary measures of fast-food consumption and retrospective measures indicated that participants underestimated the amount of fast-food that they consumed. That is, the results indicated that although prediction of retrospective behaviour may be quite good, measures of retrospective behaviour may not be entirely accurate. This point is pertinent for those using attitudinal models in the development of preventions and interventions or advising for policy.

It is also important to note that the participants completed the retrospective measure prior to the fast-food diary. It was anticipated that this might prime participants to the issues surrounding fast food and consequently suppress their intake. Although this appeared not to be the case, it is possible that without the exercise of completing the retrospective measure, the amounts of fast food recorded in the diaries might have been even higher. It is likely that perceptions of fast-food consumption rates are skewed by some form of self-



serving bias, with people possibly justifying a fast-food meal because they are particularly tired, busy, or hungry, or because they believe that they generally eat healthily, or because they simply assess that their personal risk for negative health-outcomes are lower than the risks faced by others.

#### 4.21.2 Predicting Intention to Consume Fast Food

In terms of predicting intention to consume fast food, the TPB model performed well, explaining 50% of the variance. Contrary to some other findings (e.g. Brinberg & Durand, 1983; Mahon et al., 2006), subjective norm was the strongest predictor indicating that participants were most influenced in their consumption of fast food by perceptions of what (important) others think. That is, participants indicated stronger intentions to eat fast-food the more they perceived that others approved, thus indicating the importance of social influence in fast-food consumption. The differences found between these results and those of other studies can probably be attributed, in part at least, to measurement methods, although it is also possible that social norms influence consumption of fast food differently in Australia compared to the United Kingdom and United States. Perceptions of behavioural control were the next strongest predictor with greater perceptions of control reducing intentions to eat fast food frequently. Finally, attitude was the least powerful predictor. This contrasts with findings from Mahon et al. (2006) who found that attitude was the strongest predictor of intention to purchase take-away food in a British sample. A further difference in the overall findings is reflected in the attitudes towards fast/take-away foods. British attitudes tended to be negative whereas Australian attitudes were slightly positive (admittedly, barely so) suggesting some differences in the reputation of these foods across cultures.

Although the two preliminary models testing the TPB explain reasonable variance in both intention and behaviour, they are limited in the information that they provide. They show that participants were influenced by those around them, but not by whom, that intention was reduced when feelings of control were heightened, but not what constitutes feelings of control, and that attitudes were also important, but not what influenced these attitudes.

However, the models suggested promising directions for further exploration. Therefore, an attempt was made to expand the models further to investigate the alternative constructs influencing intentions and behaviour as well as the belief constructs related to attitude, subjective norm and perceived behavioural control and how these influenced intention and behaviour.

#### **4.22 The Comparative Utility of Direct and Indirect Measures as Predictors of Intention**

Aizen (2002) strongly recommended that researchers using his theory to investigate and predict intentions and behaviour firstly investigate the beliefs underpinning attitudes, subjective norm, and perceived behavioural control. He referred to the belief-based measures as being 'indirect' indices of attitude, subjective norm, and perceived behavioural control. This preparatory process is often neglected by researchers, and consequently, the extent to which this process enhances model fit remains to be adequately tested. Two regressions to predict intention were conducted in an attempt to explore and compare the explanatory potential of the indirect (belief-based) items and direct items. There is some argument that the belief items are reflective rather than formative with some questioning the appropriateness of factor analysis. However, the aim of this research was to examine fast-food consumption rather than critique the TPB model, and Aizen's assumption that beliefs form the underlying basis of attitudes was taken at face value.

##### **4.22.1 Direct Measures of Attitude, Subjective Norm, and Perceived Behavioural Control**

Of the direct measures, self-efficacy was the most significant predictor of intention; as participant confidence in their ability to avoid fast foods grew, their intention to consume it diminished. Closely following in predictive strength were subjective norm (injunctive), self-identification, and attitude (cognitive) indicating that those who were more influenced by what they perceived others think, those who did not strongly identify themselves as healthy eaters, and those with more positive attitudes towards fast foods were those with the strongest intentions to consume. Finally, CFC was also significantly associated with intention indicating that participants who were most likely to consider the future

consequences of their behaviour were the less likely to intend to eat fast food frequently. Results also indicated that participant intentions were not influenced greatly by the extent to which they believed others eat fast food (subjective norm descriptive), nor by their perceptions of control. Also, intention was not influenced by affective attitudes towards fast foods, although it is possible that this may be attributed to the nature of the attitude measure used. Furthermore, neither FNE, nor STR contributed significantly to variance in intention. Therefore, although some participants in the preparatory research indicated that they would feel too self-conscious to purchase fast food in case others judged them for being too overweight to have reasonable justification for eating the food, it does seem that this fear did not extend to the majority of people. This may be interpreted in two ways; either participants were not particularly sensitive about the opinions of strangers, or alternatively, participants tended not to perceive themselves as being overweight and were therefore, not concerned about being evaluated negatively, although 57.8% of the participant group was classified as either overweight or obese. This second explanation is consistent with other findings, for example, Steenhuis, Bos, and Mayer (2006) found that many people underestimate the extent of their overweight.

#### 4.22.2 Indirect Measures of Attitude, Subjective Norm, and Perceived Behavioural Control

The most significant predictors of intention within the indirect measures were subjective norm and self-identification as a healthy-eater. As with the direct measures, CFC, perceived behavioural control, and attitude were all significant predictors with FNE and STR again failing to contribute.

#### 4.22.3 Summary Comparison between Direct and Indirect Measures

Although the weightings were slightly different, the significant predictors of intention did not vary greatly between the two models. However, as the direct measures explained a greater proportion of the variance in intention (58.6%), these were used in preference to the indirect measures (42.8%) for the remaining analyses.

#### **4.23 Structural Examination of Attitudes and Perceived Behavioural Control**

In order to better understand the constructs of attitude and perceived behavioural control, the nature of the underlying beliefs were examined with factor analyses. Normative beliefs were not examined because the questionnaire items reflected influence from family, friends, and health experts negating any real need to conduct factor analyses.

##### **4.23.1 Behavioural Beliefs**

The best solution for these items explained just over 34% of the variance with behavioural belief items falling into categories reflecting convenience (including time saved and reduced workload), social issues (including disruption to family meals, poor learning outcomes for children regarding the properties of food, environmental damage, and impact on the health of society), satisfaction (taste, satiation, value, and reward), and health (physical and psychological).

##### **4.23.2 Control Beliefs**

Not surprisingly, the factors generated by the analyses reflected the nature of the questionnaire items. Based on Aizen's suggestion, questions were created to reflect aspects that both facilitate and impede fast-food consumption, and the factors resulting from the analysis mirrored this approach. Factors facilitating fast-food consumption included cravings, little spare time, eating alone, and inability to cook. Impeding factors included concern about weight gain, concern about health, feelings of guilt, and the cost of fast food.

#### **4.24 Predicting Attitude, Subjective Norm, and Perceived Behavioural Control**

Having completed the factor analyses of the belief-based items, the resulting factors were then used to generate variables that could be used to elucidate the structure of attitudes and perceived behavioural control. The independent variables were as follows; attitude – convenience, satisfaction, social issues, and health; subjective norm – family, friends, experts; perceived behavioural control – impeding and facilitating factors.

#### 4.24.1 Attitude

The strongest predictors of attitude were concern about social issues and satisfaction, indicating that when forming opinions about fast foods, the participants were most influenced by the combined factors of; the notion that traditional family meals are being disrupted by fast-food meals, children are not learning about the properties of food and how to prepare meals, environmental damage related to the production of fast food, and the broader impact and costs on the health of society as well as some more personal (and less altruistic) factors such as; enjoyment of the taste, feelings of satiation, perceptions of value for money, and enjoyment of a reward or treat in the form of food. Convenience was also a significant predictor suggesting participant attitudes were influenced by the amount of time and work that was saved by consumption of a fast-food meal.

In terms of obesity prevention, probably of greatest concern is the lack of significant variance explained by beliefs about personal health. To a certain extent, this may reflect weaker operationalisation of the variable as it is the combination of two items reflecting general physical health and psychological benefit (afforded by fast-food restaurants in terms of offering a place to go for relief of boredom or for a form of social interaction). Nevertheless, the lack of consideration for health is concerning and surprising as many participants in the earlier qualitative research had raised this as an issue.

#### 4.24.2 Subjective Norm

The results indicate that friends had the greatest influence over participant fast-food consumption. Friends were followed closely by family members with very little influence from health experts. This result is consistent with the findings of White et al. (2007) who reported that the influence of family and peers was associated with low-fat food consumption. It is also consistent with the finding, described above, that participant beliefs about health-outcomes had little influence over their attitudes.

#### 4.24.3 Perceived Behavioural Control

Perceptions of behavioural control were strongly predicted by factors that facilitated fast-food consumption rather than inhibiting factors. Specifically, participants reported that issues such as their cravings for fast food, not having much spare time, eating on their own, and not being a proficient at preparing meals, all reduced their perceptions of control over their consumption rates. Impediments to eating fast food were not associated with differences in perceived behavioural control.

#### **4.25 Predicting Fast-Food Consumption: Application of the 'Extended' Theory of Planned Behaviour Models**

This research extended the traditional TPB model by including additional measures of under-lying beliefs and found the additional variables of Consideration of Future Consequences and self-identification as a healthy eater to be significantly predictive. In addition, interaction effects were found Fear of Negative Evaluation and subjective norm as well as between self-identification and attitude. Therefore, SEM analyses were conducted to test the relationships between all variables. Two outcome variables were operationalised; the retrospective self-report measure of fast-food intake and the fast-food diary. The results were largely consistent with earlier analyses testing smaller, discrete parts of the model.

##### 4.25.1 Predicting Self-Reported Retrospective Intake of Fast Food

###### *Explaining Attitude*

The model showed that along with concern regarding social issues (such as community health and wellbeing and environmental matters), convenience, and satisfaction were significant predictors of cognitive attitudes, collectively explaining 18% of the variance. Only social issues and satisfaction were significantly correlated with affective attitudes.

### *Explaining Subjective Norms*

Participants were most influenced by what they perceived friends and family think and do. Concern about the opinions of friends and family influenced injunctive subjective norms (what others think), and descriptive subjective norms (what others do). That is, participants held perceptions of social influence stemming from what they believed friends and family think of fast food and how much fast food friends and family consume. These results are different to those of other researchers who have found that food choices tend to be influenced more by modelling than by perceived approval (Backman et al., 2002; Baker et al., 2003; Nejad et al., 2004). However, such findings that modelling is more influential were made with adolescent populations and it is possible that the differences in findings are a reflection of differences in age between the samples.

In combination, the beliefs explained 23% and 13% of the variance in injunctive and descriptive norms respectively. It appeared that the participants were more aware of, and influenced by people close to them than by those with high levels of health and nutritional expertise.

### *Explaining Perceptions of Behavioural Control*

The data indicated that facilitating factors (i.e. a perception of value for money, incentives or meal deals, new products, working long hours, and eating alone) rather than impeding factors (i.e. feelings of guilt and regret, fear of weight gain, and information gained through the media) were significant predictors, explaining 13% of the variance in ability to avoid frequent fast-food consumption (self-efficacy). The correlation was negative indicating that as participant's self efficacy increased, the influence of the facilitating factors decreased. External control factors were only related to actual behavioural control.

### *Actual Behavioural Control*

Actual behavioural control reflected participant ability to access fast-food outlets and arose from proximity or illness/disability. This was significantly predictive of behaviour and, not surprisingly, the relationship was negative. In line with the traditional TPB model, actual

behavioural control was also linked with the control factors (through the error residuals). Again, both these relationships were significant and negative indicating that with limited access to outlets, participant perceptions of control and efficacy reduced.

### *Intention*

Significant predictors, collectively explaining 42% of the variance in intention, were cognitive attitude, injunctive subjective norm, facilitating factors, self-efficacy, and Consideration of Future Consequences. This indicates that participants built their intention to consume fast food based on rational, considered cognitions that were positively influenced by the convenience and satisfaction provided by fast-food consumption and negatively influenced by concerns about social issues related to frequent fast-food consumption. Affective attitudes were notably non-significant in their prediction of both intention and behaviour and there was no indication of cognitive/affective ambivalence. Some context for this finding is provided by Payne et al. (2004; 2005) who found that affective attitudes were predictive of healthy eating but not of sweet or snack food consumption. The opposite was true of their measures of cognitive attitude. It seems possible that a social desirability bias may have an impact on participant reports; that is, it is acceptable to report that one enjoys the experience of eating healthy foods, but similar enjoyment of unhealthy foods should not be admitted for fear of appearing hedonistic and greedy.

Participant intentions were also predicted by perceptions of social influence. This social influence resided in the thoughts of their friends and family. Although this relationship was positive, the mean score of subjective norm was low indicating participants perceived that family and friends held negative associations with fast food, so ultimately, this social influence would be likely to reduce rather than encourage fast-food consumption.

Facilitating factors were significantly positively related to intention indicating that these factors also influenced intentions towards fast-food consumption. Finally, self-efficacy, Consideration of Future Consequences, and self-identification were negatively related to intention indicating that intention to eat fast food frequently was reduced with greater



confidence in ability to avoid fast food, stronger propensity to consider the longer-term consequences of behaviour (generally), and identification with healthy-eating. Consistent with the observations of Armitage and Conner (1999b), it was worth differentiating between the 'external' and 'internal' control factors associated with self-efficacy as, with fast-food consumption, the internal factors appeared to play a much stronger part in influencing intentions.

#### *Self-Reported Retrospective Behaviour*

As expected, intention to consume fast food was a significant predictor of behaviour reported retrospectively, combining with actual behavioural control, beliefs about convenience, and social issues to explain 38% of the variance. Notable for its failure to add explanation to the variance in either intention or, more importantly behaviour, is the affective measure of attitude. This result might reflect difficulties in operationalising affect with the semantic differential. Although Aizen (2002) recommended this approach, he has also suggested that affect is not always a simple bipolar construct. Rather, positive moods and emotions may be orthogonal to their negative counterparts. This may be an important aspect to note when acknowledging that people may experience *affective* ambivalence about fast foods; although they experience anxiety and guilt about eating fast food, they also enjoy the experience and feel satisfied.

#### *Consideration of Future Consequences*

The extent to which participants considered the future consequences of their behaviour had a negative relationship with intention to consume fast food, although not on their consumption behaviour. In other words, although participants appeared to be aware that the longer-term consequences of frequent fast-food consumption were likely to be negative (supported by findings in the initial qualitative part of this research), this knowledge did not have a significant impact on fast-food consumption rates. As was surmised in the qualitative study, a form of self-serving bias may be impacting here, mediating the relationship between intention and behaviour.

### *Self-Identification as a Healthy Eater*

Those who identified themselves as healthy eaters were less likely to intend to eat fast food on a frequent basis, although their behaviour was not similarly influenced. Not surprisingly, Consideration of Future Consequences and self-identification were highly correlated indicating that those who believed that they belong to a group of people who eat healthily were also likely to report that they consider the future consequences of their behaviour. In some ways, this relationship might become quite circular and help to explain the apparent biases allowing participants to eat fast food regardless of their good intentions. That is, if participants perceive that they generally eat healthily, this may allow them greater license to consume fast food as they believe their future health risks are low. Consistent with Cook, Kerr, and Moore (2002), self-identification was correlated with measures of attitude and a small interaction effect was also found between the two variables. Therefore, although self-identification was a significant individual contributor, the findings should be interpreted with caution.

### *Fear of Negative Evaluation and Sensitivity to Reward*

Neither the Fear of Negative Evaluation nor the Sensitivity to Reward measures contributed significantly towards intention to consume fast food or consumption behaviour. Although research has found correlations between Fear of Negative Evaluation and both eating and exercise behaviour (Gilbert & Meyer, 2005; Latimer & Martin-Ginis, 2005) and some participants in the exploratory stage of the research described feeling anxious about what others might think of them, it appears that the anxiety was not particularly common within this sample. It is possible that such anxiety is specific to more clinical populations with people generally having few concerns about the opinions of others. It is also possible that the lack of anxiety is due, in some people at least, to an underestimation of their overweight (Steenhuis et al., 2006). However, Fear of Negative Evaluation did interact with subjective norm in its influence on intention to consume fast food indicating that social influence underlying fast-food consumption may be affected by fears of being negatively evaluated.

Also non-significant, the Sensitivity to Reward scale used was a selection of items drawn from a sub-scale. The items were selected based on the strength of their factor loadings as reported by Torrubia et al. (2001). The items were also reworded to suit an Australian audience, after being translated from Spanish to English. It is likely that the validity of the scale was reduced with these alterations as other research successfully linking Sensitivity to Reward to food and overweight used the complete 48-item measure. Including a measure of this length was deemed too taxing for participants as it would have increased questionnaire completion time upwards of 45 minutes. Therefore, it is possible that further research focussing on the relationship between fast-food consumption and Sensitivity to Reward could uncover a much stronger relationship than that which was found in this study.

#### 4.25.2 Predicting Intake of Fast Food as Captured by Fast-Food Diaries

The model appeared only slightly different when it was applied to predict behaviour determined from the fast-food diaries. This is not surprising given that the two outcomes correlated at .69. In the second model, beliefs about convenience and concern about broader social issues were no longer predictive of intention. However, self-identification with healthy eating was a significant predictor of actual fast-food consumption, combining with intention to explain a slightly smaller amount of the variance in behaviour; 30% as opposed to 37% of retrospectively measured behaviour. A small proportion of this difference is likely to be due to the weak contribution that actual behavioural control made to the explanation of retrospective behaviour. It failed to contribute to behaviour measured by diary. There was also a difference in the effect of self-identification between the two measures of behaviour; it was predictive (weakly) of diary behaviour, but not retrospective behaviour. It must be noted that the bivariate correlations between self-identification and the two measures of behaviour were very similar so the differences were minimal.

#### 4.25.3 Influence of Interaction Effects

Although some researchers have found interaction effects between variables within the TPB when examining other behaviours, (Ajzen, 1991; Conner & McMillan, 1999; Latimer & Martin-Ginis, 2005; McMillan & Conner, 2003; Yang-Wallentin et al., 2004), the effects within this research were limited. Although there were some significant interaction effects found (with the Fear of Negative Evaluation x subjective norm interaction and attitude x self-identification interaction), the relationships were weak and they did not add a great deal to the amount of variance explained.

##### 4.25.3.1 Significant Interaction Effects

###### *The Moderating Effect of Fear of Negative Evaluation on the Relationship between Subjective Norm and Intention*

The results show that for participants in this study, subjective norm was a stronger predictor of intention to consume fast food for those high in Fear of Negative Evaluation. These results are similar to findings by Latimer and Martin-Ginis (2005) that subjective norm was a stronger predictor of exercise behaviour for those high in Fear of Negative Evaluation. This suggests that social influence and the need to comply with group norms in particular, influence fast-food consumption. Although it is possible that fast-food consumption may increase by this process, it is also important to note that some participants in the earlier, qualitative study indicated that their fear was related to negative evaluation of being too fat and subjective norm may therefore also influence avoidance of fast food in some cases, particularly if the attitudes held by friends and family are negative. Ultimately, although Fear of Negative Evaluation failed to add significant variance directly to the explanation of intention or behaviour, it appears that fear of being negatively evaluated, perhaps by friends and family members, is an inherent part of the social influence underlying fast-food consumption or avoidance.

### *The Moderating Effect of Self-Identification as a Healthy Eater on the Relationship between Attitude and Intention*

Both Cook et al. (2002) and Sparks and Shepherd (1992) have hypothesised an interaction between self-identification and attitude on intention and this was confirmed in the current study. Greater identification as a healthy eater moderated attitude in relation to intention to consume fast food. Along with the individual contribution self-identification made to the explanation of variance in intention, this finding suggests that self-identification is not a construct that can be separated entirely from attitudes. It does seem likely, as argued by Sparks and Shepherd, that the semantic differential measure of attitude recommended for TPB research may not be capturing attitudes as effectively as required to optimise model fit.

#### 4.25.3.2 Non-Significant Interaction Effects

##### *The Interaction between Self-Identification as a Healthy Eater and Intention on Behaviour*

No support was found for the proposed interaction between self-identification and intention. Although self-identification as a healthy eater was a direct predictor of intention to consume fast food, intention did not vary significantly with levels of self-identification.

##### *The Interaction between Attitude and Perceived Behavioural Control on Intention to Consume Fast Food*

Overall, fast food was fairly neutrally evaluated and participants reported that their ability to avoid fast food was quite strong. This was despite the fact that many were still consuming fast food reasonably frequently. Similarly, it is apparent from the results of the qualitative research that those with generally negative evaluations of frequent fast-food consumption were still likely to consume fast food on at least a fortnightly basis. Perhaps, as a reflection of this, there was no significant interaction effect between attitude and perceived behavioural control. That is, it is possible, that despite overall ambivalent evaluations, facilitating factors, such as convenience, were still strongly related to intention.

### *The Interaction between Perceived Behavioural Control and Intention on Fast-Food Consumption*

The non-significant results from the interaction between perceived behavioural control and intention contrast with those of McMillan and Conner (2003) who found an interaction effect in their examination of illicit drug(s) use in students, and those of Conner and McMillan (1999) who also found an interaction effect when asking participants about their ability to avoid cannabis. Results of this study indicate that intention to eat fast food frequently did not alter as a function of the amount of control participants perceived they held over their ability to avoid fast foods. Differences in the findings may simply be a reflection of the behaviour under examination; the imperative for control over fast-food consumption may not be as powerful as the imperative for control over drug use.

### *The Interaction between Attitude and Subjective Norm on Intention to Consume Fast Food*

The current study treated subjective norm as a single variable during examination of interaction effects. Although this contrasts with Conner and McMillan (1999) who examined injunctive and descriptive norms separately, ultimately the results are similar with neither finding a significant interaction between attitude and subjective norm. This is rather surprising given the strength of subjective norm as an individual predictor of intention, however, it appears that although participant intentions to eat fast food were influenced by those close to them, their attitudes towards fast foods were not similarly affected.

### *The Moderating Effect of Consideration of Future Consequences on the Relationship between Attitude, Intention, and Behaviour*

There was to no support for the idea that the extent to which an individual considers the future consequences of their behaviour will moderate the relationship between attitude and intention or between intention and behaviour. That is, although Consideration of Future Consequences was a direct predictor of intention, neither participant attitudes towards fast food nor intentions to eat fast food were influenced by the extent to which they considered the future health-effects of their behaviour.

#### **4.26 Group Differences - Effects of Body Mass Index and Consumption Frequency on Intention, Attitude, Subjective Norm, and Perceived Behavioural Control**

There were some differences between groups split by BMI; overweight people intended to eat fast food more frequently, did eat fast food more frequently, and had a more positive attitude towards fast food than did normal weight people. However, these differences were lost when analyses were extended to control for a possible interaction effect between consumption frequency and BMI. As could be anticipated, those who consumed fast food more frequently perceived greater social pressure to do so, reported less control over their fast-food consumption, gave less consideration to the future consequences of their behaviour, and were less likely to identify themselves as being healthy eaters.

A possible consequence of frequent fast-food consumption was indicated in the examination of the relationship between both behaviour measures and participant BMI. The significant positive correlations found add weight to previous findings that those consuming fast food are more likely to be heavier than counterparts who eat little or no fast food (Binkley et al., 2000; Pereira et al., 2005).

#### **4.27 Overall Summary**

The findings show that the traditional TPB model (as specified by Aizen) can be successfully applied to fast-food consumption behaviour explaining up to 50% of the variance in both intention and behaviour. Although the SEM fit was not good for the extended model, the model still explained 41% of the variance in intention and 37% in behaviour. Although the overall explanatory ability is somewhat reduced, the exercise was valuable, allowing greater understanding of the key factors influencing attitude, subjective norm, and perceived behavioural control as well as showing the contribution made through the inclusion of additional variables Consideration of Future Consequences and self-identification as a healthy eater.

Although nutritional literacy appears to be at a good level within this participant group, knowledge is not enough to dissuade participants from eating fast food altogether.

Participants reported being most influenced to eat fast food by the convenience, the satisfaction, family and friends, and facilitating factors (such as busy lifestyles, experiencing cravings for fast food, not knowing how to cook, working long hours, and eating alone). Factors that prohibited fast-food consumption were feelings of self-efficacy and concern about social issues, such as loss of traditional family meal time, children not learning about food and food preparation, the habit forming nature of frequent consumption, and associated sedentary lifestyle. Notably, concern about personal health and the influence of health experts were not predictive although this finding must be understood in the context of the predictive value added by both Consideration of Future Consequences and self-identification as a healthy eater; both of these variables may be linked with concern about health and were negatively related to intention to eat fast food.

#### **4.28 Future Attitudinal Research**

One of the key aims of this study was to examine the attitudinal factors influencing fast-food choices. Although there were some useful outcomes in terms of clarifying the components of cognitive attitudes, the results associated with the affective attitudes were rather disappointing. Although recommendations by Aizen (2002) for measuring affective attitudes were carefully followed, it is possible that, in the case of fast-food consumption, the semantic differential was not the most effective tool to use. It is possible that in a society where lean is considered the ideal in terms of both health and attractiveness, concerns arising from social desirability influenced participant responses.

It is also possible that affective attitudes may have been rather unconscious and were therefore, not captured effectively by the semantic differential measure. Some pockets of the literature have differentiated between attitudes as being either explicit or implicit. Specifically, implicit attitudes are said to be those that influence the individual's behaviour in a spontaneous, automatic, affective manner without conscious cognitive processing (De Houwer, 2002; Greenwald, McGhee, & Schwartz, 1998) with explicit attitudes being much more considered and rational. Typically, explicit attitudes are captured by direct questioning and can be predictive of intention to engage in particular behaviours.



However, explicit attitudes cannot always be used to predict behaviour without encountering problems. Explicit attitudes may be influenced by biases such as self-presentation and social desirability or, may not be particularly predictive of behaviour, especially if the individual is not motivated to make conscious cognitive assessments of the outcomes of the behaviour. In these situations, it is quite likely that behaviour is influenced in a much less considered and more automatic way by underlying, or implicit attitudes (Craeynest, Crombez, De Houwer, Deforche, & De Bourdeaudhuij, 2006).

Given the nature of fast-food consumption, it seems quite possible that successful measurement of the more affective attitudes may require implementation of a tool with the capacity to capture any implicit associations that may be held with fast food. In more recent times, there have been a number of instruments developed for examining implicit associations, with some arguing that the Implicit Association Test (IAT) (Greenwald et al., 1998) is one of the most reliable measures (Perugini, 2005). Others (e.g. Brunel et al., 2004) have also suggested that the IAT may contribute well when it is combined with other measures, particularly in the prediction of behaviour, choice, or judgement.

Therefore, the next study combines measures based on the TPB with the IAT to investigate the nature of both implicit and explicit associations underlying attitudes towards fast foods. In combination with data reflecting social influence and perceptions of control over fast-food consumption rates, it is hoped that a clearer understanding of the social and psychological variables driving fast-food consumption will be created to assist those working in the area of obesity.

## Chapter Five

### Implicit Association Test as a Tool for Investigating Affective Reactions

*'...I had before my eyes the coolest, least emotional, intelligent human being one might imagine, and yet his practical reason was so impaired that it produced, in the wanderings of daily life, a succession of mistakes, a perpetual violation of what would be considered socially appropriate and personally advantageous' (Damasio, 1994)*

#### 5.1 The Role of Affect

There are two fundamental processes influencing decision-making. Historically, research surrounding human judgement has focussed on deliberate, analytic, cognitive processes. Somewhat less attention has been paid to a more intuitive, experiential, and automatic processes (Damasio, 1994; Finucane et al., 2000). Zajonc (1980) was one of the first to effectively argue that initial reactions to stimuli are very often automatic and affective in nature. The affect heuristic is a theoretical framework proposing that affect has significant influence in judgements and decision-making processes (Slovic et al., 2002). In terms of this theory, affect is described as reflecting rapid and automatic experience of a state (either with or without consciousness) of 'goodness' or 'badness' about a stimulus accompanied by a related positive or negative attitude towards the object or behaviour (Slovic et al.). Damasio suggested that much of human thought is represented by images which, with experience, become associated or 'marked' with either positive or negative feelings. Furthermore, these feelings are linked either directly or indirectly to somatic states with positively marked states acting as incentives and negatively marked states acting as deterrents. Finucane et al. argued that relying on a readily available affective impression may be far simpler and cognitively efficient than frequently engaging in a complex decision-making process for issues that need to be solved quickly or where mental resources are limited. Damasio has stated similar views, suggesting that affect is essential

to rational action and heuristics, along with their related somatic states, increase the accuracy of decision-making. This view is supported by the description of instances where people with brain damage that limits their ability to draw on heuristics have also been shown to have reduced decision-making ability.

## **5.2 Dual Attitudes**

Attitudes are likely to serve a number of functions, primarily as a mechanism for organising information and providing a frame of reference. Within this framework, attitudes are also said to provide a utilitarian function, helping individuals to 'approach' desirable objects within their environment and 'avoid' those that are unpleasant. As such, people evaluate all things that they encounter, labelling objects as either good or bad. This single-valence approach is used in a number of theories, including the TPB. Typically, people are asked to rate their primary or most salient attitude on a unidimensional scale and seem to be able to do this quite easily. However, Wilson, Lindsay, and Schooler (2000) suggested that this unidimensional school of thought may be a little naïve, proposing that although attitudes are dynamic, it is unlikely that new attitudes simply replace existing one. They argued that it is possible for people to hold quite ambivalent attitudes towards a single object.

Aside from ambivalence, there are other features of attitudes which make measuring them accurately quite a complex task. People may hold attitudes that are readily accessible (cognitively) and that they are also quite willing to share. On the other hand, people may hold attitudes they are not willing to share. Alternatively, some may not consciously be aware that they hold particular attitudes and, depending on the attitudinal object, researchers may need to differentiate between explicit and implicit participant responses. In their model of dual attitudes, Wilson et al. (2000) proposed that both implicit and explicit attitudes towards one object may co-exist in memory. They also stated that differentiation between the two is important as they may capture different cognitive-motivational processes and may, therefore, need to be measured using different procedures.

### 5.3 Measuring Implicit Attitudes

There are a number of different measures such as the Extrinsic Affective Simon Task (EAST) and Go/No Go Association Task, as well as physiological measures such as the acoustic startle eye-blink response technique, all designed to capture implicit responses. However, the Implicit Association Test (IAT) (Greenwald et al., 1998; Greenwald, Nosek, & Banaji, 2003) is purported to be one of the most reliable and frequently used measures in the area (Perugini, 2005; Richetin, Perugini, Prestwich, & O'Gorman, 2007). It relies on a series of computer-administered sorting tasks, and is said to provide some insight into more implicit attitudes by measuring the degree to which an individual associates conceptual categories. The associations are measured through response latencies which are also said to minimise opportunities for introspection. By way of example, participants are asked, under time-constrained conditions, to draw associations between targeted concepts (such as fast food and non-fast food) and evaluative valence concepts (such as positive and negative) in a task requiring simultaneous or double categorisation. That is, the participant is shown a sequence of images and adjectives in the centre of a computer screen and, using the 'E' key with the left hand and the 'I' key with the right hand, is asked to sort the images and adjectives into one of four classes; attribute discrimination (positive/negative) and target category discrimination (fast food/non-fast food). Figure 5.1 provides an example of a screen from such a sorting task.

The labels of one target category are paired with one attribute category (for example, positive or fast food) and are presented together on the top left hand section of the screen whilst the other target and attribute categories (negative or non-fast food) appear together on the top right of the screen. Participants categorise each stimulus by selecting either the 'E' or 'I' key for either the left or right side of the screen. In a second task, the target concept is reversed resulting in opposite pairings of the target concept and associated attribute (for example, positive and non-fast food on the left and negative and fast food on the right). All the individual's responses are timed and it is assumed that any pairing responses that are in accordance with pre-existing, implicit associations will be made more quickly and

accurately than responses where the participant is forced to make a pairing that contradicts their implicit associations. It is argued that such activities should be reasonably resistant to self-presentation strategies and should capture the automatic associations made even by those who would prefer not to express their thoughts, or are not even consciously aware that they hold such attitudes.

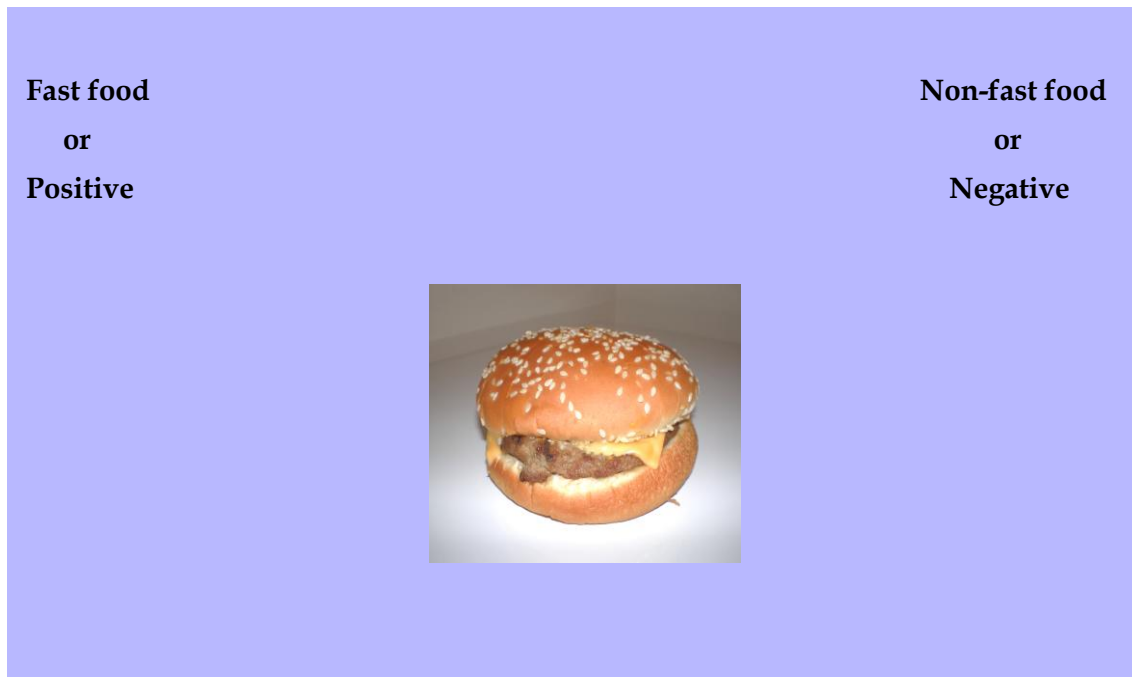


Figure 5.1. Example of Sorting Task from Implicit Associations Test

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#### 5.4 Validity of the Implicit Associations Test as a Measure of Implicit Associations

In a review of over 100 studies using the IAT, Lane, Banaji, Nosek, and Greenwald (2007) reported that the IAT is difficult to validate. This is because even when considering associations with a single object, the IAT may be applied to huge range of associations, no two of which need necessarily be related. That is, researchers are not restricted in any way to what they use as a contrast category. In studies examining implicit associations with alcohol, some researchers have used water as a contrast category whereas others have used soft-drinks. In addition to this, the variation within measurement of a single construct may

also be quite extreme; one study may use words for sorting while another may use images. Even if two studies are examining the same construct and both are using images, the images themselves will vary, also influencing validity. Comparisons of research indicate that convergent validity amongst implicit measures is generally mixed and although the IAT is often uncorrelated with other measures, it is certainly not alone. One explanation for this may be that different instruments may be capturing different aspects of an attitude or association and that as understanding of the exact nature of implicit attitudes is at an early stage, the fallible nature of *all* measures must be remembered and results interpreted with appropriate caution.

Validity is also limited by the reliability of a measure. Lane et al. (2007) compared results of 20 studies, each of which included more than one administration of the IAT. Results showed that test-retest reliability ranged from .25 to .69. It is worth noting that Lane et al. also highlighted the shared problems with reliability among all measures that attempt to infer implicit attitudes or associations. They also noted that the one study that compared reliability between different measures, demonstrated highest reliability for an IAT measure.

The review by Lane et al. (2007) also highlighted the fact that the IAT performed well across a range of behaviours from the traditionally examined social judgements, such as prejudice and stereotyping, through to health-related behaviour, including food choices. The authors pointed out that people using explicit measures of attitude have experienced difficulty in predicting certain behaviours such as controlling overweight or quitting smoking. This is because people often behave in ways that are incongruent with their apparent knowledge (for example, knowing what foods are healthy provides no guarantee that an individual will always choose healthy options). Lane et al. suggested that measures of implicit attitudes may begin to fill some of these gaps in the explanation of health-related behaviour. They argued that the very fact that many people are surprised by their IAT results indicates that the process is capturing beliefs or associations that are not available via 'conscious introspection' (Lane et al., p. 83), and this provides further evidence of the

potential of the IAT to improve the prediction of behaviour, particularly for impulsive or spontaneous behaviour.

Cunningham et al. (2004) conducted a fascinating investigation comparing IAT results with biomedical data. After conducting an IAT designed to capture implicit responses to faces based on race, they had participants, all of whom were Caucasian, take part in a similar task requiring them to sort images of Caucasian and Negroid faces shown on a screen for 30 milliseconds and for 525 milliseconds. During this second task, Cunningham et al. used functional magnetic resonance imaging (fMRI) to capture images of the amygdala<sup>3</sup>, arguing that the amygdala has been shown to be activated by both emotion and the emotional reactions to stimuli across times that allow for cognitive processing (525 milliseconds) and times so short that they only allow unconscious processing (30 milliseconds). They found that although all (13) of their participants demonstrated no prejudicial biases on explicit measures, the average response on the IAT showed more negative associations with Negroid faces than with Caucasian faces. During the 30 millisecond fMRI testing, the authors found increased amygdala activity for the Negroid faces compared to the Caucasian faces indicating that at a relatively automatic level, greater emotional responses were generated toward the Negroid faces. Moreover, these responses correlated significantly with the IAT scores so that the more negative the association with Negroid faces (IAT), the more activation was shown in the amygdala (fMRI). This difference in activation of the amygdala, observed in the 30 millisecond trials, was significantly reduced during the 525 millisecond trials, indicating that when participants were given time to consciously process the image of the face, their automatic associations were controlled by more considered attitudes. In fact, during the 525 millisecond trials, the fMRI scans showed increased activity in ventrolateral prefrontal cortex (used for regulation and executive functioning) when the participants were viewing Negroid faces compared to activity in the same area when viewing Caucasian faces. Cunningham et al. suggested that this executive

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<sup>3</sup> A subcortical structure and component of the limbic system, the amygdala plays a key role in the processing of emotions.

functioning can moderate or even override activity that might arise from automatic processing. Overall, the results of this study provide physiological evidence to support the argument that the IAT captures associations that are inherently different from more considered, explicit attitudes measured by questionnaires.

In a comparison of the IAT with the EAST, De Houwer and De Bruycker (2007) conducted three studies examining implicit associations with political parties, homosexuality, and foods as there have been suggestions that the EAST may have benefits not offered by the IAT. Although it works on a similar computer-administered, sorting task basis to the IAT, the EAST allows measurement of an attitude in a non-relative manner as researchers can present one stimulus and compare times taken to give positive and negative responses to the same stimulus. De Houwer and De Bruycker found no significant correlations between IAT and EAST scores and concluded that the IAT consistently outperformed the EAST on the basis that the IAT scores correlated, in an expected manner, with both self-reported attitudes and self-reported behaviour, something the EAST failed to achieve. Although it could be said that correlations between implicit and explicit attitudes should be weak as the two are purported to be divergent, De Houwer and De Bruycker argued that under some circumstances, which were specifically sought for these studies, it would be expected that implicit and explicit measures should correlate. For example, they maintained that although most people have quite a strong reaction towards brussel-sprouts, there seems no real reason why someone might feel socially pressured to indicate a strong liking or disliking towards them either way and there is therefore, no reason to expect that implicit and explicit attitudes might differ significantly. In an additional point of support for the IAT, the authors also pointed out that the split-half reliability analyses across all three studies were consistently higher for the IAT than the EAST.

Aside from the support that De Houwer and De Bruycker (2007) generated for the IAT generally, their second study investigated implicit attitudes towards food and beverage in an unlikely, although justified (due to the expected lack of diversity between implicit and explicit attitudes) combination of sprouts and beer. Not surprisingly, they found a



significant preference for beer over sprouts amongst their sample of university students, further evidence (albeit apparently a little tongue-in-cheek) of the capacity of the IAT to successfully capture implicit attitudes towards food and beverages.

## 5.5 Implicit Associations Test and Health-Related Attitudes

Although the IAT has, historically, been applied to better understand socially sensitive issues such as prejudice and stereotypical beliefs, it has also been applied more recently to attitudes towards health-risk behaviours such as drug and tobacco use (e.g. Czyzewska & Ginsburg, 2007; Perugini, 2005; Wiers, van Woerden, Smulders, & de Jong, 2002).

Czyzewska and Ginsburg (2007) compared attitudes of young adults towards marijuana and tobacco use before and immediately after they were exposed to anti-drug and anti-smoking advertisements. They found that for explicit attitudes, the anti-marijuana advertisements appeared to have the opposite effect to that intended. The group exposed to these advertisements held fewer negative explicit attitudes towards marijuana than the group exposed only to anti-tobacco advertisements. However, they observed that the implicit attitudes of each group were more negative towards the substance that corresponded with the advertisements they watched. Although it is not clear if the differences between implicit and explicit attitudes existed prior to the priming, these data certainly support the argument for the existence of dual attitudes in a health-related domain.

Perugini (2005) hypothesised that dual attitudes function in three ways. Firstly, dual attitudes may be *additive*, with the implicit and explicit attitudes explaining differing portions of the variance in behaviour. Secondly, it is possible that they function by *double dissociation* whereby implicit attitudes predict spontaneous behaviour and explicit attitudes predict deliberative behaviour. Finally, he suggested that they have a *multiplicative* effect when implicit and explicit attitudes interact to influence behaviour. Perugini conducted research to examine these differing effects.

Using the IAT with a sample of 48 students, Perugini (2005) found that although all the participants held negative attitudes towards smoking in relation to exercise, smokers held implicit and explicit attitudes that were significantly less negative than those of their non-smoking counterparts. Perugini used measures of both implicit and explicit attitudes in a regression to examine the predictive power of each for smoking. He also included a multiplicative term to test for an interaction between the implicit and explicit measures. He found that explicit attitudes were a significant predictor, implicit attitudes did not reach significance, and although the multiplicative term entered at the second step improved the overall prediction, this was also not significant. Further analyses of the interaction effect within the interaction term indicated that when both implicit and explicit attitudes were in the same direction (i.e. both negative or both positive), the predictive ability increased lending some support to the multiplicative theory. Perugini concluded that as only the explicit, and not the implicit attitudes, were significant predictors of behaviour, this reduced support for the additive theory. However, this finding is countered by that of Nosek and Smyth (2007) in a study spanning seven different sets of attitudes. They found that the model specifying two distinct but related attitudes performed more convincingly than the model suggesting that attitude is a single construct. This combination of results indicates that the nature of the attitude object is likely to dictate whether implicit and explicit attitudes correlate. In the case of fast food, results from the qualitative stage of this research indicate that participants tended to feel quite positively about the outcomes of a fast-food meal, despite knowing that fast foods are not healthy, suggesting two separate constructs.

Waters et al. (2007) suggested that automatic cognitive processes may also help in the explanation of addictive behaviour and applied the IAT to examine whether implicit cognitions around smoking were associated with craving and dependence. In addition, they compared IAT performance against the acoustic startle eye-blink response technique, also shown to be useful in measuring automatic affective responses. The startle response has been shown to correlate with activation of the amygdala (Phelps et al., 2000). Working with a sample of 57 people with a mean age of 43.6 years, Waters et al. found that the IAT

demonstrated good internal reliability and that the IAT effect for smoking was generally negative indicating a preference for non-smoking. The authors also found that the IAT effect was most positive for participants who had abstained from smoking overnight, finding significant differences in IAT effects between the abstaining group and a group who smoked within the testing session (who were the most negative group). Finally, Waters et al. found that scores on the IAT were not correlated with the startle response and suggested that the two measures may be tapping into separate components of affective processing. The two tests were carried out at different times within the testing session and were not counterbalanced, a factor that may also have impacted on results. One of the key findings was that the IAT could be effectively implemented with a sample significantly older than the usual student cohort; a point of importance for the current research.

Differentiating between cognitions related to *valence* (positive/negative) and *arousal* (arousal/sedation), Wiers, van Woerden, Smulders, and de Jong (2002) examined the implicit and explicit cognitions of heavy and light drinkers towards alcohol. Using 48 undergraduate students, they applied a valence IAT which used positive and negative words (for example, sociable, good, pleasant, and stupid, obnoxious, tedious) and an arousal IAT which used active arousal and sedation words (for example, energetic, lively, funny, and sleepy, woozy, listless). As well as measuring the cognitions implicitly, the authors also measured explicit cognitions using the same words on paper-and-pencil tests. Wiers et al. also had participants complete a 28-day alcohol diary and they were able to test the extent to which attitudes predicted alcohol use. Their findings indicated that although heavy and light drinkers did not differ on implicit measures of valence associations, arousal associations varied with heavy drinkers showing a strong implicit association with alcohol not shown by the light drinkers. This difference was paralleled by a similar difference in explicit arousal expectancies. Wiers et al. also found that despite both groups showing positive explicit attitudes towards alcohol, they both also showed strong negative implicit attitudes towards alcohol. This finding suggests that social or environmental pressures may influence the expression of some attitudes and that the IAT might be effective in measuring underlying attitudes. Finally, Wiers et al. were able to show that although the

prediction of alcohol consumption was primarily explained by explicit associations, implicit associations also made a unique contribution to explanation of the variance.

Wiers et al. (2002) explained their inclusion of arousal-sedation dimension (as well as valence) in terms of individual reactions specific to drug or alcohol consumption and the role that these reactions play in terms of addiction. Results from the qualitative part of this research indicate that a similar function may exist with reactions to fast food. That is, several participants described feeling cravings for fast food with others reporting a tendency to eat fast food when feeling depressed or low suggesting that associations with fast food might span arousal dimensions as well as valence (positive/negative) dimensions. For this reason, a similar format to that followed by Wiers et al. is proposed for this study with two IAT to be conducted; the first to examine implicit valence-related associations and the second to examine implicit arousal associations.

Ostafin and Palfai (2006) were also interested in alcohol-consumption and they investigated the effectiveness of the IAT with a group of 88 college students, selected because it was believed that they held 'hazardous' drinking habits. The authors used water as a natural contrast category for alcohol and decided to use images rather than words on the assumption that pictures may relate more closely to the context of drinking, thereby proving greater external validity. Ostafin and Palfai had participants complete self-report measures of drinking behaviour as well as a measure capturing motivation to consume alcohol. Although they found that scores on the IAT were correlated with the number of binge-drinking episodes and cue reactivity, IAT scores did not predict frequency of alcohol use. Ostafin and Palfai suggested that the IAT predicts motivational response to alcohol cues, although it is likely that it is other factors, such as social cues, that motivate drinking behaviour. This suggests that the IAT should be further tested in conjunction with other behavioural measures (such as the TPB) to see how useful scores are in terms of their predictive ability when combined with other factors influencing behaviour.

In conclusion, research summarised in this chapter highlights both the limitations and advantages of measuring implicit cognitions using the IAT. The IAT can only generate

relative associations between the construct of interest and a comparison construct and its effectiveness appears to vary with stimulus items and evaluation terms. However, research also indicates that the IAT is both valuable and valid and has made a significant contribution to the knowledge and understanding of the role of implicit associations in understanding attitudes and behaviour. Some (e.g. Brunel et al., 2004) suggested that the IAT may contribute well when it is combined with other measures, particularly in the prediction of behaviour, choice, or judgement. However, the predictive ability of IAT is rather less established and results seem to vary according to the behaviour in question. Its validity for the prediction of intention to consume fast food and consumption behaviour will be tested in the next chapter.

## Chapter Six

### Implicit Associations with Fast Food: Application of the Implicit Associations Test

Since the early investigations into prejudice in the mid-1990s, the IAT has been used to explore implicit associations in a number of areas. Some work has been completed investigating the associations that people make with various types of food with many researchers interested in links with overweight and obesity. For example, some research suggests that people with obesity may have food preferences that differ from those of their non-obese counterparts (Capaldi, 1996; Drewnowski, Kurth, Holden-Wiltse, & Saari, 1992). The main aim of this study is to combine the IAT with the TPB model to help explain associations with fast food and the influence that these might have on fast-food consumption.

#### 6.1 Research Applying the Implicit Associations Test to Examine Associations with Food and Beverages

Perugini (2005) argued that dual attitudes have been shown to function in various ways and his research spanning additive and multiplicative functions was discussed previously (section 5.5). He also described a process of *double dissociation* whereby implicit attitudes predict spontaneous behaviour and explicit attitudes predict deliberative behaviour. Perugini investigated this, looking for instances where explicit attitudes might explain deliberative choices between unhealthy snacks and fruit and implicit attitudes might explain spontaneous choices. He created occasions for spontaneous and deliberative behaviour by asking participants to report their regular consumption of snacks and fruit (deliberative) as well as offering them the choice of a snack or a piece of fruit at the conclusion of the experiment (spontaneous). Perugini found strong support for double dissociation as implicit attitudes significantly predicted spontaneous but not deliberative behaviour and explicit attitudes reflected an opposite pattern.

Perugini (2005) also conducted analyses testing for an interaction term between the implicit and explicit measures (or a multiplicative effect) on food choice behaviour. As with his aforementioned study investigating smoking behaviour, the interaction between implicit and explicit attitudes related to foods was non-significant. Similar findings to those of Perugini were found in a slightly more recent study also investigating food choices. Richetin, Perugini, Prestwich, and O'Gorman (2007) also found that along with explicit measures, IAT measures were independently predictive of food choice, although the researchers found no interaction effect between the two attitudinal measures.

Although Perugini (2005) did not find strongly significant effects to support the multiplicative theory, similar analyses will be conducted to test for an interaction in relation to fast-food consumption. The support that Perugini found for double dissociation is of particular interest because the theory intuitively lends itself well to food selections, especially unhealthy foods. That is, if people are aware of the health consequences of consuming unhealthy foods, but continue to do so regardless, some of these decisions are likely to be spontaneous rather than deliberative. Although it is planned that data will be collected through online sources making it impossible to create a similar situation where participants are forced to make a spontaneous food choice, an attempt will be made to generate similar comparisons between implicit and explicit predictors through use of self-reported consumption rates (deliberative) and food diary data (spontaneous).

Roefs and Jansen (2002) applied the IAT in a project examining the implicit and explicit attitudes held by obese and non-obese people towards foods high in fat. Contrary to their hypotheses, both groups held negative implicit and explicit attitudes towards high-fat foods, although implicit attitudes were more negative for the obese group. Although there was little difference between the groups in terms of preference for the taste of foods high in fat, the authors reported that other research has found obese people prefer and consume more high-fat food. They proposed that although obese people may not like the *concept* of high-fat content in foods, they probably still like the taste and choose to eat high-fat foods for this reason. The concept dimension of foods in Roefs and Jansen's study was

represented by words rather than images and participants were asked to sort them into categories labelled 'high-fat' and 'low-fat'. It could be argued that these labels carry some value-judgement and that the obese group, in particular, may have been sensitised by this judgement rather than the food itself. This tendency to react to value-judgements, rather than the object itself, is likely to have been exacerbated by the use of words rather than images; it is easier to relate to a picture than an adjective. Consequently, the proposed research will use images of food for the stimulus material and will ask participants to sort images into categories of positive or negative rather than high-fat and low-fat. Although the words positive and negative also hold values, they are perhaps not so easily associated with food and may perform in a more neutral manner.

Raghunathan, Walker-Naylor, and Hoyer (2006) investigated the inferences made by 138 undergraduate students about foods based on the associated portrayals of healthiness. Using the IAT, Raghunathan et al. asked participants to categorise a series of images of either healthy or unhealthy foods and a series of words designed to reflect either enjoyment or a lack of enjoyment (such as *tasty, delicious, flavourless, and unpalatable*). They found significantly shorter response latencies when participants were asked to categorise unhealthy foods as enjoyable, concluding that this reflected an implicit association between unhealthy foods, good taste, and enjoyment. Should a similar result be found with this study, positive implicit associations with fast food might be used to explain why people, who know fast food is unhealthy, continue to consume it regardless.

Craeynest et al. (2005) used the Extrinsic Affective Simon Task (EAST) (a modified version of the IAT) to examine the differences in implicit and explicit attitudes of obese and non-obese children towards food and exercise. Their findings support the hypothesis that there may be differences between implicit and explicit attitudes towards food as they found that obese children held more positive implicit attitudes towards both healthy and unhealthy foods although there were no differences between the groups in their explicit attitudes towards food. These results suggest that the obese children may simply have enjoyed eating both healthy and unhealthy foods and Craeynest et al. suggested that unhealthy and



healthy foods need not be concepts that vary on a one-dimensional taxonomy; it is entirely possible that people may like both categories of food equally. What is of interest for this study is whether implicit attitudes towards fast food differ from explicit attitudes.

In a follow-up project applying the IAT, Craeynest et al. (2006) investigated attitudinal differences in obese and non-obese boys (nine to eighteen years of age) towards high-fat foods and exercise. They found a marked difference between the groups in their implicit identification with specific foods, although not with exercise. Participants were presented with stimuli related to the self (for example, I, me, myself), to others (for example, he, she, them), to high-fat food (for example, French fries, hamburger, chocolate), and non-fat (sic) food (for example, vegetables, fruit, yoghurt). Overall results were similar to those found with the EAST, indicating that the non-obese boys associated themselves more with non-fat food than with high-fat food, whereas the obese boys associated themselves equally with both high-fat and non-fat food. Again, there were no differences between the groups on explicit measures of attitude. Craeynest et al. suggested that the findings with the IAT data might be attributed to participants being asked to identify *themselves* with high-fat food. It is possible that this approach may have invoked fewer socially-biased responses than the more traditional IAT process of categorising according to labels of 'positive' and 'negative'. However, this interpretation is questionable given that similar implicit results were found in the earlier study using the EAST where words were classified according to valence (positive or negative).

Investigating branded preferences for fast foods, Maison, Greenwald, and Bruin (2004) investigated both implicit and explicit predictors of behaviour. They recruited 20 people each as they left either a 'McDonalds' or 'Milk Bar' restaurant arguing that this would represent actual behaviour rather than self-reported behaviour. Participants evaluated the restaurants by questionnaire and analyses showed that participants held strong explicit preferences for the restaurant at which they had just eaten. Not represented in Australia, it appears that Milk Bar restaurants offer traditional Polish cuisine considered significantly healthier than the traditional fare at McDonalds. In terms of implicit associations, Milk Bar

diners showed a significant preference for their restaurant of choice, although diners from McDonalds showed no significant difference either way — perhaps an indication of ambivalent feelings towards the chain and their foods. The implicit associations failed to contribute significantly to the explanation of behaviour beyond the explicit measure.

In a second study investigating preferences between two very similar products, Coca-Cola and Pepsi, Maison et al. (2004) again found that people showed implicit preferences for the brand that they consumed regularly, especially if they were able to distinguish Coca-Cola from Pepsi in a taste test. This preference was diminished when people purchased and consumed both of the branded drinks. Although such a finding might be expected as consuming both brands would indicate a lack of preference for either, the finding is worthy of note because it provides further evidence of the ability of the IAT to capture associations accurately. Multiple regression analyses indicated that both implicit and explicit measures were significant independent predictors for preferred brand as well as taste discrimination success. The findings from these studies indicate that the IAT is a useful tool in assessing implicit preferences towards brands, and, importantly, food and beverage preferences.

Seibt, Häfner, and Deutsch (2007) used the IAT to examine their hypothesis that the immediate valence of food stimuli would be more positive for people who are hungry than for those who have recently eaten. Participants were divided into groups based on the length of time that had passed since they had last eaten; those who had eaten within the previous two hours were considered satiated, and those who had not eaten within the two hours were considered deprived. Stimuli used in the IAT consisted of names of foods, sport-related adjectives, and a series of words reflecting pleasant and unpleasant associations. The findings indicated that deprived participants associated the food-related adjectives significantly more quickly with positive adjectives than did the satiated group. Although these results are not particularly surprising in their indication that participants associated food more positively when hungry, they do provide further evidence that the IAT has the capacity to capture differences in associations people hold with food.

Other research has investigated the habitual nature of the behaviour under investigation and individual need for cognition as potential moderators of implicit and explicit attitudes and behaviour. Conner, Perugini, O'Gorman, Ayers, and Prestwich (2007) investigated snacking behaviour with chocolate and sweets and measured implicit associations with both the IAT and EAST. The IAT was completed using images of sweets such as Kit-Kats and Maltesers, with various shapes as the contrast stimuli. Consumption rates were measured with a one-week food diary. The authors found no significant correlation between the IAT and EAST data. However, the IAT did correlate with the explicit measures of attitude with both of these measures reflecting a slightly positive attitude towards sweets. After analysing the predictive ability of both the IAT and EAST, along with explicit measures of attitude, and the individual differences of habit and need for cognition, Conner et al. found that the IAT failed to add significantly to explanation of behaviour, but the EAST contributed well, outperforming the explicit measure of attitude.

Conner et al. (2007) considered that that the neutral nature of the contrast stimuli (shapes) may have contributed to the poor predictive performance of the IAT and conducted a second study using a 'true contrast' in the form of an alternative snack food; fruit.

Although true contrast stimuli were included, the attribute categories were not related to the stimuli (*pleasant*; love, gift, joy, pleasure, and rainbow and *unpleasant*; evil, cancer, vomit, death, and agony). Although these words are strong in their capacity to evoke perceptions of pleasantness and unpleasantness, an even stronger result may have been elicited if the words had been specifically food-related (for example, delicious, tasty, disgusting, vile). In addition to changing the stimuli, the authors also included an additional measure of behaviour whereby participants were invited to select either a piece of fruit or a sweet from large boxes, out of view of the experimenter, at the conclusion of the experiment. In this second study, the IAT did not correlate with the explicit measure and was a significant predictor of both measures of behaviour indicating that careful and deliberate selection of the comparison stimuli is likely to be critical to the overall results.

In both of these studies, Conner et al. (2007) were primarily interested in the interaction effects between the variables, individual differences in habit, and need for cognition. Therefore, they dedicated little discussion to the differences in performances between the IAT and EAST or the differing performance of the IAT across the two studies. It does appear from their results however, that implicit and explicit measures contribute separately to the explanation of behaviour and that the IAT can perform well when applied to food-related behaviour.

## **6.2 Application of the Implicit Associations Test to Examine Associations with Fast Food**

The results of these studies combine to create a compelling argument that the IAT is a good tool for exploring the implicit associations that people hold with foods. As well as providing a point for comparison with self-reported explicit measures, it may also be possible to use the implicit measures to help in the explanation of food consumption, although it does seem that this has been done with rather limited success and that explicit measures are often the stronger predictor of behaviour.

In light of both the reviewed literature and the findings within the first two studies of this research project, it is proposed that the IAT should be used to examine the implicit associations that people hold with fast food in the anticipation that this measure may explain additional variance over and above that captured by the TPB. It is possible that those who eat fast food frequently as well as those people who are overweight will show more positive associations with fast food than less frequent consumers, although measures of explicit attitudes are not expected to differ.

As discussed in the previous chapter, Wiers, van Woerden, Smulders, and de Jong (2002) examined both the implicit and explicit cognitions of heavy and light drinkers towards alcohol, differentiating between cognitions related to *valence* (positive/negative) and *arousal* (arousal/sedation). Their findings indicated that although heavy and light drinkers did not differ on implicit measures of valence associations, they did in terms of arousal with heavy drinkers showing a strong implicit association between alcohol and arousal not shown by

the light drinkers. Findings from the first study in this research suggested that a similar division between expectancies (in terms of a set of valence expectancies and a set of arousal expectancies – both psychological and physiological) may be found for fast-food consumption. For this reason, a similar format to that followed by Wiers et al. is proposed with two IATs to be conducted; the first to examine implicit valence-related associations with fast food and the second to examine implicit arousal associations, or personal and individual expectancies associated with consuming fast food. Findings similar to Wiers et al. are expected, such that frequent consumers of fast food will have more positive arousal associations with fast food than those who consume fast food less frequently.

## Method

### 6.3 Design

The design was a combination of survey and quasi-experiment with a web-based delivery. It also included both retrospective and prospective measures.

### 6.4 Participants

All participants within the North West Adelaide Health Study (NWAHS) group were invited to take part in the study. A total of 127 completed the tasks involved. The participants ranged from 18 to 84 years of age ( $M = 47.41$  years,  $SD = 12.61$  years) compared to a range between 18 and 95 years ( $M = 54.24$  years,  $SD = 15.87$  years) across the whole NWAHS group. See Table 6.1 for sex, education level, and BMI distributions within the group. Comparison of the characteristics of the study sample with the NWAHS group showed that a significantly higher number of men took part in this study and that participants were also significantly better educated. Participants taking part in this study also had lower BMI scores than the larger NWAHS group, although were still well represented across each of the three categories.

Participants were encouraged to take part in the study by the provision of a small cash prize (\$50 shopping voucher) won through a process of random selection.

## 6.5 Procedure

Over an eight-week period between 11.6.07 and 12.8.07, all potential participants from the NWAHS group were sent a letter inviting them to participate in a study investigating thoughts and feelings about fast food. Participants were also sent an information sheet and were informed that if they took part in the research, their name would be entered into a draw for a chance to win a \$50 shopping voucher. Any participant requiring a copy of the final results was asked to provide either an email or a postal address. Between two and four weeks after the initial invitation was sent (from 25.6.07 to 9.7.07), follow-up phone calls were made to participants as part of a larger data collection activity within the NWAHS.

Table 6.1

*Comparison of Demographic Information between Study Participants and NWAHS Group*

	<u>Participants in Current Study</u>	<u>NWAHS Participant group</u>
Sex	n (%)	(%)
Female	47 (37)	(51)
Male	80 (63)	(49)
<u>Education</u>		
Secondary	37(29.1)	(43.1)
TAFE*	39(30.7)	(40.4)
University degree	51(40.2)	(11.7)
<u>Body Mass Index (BMI)**</u>		
Normal	58(46.4)	(35.3)
Overweight	35(28)	(36.6)
Obese	30 (24)	(28)

\*or other accredited qualification, \*\*some participants in both groups chose not to disclose, \*\*\*BMI was divided according to the following criteria; normal weight < 24.9, , overweight 25 to 29.9, and obese > 30.

## 6.6 Instruments (see Appendix C)

### 6.6.1 Letters of Introduction

A letter of introduction was provided, detailing the confidentiality with which all responses would be treated and advising participants that they were free to withdraw from the study at any stage. Participants were also provided with contact details for both the researcher and the Acting Convener of the Human Research Ethics Subcommittee, School of Psychology, University of Adelaide, to whom they could direct any queries regarding the study. Participants were introduced to the nature of the online tasks and were invited to enter the website (address) and enter their NWAHS identification codes for logon access to the study.

### 6.6.2 Implicit Association Test

The website (<http://psychology.adelaide.edu.au/expts/foodstudy.html>) was set up through the University of Adelaide, School of Psychology and contained links to two IAT studies; the current study and another investigating eating behaviour. Participants were invited to take part in either one or both studies. The IAT code was written in Javascript and software was designed to run on most browsers (checked on Internet Explorer versions 6 and 7, Netscape 6 (Mozilla), and Firefox versions 1.5 and 2). Participants downloaded the program onto their own browser and the program used the participant's computer to present stimuli and measure response latencies. Following this, the participant's browser then returned the data to the University web server where the result was recorded. Although it must be acknowledged that accuracy in measuring the response latencies was limited by the operating system supporting participant's web browsers, this is not believed to be particularly problematic because of the non-systematic nature of the differences in systems and because of the averaging of the data over 120 trials for each IAT.

Within the current study, participants were exposed to two individual IAT tasks. One was labelled the *valence* task and the other the *arousal* task. A combination of ten stimulus images was used across each IAT task. Each IAT task also contained a separate set of

stimulus words. The interval separating the presentation of each stimulus was 400 milliseconds and participants were allowed up to 10,000 milliseconds in which to respond.

### 6.6.2.1 Valence Adjectives

The stimulus words were five adjectives drawn from the initial qualitative stage of this research. These were the adjectives most commonly used by participants to describe fast food. Semantic opposites of each word were chosen for the IAT task. The same adjectives were also used within a semantic differential designed to capture explicit attitudes (see section 6.6.3.1). The adjectives are detailed in Table 6.2 below.

### 6.6.2.2 Arousal Adjectives

As with the valence IAT, five stimulus adjectives were drawn from the initial qualitative stage of this research. This research is based on similar research investigating associations with alcohol and an attempt was made to select adjectives for their representation of the way that participants felt about or reacted to fast food, either physically or emotionally. Semantic opposites of each word were again chosen for the IAT task as well as a semantic differential question measuring explicit attitudes. The adjectives are detailed in Table 6.2.

Table 6.2

*Stimulus Words for Valence IAT and Arousal IAT Tasks*

Valence Outcomes (negative/positive)		Arousal Outcomes (bad/good)	
<u>Negative</u>	<u>Positive</u>	<u>Bad</u>	<u>Good</u>
Time consuming	Quick	Disgusted	Enticed
Unpleasant	Pleasant	Guilty	Carefree
Expensive	Affordable	Lethargic	Energetic
Tedious	Exciting	Disappointed	Gratified
Inconvenient	Convenient	Discontent	Content



### 6.6.2.3 Stimulus Images Used Across Both Implicit Association Tests

The stimulus images were created by the author and were designed to reflect five items typically available from a fast-food menu (burger, French fries, fried chicken, pizza, and chicken nuggets) and five items of unprocessed food typically available from an Australian supermarket (whole uncooked fish, raw steak, raw vegetables, dairy products, and fresh fruit). The food items were specifically selected to represent the state of food at time of purchase. That is, the fast foods were cooked and ready for immediate consumption whereas most of the non-fast foods were in a raw state, requiring preparation and cooking. This was a deliberate attempt to capture the extent that factors such as convenience and immediate gratification influence associations with fast food. The images are detailed in Figure 6.1 below.

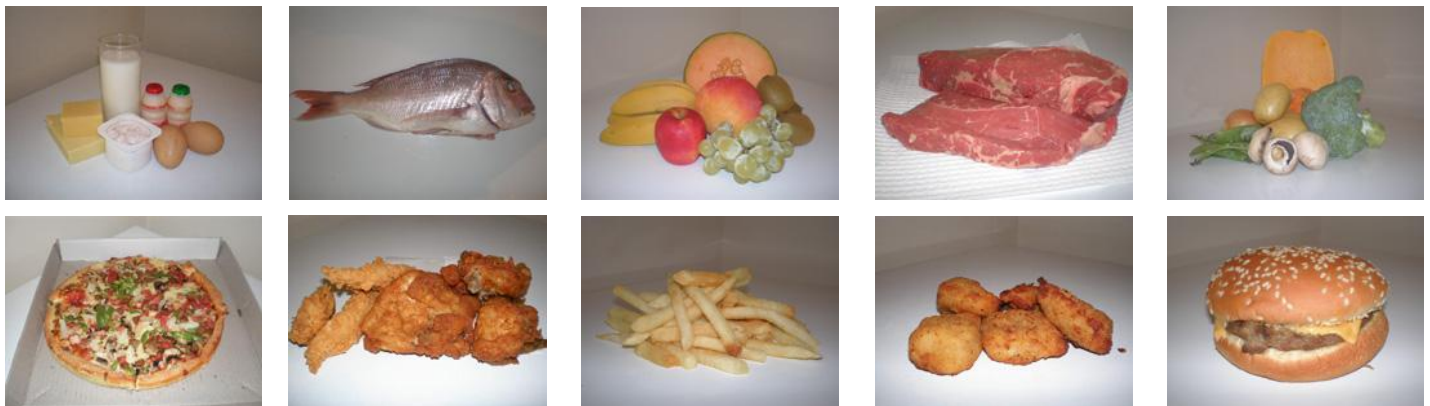


Figure 6.1  
*Stimulus Images Used Across Both IAT Tasks*

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### 6.6.2.4 Implicit Association Test Presentation Format

The IAT is designed to assess the association between a *target-concept* and an *attribute dimension* (Greenwald et al., 1998). Borrowing from the format followed by Wiers et al. (2002), Figure 6.2 shows the specific process followed for the valence IAT and Figure 6.3 shows the process followed for the arousal IAT. Table 6.3 shows the sequence of trial

blocks across both IATs. It is important to note that the stimuli within each block were presented to the participants in a random order. Presentation of each IAT was also counterbalanced in an attempt to avoid practice effects. Instructions to participants for completion of the IAT tasks were taken directly from those used by Greenwald et al. in the Harvard University Project Implicit (Harvard University). Please see Appendix C for a copy of these instructions.

During Block 1, participants were introduced to the target-concept and were asked to discriminate between foods that are recognised as fast and those which are not. Discrimination trials were performed by assigning a response to either the right hand or left hand (as indicated by the black dots in Figures 6. 2 and 6.3). For example, all fast foods were classified by clicking 'E' on the key board with the left hand and all non-fast foods were classified by clicking the 'I' key with the right hand.

Block 2 introduced the attribute dimension by asking participants to categorise adjectives as either positive or negative (as indicated by the black dots in Figures 6. 2 and 6.3).

Block 3 was a practice block and a combination of the stimuli from blocks 1 and 2 were presented in alternate trials. All fast foods and positive adjectives were (correctly) allocated to the left hand and all non-fast foods and negative adjectives were (correctly) allocated to the right. Reaction times were captured for analysis at this point.

Block 4 was a test which repeated block 3 with twice the number of trials. Reaction times were again captured at this point.

During Block 5, participants learned a reversed sequence of the response trials for the target discrimination (responses for fast foods were categorised to the right hand and all non-fast foods were categorised to the left).

Sequence	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7
<b>Task description</b>	Initial target-category discrimination	Associated attribute discrimination	Initial combined task (practice)	Combined task (monitored)	Reversed target-category discrimination	Reversed combined task (practice)	Reversed combined task (monitored)
<b>Task instructions</b>	<ul style="list-style-type: none"> <li>• Fast</li> <li>• Non-fast</li> </ul>	<ul style="list-style-type: none"> <li>• Positive</li> <li>• Negative</li> </ul>	<ul style="list-style-type: none"> <li>• Fast</li> <li>• Positive</li> <li>• Non-fast</li> <li>• Negative</li> </ul>	<ul style="list-style-type: none"> <li>• Fast</li> <li>• Positive</li> <li>• Non-fast</li> <li>• Negative</li> </ul>	<ul style="list-style-type: none"> <li>• Fast</li> <li>• Non-fast</li> </ul>	<ul style="list-style-type: none"> <li>• Fast</li> <li>• Positive</li> <li>• Non-fast</li> <li>• Negative</li> </ul>	<ul style="list-style-type: none"> <li>• Fast</li> <li>• Positive</li> <li>• Non-fast</li> <li>• Negative</li> </ul>
<b>Sample Stimuli (each stimulus shown twice per step)</b>	<ul style="list-style-type: none"> <li>• Burger</li> <li>• French fries</li> <li>• Fried chicken</li> <li>• Pizza</li> <li>• Nuggets</li> <li>• Fish</li> <li>• Steak</li> <li>• Vegetables</li> <li>• Dairy</li> <li>• Fruit</li> </ul>	<ul style="list-style-type: none"> <li>• Quick</li> <li>• Pleasant</li> <li>• Convenient</li> <li>• Cheap</li> <li>• Exciting</li> <li>• Time consuming</li> <li>• Unpleasant</li> <li>• Inconvenient</li> <li>• Expensive</li> <li>• Tedious</li> </ul>	<ul style="list-style-type: none"> <li>• Burger</li> <li>• French fries</li> <li>• Fried chicken</li> <li>• Pizza</li> <li>• Nuggets</li> <li>• Quick</li> <li>• Pleasant</li> <li>• Convenient</li> <li>• Cheap</li> <li>• Exciting</li> <li>• Fish</li> <li>• Steak</li> <li>• Vegetables</li> <li>• Dairy</li> <li>• Fruit</li> <li>• Time consuming</li> <li>• Unpleasant</li> <li>• Inconvenient</li> <li>• Expensive</li> <li>• Tedious</li> </ul>	<ul style="list-style-type: none"> <li>• Burger</li> <li>• French fries</li> <li>• Fried chicken</li> <li>• Pizza</li> <li>• Nuggets</li> <li>• Quick</li> <li>• Pleasant</li> <li>• Convenient</li> <li>• Cheap</li> <li>• Exciting</li> <li>• Fish</li> <li>• Steak</li> <li>• Vegetables</li> <li>• Dairy</li> <li>• Fruit</li> <li>• Time consuming</li> <li>• Unpleasant</li> <li>• Inconvenient</li> <li>• Expensive</li> <li>• Tedious</li> </ul>	<ul style="list-style-type: none"> <li>• Burger</li> <li>• Fries</li> <li>• Fried chicken</li> <li>• Pizza</li> <li>• Nuggets</li> <li>• Fish</li> <li>• Steak</li> <li>• Vegetables</li> <li>• Dairy</li> <li>• Fruit</li> </ul>	<ul style="list-style-type: none"> <li>• Burger</li> <li>• Fries</li> <li>• Fried chicken</li> <li>• Pizza</li> <li>• Nuggets</li> <li>• Time consuming</li> <li>• Unpleasant</li> <li>• Inconvenient</li> <li>• Expensive</li> <li>• Tedious</li> <li>• Fish</li> <li>• Steak</li> <li>• Vegetables</li> <li>• Dairy</li> <li>• Fruit</li> <li>• Quick</li> <li>• Pleasant</li> <li>• Convenient</li> <li>• Cheap</li> <li>• Exciting</li> </ul>	<ul style="list-style-type: none"> <li>• Burger</li> <li>• Fries</li> <li>• Fried chicken</li> <li>• Pizza</li> <li>• Nuggets</li> <li>• Time consuming</li> <li>• Unpleasant</li> <li>• Inconvenient</li> <li>• Expensive</li> <li>• Tedious</li> <li>• Fish</li> <li>• Steak</li> <li>• Vegetables</li> <li>• Dairy</li> <li>• Fruit</li> <li>• Quick</li> <li>• Pleasant</li> <li>• Convenient</li> <li>• Cheap</li> <li>• Exciting</li> </ul>

Figure 6.2. Schematic Illustration of IAT Format for Valence Outcome Expectancies.

Sequence	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7
<b>Task description</b>	Initial target-category discrimination	Associated attribute discrimination	Initial combined task (practice)	Initial combined task (monitored)	Reversed target-category discrimination	Reversed combined task	Reversed combined task (monitored)
<b>Task instructions</b>	<ul style="list-style-type: none"> <li>Fast</li> <li>Non-fast</li> </ul>	<ul style="list-style-type: none"> <li>Good</li> <li>Bad</li> </ul>	<ul style="list-style-type: none"> <li>Fast</li> <li>Good</li> <li>Non-fast</li> <li>Bad</li> </ul>	<ul style="list-style-type: none"> <li>Fast</li> <li>Good</li> <li>Non-fast</li> <li>Bad</li> </ul>	<ul style="list-style-type: none"> <li>Fast</li> <li>Non-fast</li> </ul>	<ul style="list-style-type: none"> <li>Fast</li> <li>Good</li> <li>Non-fast</li> <li>Bad</li> </ul>	<ul style="list-style-type: none"> <li>Fast</li> <li>Good</li> <li>Non-fast</li> <li>Bad</li> </ul>
<b>Sample Stimuli (each stimulus shown twice per step)</b>	<ul style="list-style-type: none"> <li>Burger</li> <li>French fries</li> <li>Fried chicken</li> <li>Pizza</li> <li>Nuggets</li> <li>Fish</li> <li>Steak</li> <li>Vegetables</li> <li>Dairy</li> <li>Fruit</li> </ul>	<ul style="list-style-type: none"> <li>Enticed</li> <li>Carefree</li> <li>Energetic</li> <li>Gratified</li> <li>Content</li> <li>Disgusted</li> <li>Guilty</li> <li>Lethargic</li> <li>Disappointed</li> <li>Discontent</li> </ul>	<ul style="list-style-type: none"> <li>Burger</li> <li>French fries</li> <li>Fried chicken</li> <li>Pizza</li> <li>Nuggets</li> <li>Enticed</li> <li>Carefree</li> <li>Energetic</li> <li>Gratified</li> <li>Content</li> <li>Fish</li> <li>Steak</li> <li>Vegetables</li> <li>Dairy</li> <li>Fruit</li> <li>Disgusted</li> <li>Guilty</li> <li>Lethargic</li> <li>Disappointed</li> <li>Discontent</li> </ul>	<ul style="list-style-type: none"> <li>Burger</li> <li>French fries</li> <li>Fried chicken</li> <li>Pizza</li> <li>Nuggets</li> <li>Enticed</li> <li>Carefree</li> <li>Energetic</li> <li>Gratified</li> <li>Content</li> <li>Fish</li> <li>Steak</li> <li>Vegetables</li> <li>Dairy</li> <li>Fruit</li> <li>Disgusted</li> <li>Guilty</li> <li>Lethargic</li> <li>Disappointed</li> <li>Discontent</li> </ul>	<ul style="list-style-type: none"> <li>Burger</li> <li>Fries</li> <li>Fried chicken</li> <li>Pizza</li> <li>Nuggets</li> <li>Fish</li> <li>Steak</li> <li>Vegetables</li> <li>Dairy</li> <li>Fruit</li> </ul>	<ul style="list-style-type: none"> <li>Burger</li> <li>Fries</li> <li>Fried chicken</li> <li>Pizza</li> <li>Nuggets</li> <li>Disgusted</li> <li>Guilty</li> <li>Lethargic</li> <li>Disappointed</li> <li>Discontent</li> <li>Fish</li> <li>Steak</li> <li>Vegetables</li> <li>Dairy</li> <li>Fruit</li> <li>Enticed</li> <li>Carefree</li> <li>Energetic</li> <li>Gratified</li> <li>Content</li> </ul>	<ul style="list-style-type: none"> <li>Burger</li> <li>Fries</li> <li>Fried chicken</li> <li>Pizza</li> <li>Nuggets</li> <li>Disgusted</li> <li>Guilty</li> <li>Lethargic</li> <li>Disappointed</li> <li>Discontent</li> <li>Fish</li> <li>Steak</li> <li>Vegetables</li> <li>Dairy</li> <li>Fruit</li> <li>Enticed</li> <li>Carefree</li> <li>Energetic</li> <li>Gratified</li> <li>Content</li> </ul>

Figure 6.3. Schematic Illustration of IAT Format for Arousal Outcome Expectancies.

Block 6 was another practice block where the newly-learned reversed target discrimination trial was paired with the existing attribute discrimination. That is, all fast foods and negative adjectives were categorised to the right and all non-fast foods and positive adjectives were categorised to the left. Reaction times were captured for this block.

Block 7 was a further test which repeated block 6 with twice the number of trials. Reaction times were captured again at this final point. The premise of the IAT is that a person with a positive implicit attitude towards fast foods is likely to categorise more quickly and accurately when pairing the stimuli with categories congruent with their own associations.

The sequence of practice and test trials and the assignment of adjectives and images across each of the seven blocks are outlined in Table 6.3.

Table 6.3  
*Sequence of Trial Blocks for Both IATs*

Block	No.of trials	Function	Items assigned to left-key response	Items assigned to right-key response
1	20	Practice	Fast-food images	Non fast-food images
2	20	Practice	Positive attributes	Negative attributes
3	20	Practice	Fast food and positive attributes	Non fast food and negative attributes
4	40	Test	Fast food and positive attributes	Non fast food and negative attributes
5	20	Practice	Non fast-food images	Fast-food images
6	20	Practice	Non fast food and positive attributes	Fast food and negative attributes
7	40	Test	Non fast food and positive attributes	Fast food and negative attributes

Note: For half the subjects, the positions of Blocks 1, 3, and 4 are swapped with Blocks 5, 6, and 7 respectively. This strategy was used successfully by Greenwald et al. (2003) to reduce the typical effect of order in which the combined tasks are performed.

#### 6.6.2.5 Scoring the Implicit Associations Test

In an early publication about the IAT, Greenwald et al. (1998) recommended a conventional scoring algorithm which included capturing two trials (typically blocks 4 and 7), recoding any outlying scores to the boundary values (minimum of 300 milliseconds and a maximum of 3,000 milliseconds), transforming latencies prior to averaging them, including error-trial latencies in the analysed data, and

removing any data with average latencies or error rates that seem to be extreme for the sample. The IAT score was conventionally computed as the difference between the central tendency measures (which are the monitored tasks; blocks four and seven).

More recently, Greenwald et al. (2003) investigated alternative scoring methods, analysing large sets of data generated through demonstration IATs available for public use via the Yale IAT web site. After conducting six sets of analyses with a series of alternative methods for computing IAT scores, the authors found that an outcome they labelled '*D*' (which behaved in a similar manner to Cohen's *d*), was consistently more successful across five assessment criteria than the conventional IAT assessment method. The first of these criteria was the magnitude of the implicit-explicit correlation; Greenwald et al. (2003) argued that higher correlations can indicate greater construct validity as a measure of association strengths which is presumed to be a latent component of both the implicit and explicit measures. They explained this argument with the analogy that a more accurate measure of height (for example, measuring millimetres rather than centimetres) should yield higher correlations with weight. Drawing on this argument, it might be presumed that a more accurate measure of implicit attitudes would be correlated more highly with measures of explicit attitudes. Second, they found *D* was more resistant to contamination by differences in response speeds. Third, this measure was also more resistant to the experience effect created when participants have previously completed IAT testing. Fourth, they found the measure was less sensitive to known effects on IAT measures; the previous IATs used by Greenwald et al. were known to be sensitive to implicit stereotypes that are pervasive in American society. Given the results from the first study where it was indicated that people held a strong prototypic belief that fast foods are foods which are high in fat and unhealthy, it is possible that a similar sensitivity will need to be considered in the present study. Finally, a clearer latent implicit-explicit path in confirmatory factor analyses was found for the measure *D*.

Rather than simply computing the difference between the two monitored blocks, the *D* measure divides the difference between the test block means by the standard deviation of all the latencies across the two test blocks. The rationale for this is that the difference between the means is often correlated with the variability of the data from which the means are computed.

In summary, Greenwald et al. (2003) found that a number of procedures improved the value of their analyses. As well as using the *D* measure, they found benefits from the exclusion of participants where 10% or more of their responses were faster than 300 to 400 milliseconds, and from including the latency scores from the practice trials.

In terms of measuring response latencies online, Greenwald et al. (2003) acknowledged that absolute accuracy was limited by the web browser used by each participant, but argued that the effect was not 'debilitating because of the non-systematic nature of the resulting noise and the substantial reduction of its magnitude produced by averaging data over approximately 40 trials' (p. 199). Moreover, they found that the *D* scoring method reduced this effect, adding further weight to their argument surrounding the management of this problem. Other issues that Greenwald et al. pointed out in relation to online data collection are those of self-selection and multiple participations. Neither of these concerns are considered to be particularly significant for the current study as participants will be drawn from a representative population sample and will be required to enter an identification code for access to the tests.

Following the findings of Greenwald et al. (2003), the methods from this most recent and 'improved' scoring algorithm for the IAT were employed here. The algorithm allowed for a *D* score to be calculated, reflecting both the direction and the strength of the automatic associations captured. Following recommendations by Greenwald et al., the following steps were followed in calculating *D* scores. Data from all trials within blocks 3, 4, 6, and 7 were used (incorporating both practice and test blocks). Greenwald et al. recommended that participants be excluded on the basis that their recorded latencies are greater than 10,000

milliseconds, or when more than 10% of their trials record latencies of less than 300 milliseconds. There was no need to exclude participants from this study on either basis. Means were calculated for the correct latencies within each block, then one pooled standard deviation was calculated for all trials within blocks 3 and 6, and another for blocks 4 and 7. Each error latency was then replaced with a mean (for the correct latencies within the block) plus an additional 600 milliseconds. The values for each of the four blocks were then averaged and the differences between blocks 6 and 3 (B6 minus B3) as well as the differences between blocks 7 and 4 (B7 minus B4) were calculated. Each difference was then divided by its associated pooled standard deviation. A final *D* score was calculated by averaging the two resulting quotients with positive *D* scores representing positive associations with fast food and negative *D* scores representing negative associations.

### 6.6.3 Self-Report Measures

After completing both IAT tasks, participants completed an online questionnaire including TPB questions, demographics, and items to measure explicit attitudes towards the target categories in each of the IATs. Each set of items is detailed below.

#### 6.6.3.1 Theory of Planned Behaviour

##### *Behaviour - Fast-Food Consumption*

Behaviour was measured by a single item asking participants to click in the most appropriate box to indicate (on average) how often they ate fast food. Options were never, occasionally, once per month, once per week, 2-3 times per week, 4-6 times per week, once a day, and more than once a day.

##### *Intention to Consume Fast food*

Intention was assessed using two items. The first, 'Given my lifestyle and/or taste preferences, it is likely that I will eat fast food regularly over the next 4 weeks', was measured on a scale from 1 (strongly disagree) to 7 (strongly agree). The second, 'I am likely to eat fast food regularly over the next month', was



measured on a scale from 1 (definitely false) to 7 (definitely true). Cronbach's  $\alpha$  for the scale was .90.

#### *Explicit Attitudes towards Fast Food*

Explicit attitudes were assessed using two semantic differential scales (valence and arousal).

##### Valence-Related

In order to measure explicit valence-related attitudes, participants were presented with the sentence 'To me, eating fast food frequently is...' followed by five pairs of adjectives rated on a 100-point scale; harmful - beneficial, quick - time consuming, convenient - inconvenient, unpleasant - pleasant, and affordable - unaffordable. The mean of the five scores was taken as a composite score. Cronbach's  $\alpha$  for the scale was .74.

##### Arousal-Related

In order to measure explicit arousal-related attitudes, participants were presented with the sentence 'When I eat fast food, I feel...' followed by five pairs of adjectives rated on a 100-point scale; enticed - disgusted, guilty - carefree, lethargic - energetic, disappointed - gratified, well - unwell, content - discontent. The mean of the five scores was taken as a composite score. Cronbach's  $\alpha$  for the scale was .87.

#### *Subjective Norms*

Normative beliefs were measured with four items, two of which were injunctive and two of which were descriptive. Each item was presented on a 7-point scale from 1 (definitely false) to 7 (definitely true). Cronbach's  $\alpha$  for the overall scale was .78.

### Injunctive

Injunctive items (what the person *thinks*) were; 'Most people who are important to me think that I should eat fast food regularly' and 'Those close to me expect me to eat fast food regularly'.

### Descriptive

Descriptive norms (what the person *does*) were; 'The people in my life whose opinions I value eat fast food regularly' and 'Those who are close to me eat fast food regularly'.

### *Perceived Behavioural Control*

Perceived behavioural control was measured in terms of self-efficacy and perceptions of control. Cronbach's  $\alpha$  for the overall scale was .72.

### Self-efficacy

In order to capture self-efficacy, two items, both on a 7-point scale between 1 (definitely false) and 7 (definitely true) were asked. They were; 'If I wanted to, I could avoid eating fast food regularly over the next month' and 'It would be impossible for me not to eat fast food regularly over the next month'.

### Control

In order to capture perceptions of control, two items, both on a 7-point scale between 1 (definitely false) and 7 (definitely true) were asked. They were; 'I have complete control over the number of times I will eat fast food over the next month' and 'How often I will eat fast food over the next month is mostly up to me'.

#### 6.6.3.2 Demographics

Participants were asked to respond to demographic questions relating to their age, sex, education level, height (to the nearest cm), and weight (to the nearest kg). These last two measurements were then used to calculate Body Mass Index where BMI equals weight divided by height squared. A random sample of 40 of

the BMI calculations were compared to clinical measures of BMI for the same people as calculated for the NWAHS. No significant differences were found between the measurements.

#### **6.6.4 Final Items**

Finally, participants were invited to pass any comments they wished and they were thanked for taking part in the research.

## **Results**

### **6.7 Data Preparation and Preliminary Analyses**

All data analyses were performed using SPSS version 14.0 with an alpha level of .05 except where explicitly stated.

#### **6.7.1 Implicit Associations Test Variables**

As described in section 6.6.2.5, the recommendations of Greenwald et al. (2003) were followed and methods from the most recent scoring algorithm for the IAT were employed. This process was completed for both IAT tasks and final variables were named *arousal IAT* and *valence IAT*.

#### **6.7.2 Theory of Planned Behaviour Variables**

Scores were recoded and variables were created to reflect the following measures from the TPB; attitude - three variables in total, named *attitude (cognitive)*, *attitude (affective)*, and the sum of these two, *explicit attitude*, subjective norms (SN) - three variables in total named *injunctive norms*, *descriptive norms*, and the sum of these two *subjective norm*, perceived behavioural control (PBC) - three variables in total named *control*, *self efficacy* and the sum of these two, *perceived behavioural control*, *intention*, and *behaviour*.

A number of participants from Study 2 also took part in the current study. All of those participants gave permission for their fast-food diary data to be used in

combination with their IAT data. A variable labelled *diary* was created for this sub-group.

### 6.7.3 Other Variables

A variable reflecting Body Mass Index (BMI) was calculated using the height (to the nearest cm), and weight (to the nearest kg) variables where BMI equals weight divided by height squared.

A comparison between original means and trimmed means revealed no substantial influence from outlying values. As recommended by Tabachnick and Fidell (2001), histograms with normal probability plots were used to check distributions and assumptions of analyses. Four of the fourteen variables were skewed, however transformations failed to improve the distribution so were not applied. Examination of the Kolmogorov-Smirnov tests of normality indicated no abnormal distributions.

A search for univariate outliers was conducted through examination of z-scores. Two cases; (id 10) with a high z-score on the valence IAT (6.32), and (id 79) with high z-scores on perceived behavioural control and behaviour (5.29 and 8.2 respectively) were deleted.

An examination for multivariate outliers was also conducted with all dependent variables (intention, behaviour, BMI, age) entered into a regression in which Mahalanobis distance was calculated. Using a criterion of  $p < .001$ , a maximum value of 26.99 was obtained which exceeded the critical value of 20.52 for five variables. One case (id 117) exceeded the criterion with a distance of 26.99. These scores reflected a high BMI score of 51. As this score was related to a physical measurement, the case was retained in the data unaltered.

## 6.8 Descriptive Statistics

### 6.8.1 Sample Outcomes for All Variables

Means and standard deviations for each of the variables are presented in Table 6.4. Separate means are shown for the sub-group who also completed a fast-

food diary. Mean scores indicated a tendency to avoid fast food with low intention scores and consumption rates averaging once a fortnight. Cognitive and affective attitudes tended to be slightly positive, although the cognitive attitudes were slightly less so than the affective attitudes. Scores on subjective norm were quite low indicating that participants perceived that few people important to them would expect them to eat fast food frequently. Scores for perceived behavioural control were high indicating strong perceptions of ability to avoid fast food. All of these TPB results are consistent with findings in the second study, providing some support for the reliability of the earlier result. The measure of BMI showed the mean index of the participant group to be within the overweight category. The mean scores for both the valence and arousal IAT tests show that both sets of implicit associations with fast food tended to be negative.

Table 6.4

*Mean Scores and Standard Deviations for Entire Participant Groups and Diary Sub-Group*

Variable	Range	N	Entire group Mean (SD)	Sub-group Mean SD
Intention	1 - 7	125	2.11 (1.68)	1.74 (1.29)
Behaviour	1 - 8	125	3.03 (1.23)	0.80 (1.29)
Attitude				
• Affective attitude	1 - 100	125	38.26 (18.13)	36.50 (15.68)
• Cognitive attitude	1 - 100	125	42.64 (16.08)	40.79 (16.87)
• Explicit attitude*	1 - 100	125	40.45 (14.61)	38.65 (12.72)
Subjective Norm	1 - 7	125	1.97 (1.09)	1.76 (1.01)
Perceived Behavioural Control	1 - 7	125	6.41 (0.89)	6.55 (0.83)
Body Mass Index (BMI)	17 - 51	123	26.89 (5.55)	28.68 (6.43)
Valence IAT ( <i>D</i> )	-1.31 - .73	125	-.47 (.41)	-.45 (.36)
Arousal IAT ( <i>D</i> )	-1.68 - .66	125	-.64 (.44)	-.63 (.43)

\* Sum of affective and cognitive scores

## 6.8.2 Relationships Between all Dependent and Independent Variables

The relationships between all dependent and independent variables were initially assessed using Pearson Correlations. The results for the entire sample are reported in Table 6.5 and Table 6.6 for the diary sub-group.

Table 6.5

*Bivariate Correlations of Predictor and Criterion Variables for Entire Sample*

	Behaviour	Age	Sex	Education	BMI	Cognitive att.	Affective att.	Explicit att	SN	PBC	Intention	Arousal IAT
Age	-.376***											
Sex	-.122	-.192*										
Education	.092	-.253**	.184*									
BMI	.310**	-.026	-.100	-.085								
Cognitive att.	.437***	-.174	-.117	.062	.144							
Affective att.	.223*	.109	-.330***	-.022	.009	.457***						
Explicit att.	.378***	-.028	-.270**	.021	.085	.834***	.872***					
SN	.290**	-.206	-.048	-.098	.107	.245**	.045	.163				
PBC	-.439***	.144	.131	.014	-.224**	-.315***	-.110	-.242**	-.301**			
Intention	.595***	-.245**	-.003	.096	.197*	.506***	.272**	.447***	.493***	-.484***		
Arousal IAT	.069	-.065	-.079	-.100	.123	.178*	.184*	.212*	.138	-.058	.121	
Valence IAT	.132	-.082	-.034	.125	-.020	.060	.149	.125	.103	-.126	.145	.381***

\*p<.05, \*\*p<.01, \*\*\*P<.001 (2-tailed)

BMI = Body Mass Index, att. = attitude, SN = Subjective Norm, PBC = Perceived Behavioural Control, IAT = Implicit Associations Test, Behaviour = fast-food consumption, Intention = intention to consume fast food

Table 6.6

*Bivariate Correlations of Predictor and Criterion Variables for Diary Sub-Group*

	Behaviour	Age	Sex	Education	BMI	Cognitive att.	Affective att.	Explicit att	SN	PBC	Intention	Arousal IAT
Age	-.092											
Sex	.122	-.141										
Education	-.106	-.453**	.132									
BMI	.210	-.080	-.111	-.052								
Cognitive att.	.341*	-.176	.091	.163	.079							
Affective att.	-.048	.040	-.170	.058	-.032	.220						
Explicit att.	.196	-.092	-.045	.144	.032	.799***	.763***					
SN	.397*	.023	-.060	-.182	.077	.015	-.368*	-.217				
PBC	-.096	-.108	.138	.021	-.318*	-.172	.020	-.102	-.038			
Intention	.599***	-.068	.066	.101	.087	.364*	.227	.318*	.228	-.373*		
Arousal IAT	-.416	-.099	-.048	.325*	.106	.023	.168	.118	-.035	.022	-.208	
Valence IAT	-.145	-.032	-.073	.261	-.105	-.193	-.129	-.208	.036	.365*	-.279	.167

\*p&lt;.05, \*\*p&lt;.01, \*\*\*P&lt;.001 (2-tailed)

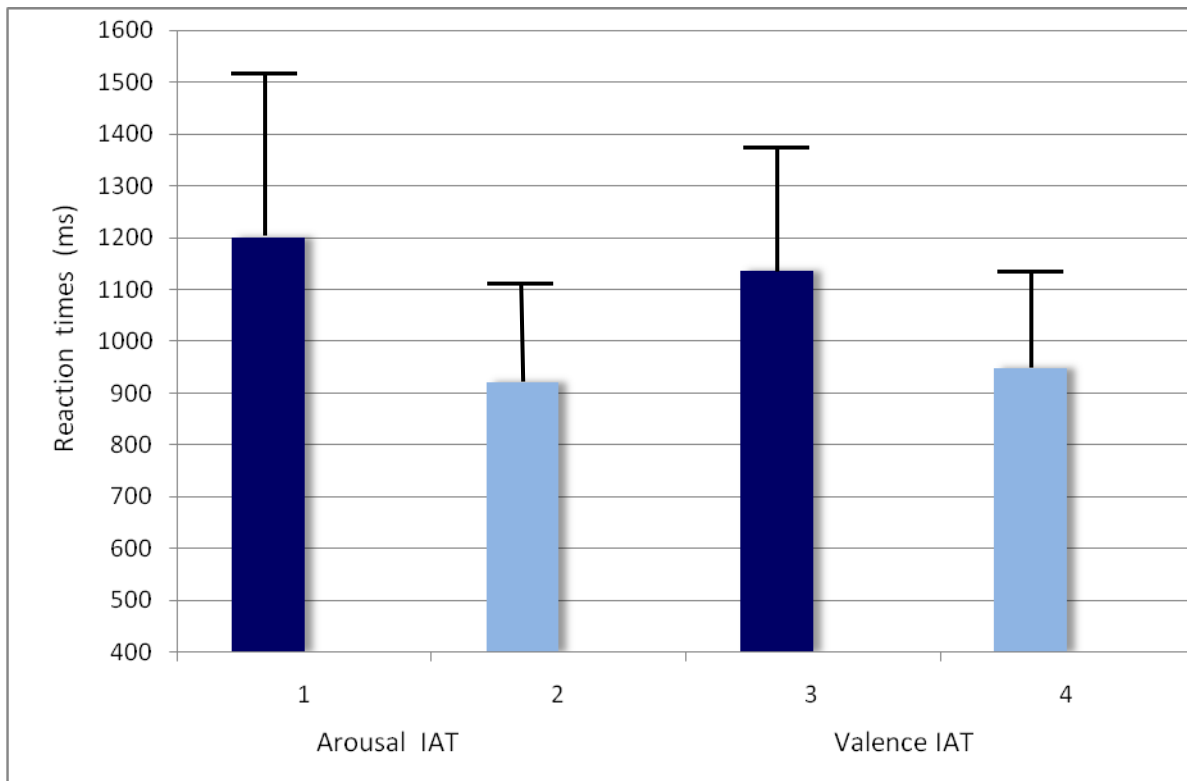
BMI = Body Mass Index, att. = attitude, SN = Subjective Norm, PBC = Perceived Behavioural Control, IAT = Implicit Associations Test, Behaviour = fast-food consumption, Intention = intention to consume fast food

Results reflected previous findings with other applications of the TPB. Specifically, they show expected correlations between the attitudinal, normative, and control items. Also as expected, intention and behaviour correlated strongly with each other and both of these also correlated moderately with most of the predictor variables in the matrix. Exceptions to this are the IAT items. Although the arousal IAT had weak correlations with the attitude measures, the valence IAT did not correlate at all. This is not surprising considering the IAT purports to measure associations rather than attitudes, and it can be assumed the explicit attitudes and implicit associations are different, although overlapping, constructs. These results provide further validation for the TPB model as a predictor of fast-food consumption and further support to the suggestion that fast-food consumption may be related to obesity.

### **6.9 Group Differences in Mean Scores from Implicit Association Test**

Preliminary analyses showed significant differences in reaction times across both IAT tasks. Figure 6.4 below shows the mean reaction times in milliseconds across both the arousal and the valence IATs with the dark columns representing the reaction times when fast food was paired with positive or good adjectives and the light columns representing reaction times when fast food was paired with negative or bad adjectives. There was a significant difference between reaction times for the arousal IAT ( $t=11.76$ ,  $p<.001$ ) with the positive pairings ( $M=1201.20$ ,  $SD=328.81$ ) taking longer than negative pairings ( $M=921.19$ ,  $SD=180.12$ ). Similarly, there was also a significant difference between reaction times for the valence IAT ( $t=11.92$ ,  $p<.001$ ) with the positive pairings ( $M=1136.47$ ,  $SD=255.28$ ) taking longer than negative pairings ( $M=948.36$ ,  $SD=198.57$ ) indicating that across both sets of stimuli, participants implicitly associated fast food with negative outcomes.





Fast food paired with 'Good' (1) and 'Positive' (3) adjectives; Fast food paired with 'Bad' (2) and 'Negative' (4) adjectives

Figure 6.4

*Mean Effects for Arousal and Valence IATs*

### 6.10 Differences in Arousal Implicit Associations Test Scores across Body Mass Index and Frequency of Fast-Food Consumption

Further analyses indicated some group differences in *D* scores within the arousal IAT that were not replicated within the valence IAT. Differences were found between groups distinguished by both BMI and frequency of consumption. Differences were not found for age or IAT condition, negating the need to control for either of these variables. Differences were not found on explicit measures.

A two-way between-groups analysis of variance was conducted to explore the impact of BMI and frequency of fast-food consumption on implicit associations as captured by the arousal IAT. Participants were divided into three groups according to their BMI; 1 - normal weight, 2 - overweight, 3 - obese and five groups according to consumption

frequency; 1 – never, 2 – occasionally, 3 – once a month, 4 – once a week, 5 – 2 or more times a week.

Although there was no statistically significant effect for frequency, [ $F(4, 109) = 0.74, p = .598$ ], there were statistically significant main effects for both BMI [ $F(2, 109) = 3.62, p = .030$ ] and for the interaction effect [ $F(6, 109) = 2.20, p = .049$ ]. Both of these effects had moderate to strong effect sizes (eta squared = .06 and .11 respectively).

Post-hoc comparisons using the Tukey test indicated that the mean score for the overweight group ( $M = -.48, SD = .40$ ) was significantly different from the normal weight group ( $M = -.75, SD = .42$ ). The obese group ( $M = -.64, SD = .44$ ) did not differ significantly from either of the other 2 groups.

Further analyses were conducted to examine this difference. The data-set was split according to frequency of consumption, as detailed above, and a one-way ANOVA was conducted to examine the *D* score differences between BMI groups. Significant differences were found within the groups who ate fast food occasionally and those who ate it 2-3 times a week.

#### *Occasional Fast-Food Consumers*

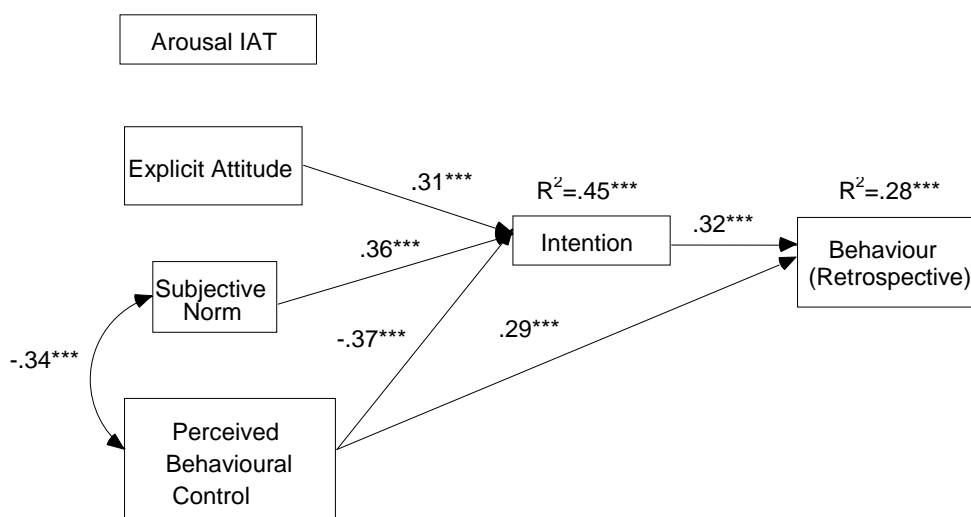
Within the occasional consumers, the overweight group held significantly more positive implicit associations [ $M = -.38, SD = .45; F(2,47) = 4.62, p = .015$ ] than did the normal weight group ( $M = -.79, SD = .41$ ). The obese group ( $M = -.47, SD = .59$ ) did not differ significantly from either group.

#### *Consumers of Fast Food 2-3 Times a Week*

Within the group eating fast food 2-3 times a week, the overweight group again held significantly more positive implicit associations [ $M = -.20, SD = .40; F(2,10) = 5.58, p = .024$ ] than did the normal weight group ( $M = -1.08, SD = .18$ ). The obese group ( $M = -.65, SD = .36$ ) did not differ significantly from either group.

## 6.11 Retrospective Fast-Food Consumption - Modelling the Relationship between Implicit Associations and Theory of Planned Behaviour Variables

Two SEM analyses using AMOS version 5 were conducted in order to examine the basic TPB model, extended to include implicit associations as captured by the two IAT tasks. As Perugini (2005) argued that implicit associations and explicit attitudes may interact to influence behaviour, interaction effects between the IAT and explicit measures of attitude were included. The contribution across both models was non-significant. The interaction variable was subsequently deleted from each model to reduce interference with the model fit. The first model (Figure 6.5) applied the TPB in combination with arousal associations to predict retrospectively measured fast-food consumption.



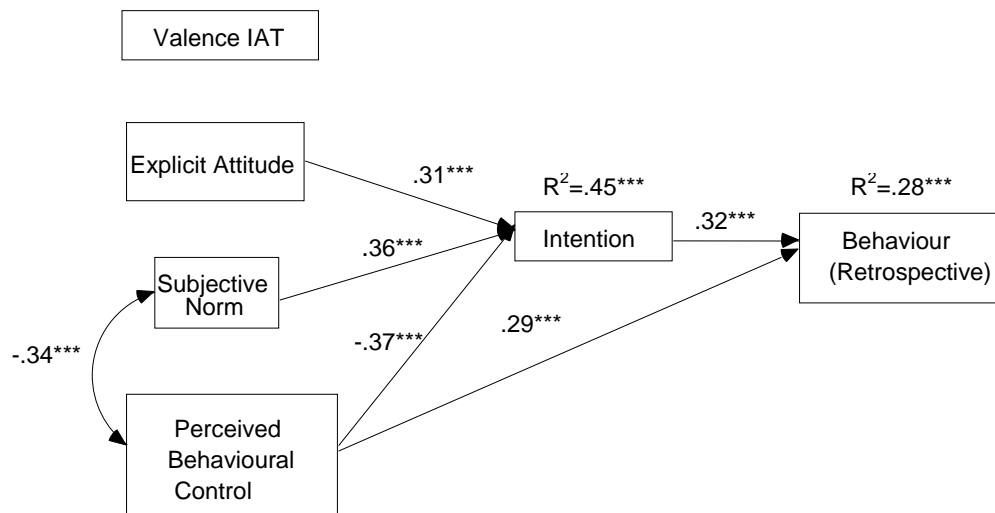
\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Figure 6.5.

*Path Analysis for the TPB with Arousal Associations.*

The analysis indicated that attitude, subjective norm and perceived behavioural control had significant direct effects on intention explaining 45% of the variance in the first model. Implicit arousal associations did not contribute to the explanation of intention. Intention, along with perceived behavioural control, is also shown to have a significant effect on behaviour explaining 28% of the variance. Contrary to expectations, implicit

arousal associations did not add significantly to the explanation of the variance in behaviour. The fit of the model was strong with the chi-square test non-significant,  $\chi^2(8) = 8.30, p = .405, GFI = .98, NFI = .95, RMSEA = .02$ .



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

Figure 6.6.

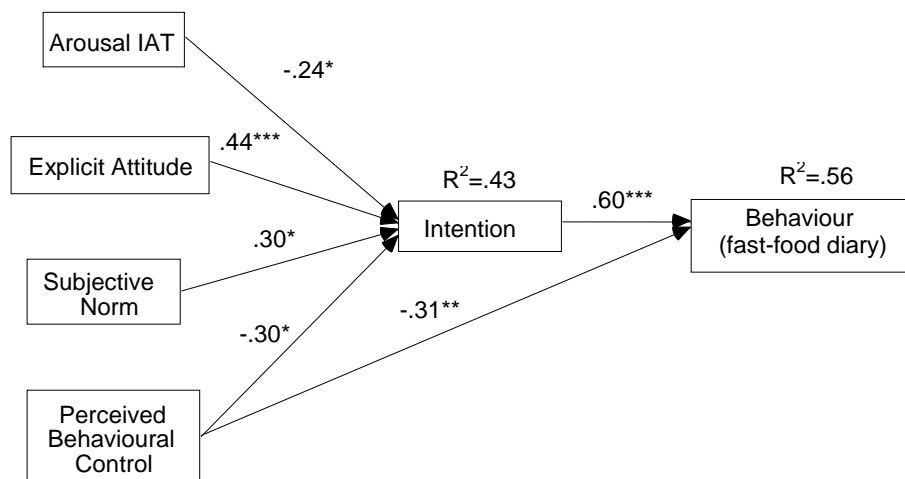
*Path Analysis for the TPB with Valence Associations.*

The second model (Figure 6.6) applied the TPB in combination with valence associations to predict retrospectively measured fast-food consumption. Implicit valence associations did not add significantly to the explanation of the variance in behaviour. The remainder of the model was unchanged from that in the first model. The fit of the model was strong with the chi-square test non-significant,  $\chi^2(9) = 9.94, p = .355, GFI = .97, NFI = .94, RMSEA = .03$ .

### 6.12 Fast-Food Consumption Measured by Fast-Food Diaries - Modelling the Relationship between Implicit Associations and Theory of Planned Behaviour Variables

The current study included 40 participants who had also taken part in the second study where a fast-food diary was kept over the period of seven days. All of these participants

gave permission for their diary data to be reused in the current study. The data from the present study were used throughout the model (attitudes, subjective norms, perceived behavioural control, and intention) but data from the second study (fast-food diary) was used in the measure of actual behaviour. A further two SEM analyses using AMOS version 5 were conducted in order to examine the predictive ability of implicit associations when behaviour was captured by the fast-food diaries. Again, a variable representing the interaction between the IAT and explicit measures of attitude was included, although the contribution made across both models was non-significant. The interaction variable was again deleted from each model to reduce interference with the model fit. The first model (Figure 6.7) applied the TPB in combination with arousal associations and the second model (Figure 6.8) combined the theory with valence associations.



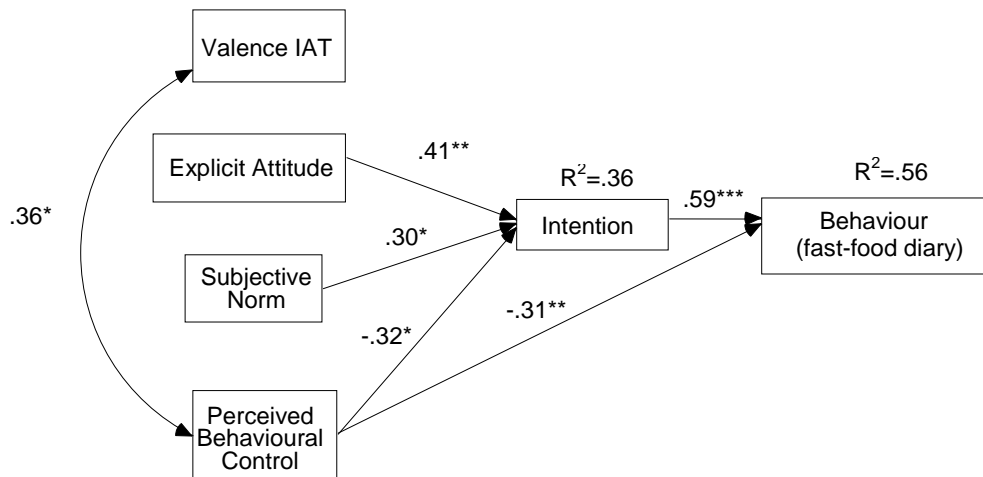
\*p<.05, \*\*p<.01, \*\*\*P<.001

Figure 6.7.

*Path Analysis Predicting Actual Behaviour with Arousal Associations.*

The analysis for the first model indicated that, the arousal IAT as well as explicit attitude, subjective norm, and perceived behavioural control had significant direct effects on intention explaining 43% of the variance. Intention, together with perceived behavioural control, was also shown to have a significant effect on behaviour explaining

56% of the variance. Contrary to expectations, implicit arousal associations did not add significantly to the explanation of the variance in behaviour. The fit of the model was strong with the chi-square test non-significant,  $\chi^2(9) = 6.52, p = .687$  GFI = .98, NFI = .89, RMSEA <.001.



\*p<.05, \*\*p<.01, \*\*\*P<.001

Figure 6.8.

*Path Analysis Predicting Actual Behaviour with Valence Associations.*

The analysis for the second model indicated that explicit attitude, subjective norm, and perceived behavioural control had significant direct effects on intention explaining 36% of the variance. Intention, along with perceived behavioural control, is also shown to have a significant effect on behaviour explaining 56% of the variance. Contrary to expectations, implicit valence associations did not add significantly to the explanation of the variance in behaviour, although valence was significantly related to perceived behavioural control suggesting that as people held more negative associations with fast food, the less control they perceived that they held over their consumption rates. The fit of the model was strong with the chi-square test non-significant,  $\chi^2(9) = 8.55, p = .480$ , GFI = .97, NFI = .87, RMSEA <.001.

## Discussion

### 6.13 Implicit Associations with Fast Food

The results showed that overall, participants made faster associations with fast food and negative adjectives than they did with positive adjectives. This tendency held whether the associations were valence or arousal-based. Explicit attitudes towards fast foods tended to be slightly positive and poor correlations between the implicit and explicit measures indicate that the constructs are distinct. This suggests that the IAT may be used in conjunction with the direct TPB measures, aiding in the understanding of the formation and composition of attitudes and beliefs. The findings also provide support for the argument that implicit and explicit associations are related to *different* attitudes rather than reflecting different points along a continuum of *one* attitude. This is consistent with the observations of Perugini (2005) who suggested that that dual attitudes may be additive, explaining different portions of the variance in behaviour. However, differences may also be attributable, to some extent, to the different measurement methods used to capture implicit versus explicit attitudes; a point to be considered before firm conclusions are drawn.

The negative implicit associations indicate that although people may not like the concept of fast food, this is certainly not the only factor influencing consumption behaviour. Maison, Greenwald, and Bruin (2001) reported that women who preferred the taste of high-calorie products, still had implicit preferences for low-calorie products; although they preferred the concept of low-calorie foods, the taste of higher-calorie products was also important. Similarly, Roefs and Jansen (2002) found that both obese and non-obese groups held negative implicit and explicit attitudes towards high-fat foods and suggested that although obese people may not like the concept of foods with a high-fat content, they probably still like the taste and choose to eat high-fat foods for this reason. In a very concrete example, Richetin et al. (2007) demonstrated across four individual studies that although participants held both implicit and explicit preferences for fruit over snacks (chocolate, biscuits, cake etc.), when they were offered the opportunity to choose a piece of fruit or a snack at the end of the experiment, just over 50% chose snacks. It is possible that this explanation may also be applied to the findings reported

here and go some way to explaining the lack of predictive ability of the IAT; factors such as the taste and convenience of fast food may override the generally negative associations with fast food.

Results from the initial qualitative part of this research indicated that there is a deeply held societal belief that fast foods are inherently 'bad' to the point that they have developed their own prototype, differentiating them from other convenience foods. Although time constraints are said to eradicate the influence of social biases in IAT responses, it has also been suggested that general societal attitudes can impact on IAT results (Fazio & Olsen, 2003). This point is debated with others arguing that latencies captured by the IAT reflect personal rather than cultural preferences (Lane et al., 2007). Nosek (2007, p. 68) stated that '...implicit evaluation reflects accumulated experience that may not be available to introspection...'. Such an interpretation opens the possibility that social learning may have an influence on personal attitudes and preferences. For example, in Australia, extensive media attention has focussed on the detrimental health effects related to poor food choices, particularly through popular, reality weight-loss television shows. Therefore, the negative implicit attitudes reflected in the results of this study may be as much a reflection of wider societal views as they are of individual associations with fast food.

The question of the stability of implicit associations also needs to be addressed. Rather than being static and rigid, they might, due to their automatic nature, be dynamic (Lane et al., 2007), fluctuating with cravings and hunger. Fazio and Olsen (2003) found that people who smoked cigarettes during their IAT session held more negative associations with smoking compared to participants who had abstained from smoking both during the testing session and during the previous night. Similarly, Seibt, Häfner, and Deutsch (2007) found food-deprived participants rated food more positively than did satiated participants. Richard, van der Pligt, and de Vries (1996) also argued that it is not only the affective response to a behaviour that is influential in the formation of an attitude, but also the affective response over time. As this research was conducted online, there was no control for people consuming food during the testing. Likewise, there was no control for the level of hunger that people experienced, nor the recency of fast-food



consumption. It is likely that most participants completed the testing at a time when there were no other pressing demands, such as preparing a meal, and that most were not particularly hungry when they completed the IAT tasks. It is likely, given indications from the second study that gratification and satisfaction are important predictors of fast-food consumption, that people would respond more positively to images of fast food if they were feeling hungry than if they had recently consumed a meal or snack. It would be interesting for future research to manipulate hunger to investigate its effect on the implicit associations held with fast foods.

When analysing IAT findings, it must also be remembered that the IAT is capable only of revealing relative differences in associations. That is, it is possible only to draw conclusions about the associations with fast foods in relation to the raw foods that were used in the opposing stimuli. Conner, Perugini, O'Gorman, Ayers, and Prestwich (2007) found that the nature of the contrast stimuli, whether these be neutral or related to the concept of interest, may influence the results to the extent that the *D* score may change direction. Although it is likely that different results would be found if images of fast food were contrasted with images of fully prepared and cooked meals, it seems most likely that people would indicate stronger preferences for an image such as a delicately grilled salmon fillet with a side salad that they would for a whole, raw fish as was used here. Therefore, it seems unlikely that the results would differ greatly, although this still remains an issue worthy of further investigation.

#### **6.14 Group Differences in Implicit Association Test Reaction Times**

Despite the lack of variance in the negative associations with fast food, there were some interesting group differences across *D* scores on the arousal. Although the predicted differences in IAT reaction times did not occur clearly across groups according to the frequency of fast-food consumption, there were differences indicating that overweight people who ate fast food either on an occasional basis or 2-3 times a week had significantly more positive arousal associations with fast food than normal weight people. These findings contrast with other studies examining differences between groups distinguished by weight and their associations with foods. In studies with young participants, researchers have found that obese children associate more positively

with *all* foods than normal weight who tend to associate more positively with lower-fat foods (Craeynest et al., 2006; Craeynest et al., 2005). Working with adults, Roefs and Jansen (2002) found that obese and non-obese participants held similar negative associations with high-fat foods. It is possible that the results reflect a u-shape pattern and that people who are overweight, as opposed to obese, are most susceptible to the temptation of fast food. The fact that the differences appeared in the arousal IAT rather than the valence IAT suggests that the finding has to do with reactions to the consumption of the food, rather than simply the concept of fast food. Although more research is needed to investigate this further, it may be that many overweight people are less aware of their overweight (Steenhuis et al., 2006) than are obese people, and are consequently less concerned with the composition of the foods that they are consuming and perhaps more concerned with the benefits of saving time and feeling satiated quickly. Alternatively, some explanation may be found in the Sensitivity to Reward research that was discussed in Chapter 4. Davis, Strachan, and Berkson (2004) found that overweight participants had greater Sensitivity to Reward than either normal weight or obese participants. Their explanation for this was drawn from theory regarding addiction which suggests that at a certain point, the need for the drug (or food) continues although the experience of the associated reward is less intense. That is, obese people still experience a form of addiction to foods high in fat or sugar, although the positive associations are somewhat reduced due to altered dopamine levels.

Either way, it is important for researchers examining differences according to weight status to differentiate between overweight and obese people as their variations in weights are likely to result in differing cognitive and emotional effects. As a final point, the results indicate that it is people who are overweight and consuming fast food anywhere from on an occasional basis through to 2-3 times a week who are most likely to benefit from targeted intervention strategies as participants in these groups demonstrated the most positive associations with fast food.

### **6.15 Predicting Fast-Food Consumption from Implicit Associations**

The path models showed that neither the valence nor the arousal IAT variables contributed significantly to the explanation of fast-food consumption. Others have also

found that measures from the IAT are not predictive of behaviour (Conner et al., 2007; Maison et al., 2004; Ostafin & Palfai, 2006). A possible explanation for this may be that implicit associations influence behaviour much more strongly in instances where the person behaves with little or no cognitive consideration, that is, where the behaviour is entirely impulsive or spontaneous, rather than in situations where the person has time for consideration. As such, food choice behaviours are quite possibly one of the most difficult behaviours to predict using implicit measures. Fast food, unlike cigarettes for example, is not something that can be stored and made readily available for consumption on a fleeting whim. Although the cognitive consideration required is admittedly minimal, people deciding on a fast-food meal must still make the effort to either order and wait for a delivery or travel to an outlet to purchase the meal; the behaviour can not be described as completely automatic. This may be why many researchers focus on group differences in IAT effects rather than modelling the influence of food-related associations on behaviour. Future research might find that people using drive-through access to purchase a fast-food snack behave more spontaneously than those who elect to order fast food as a meal after deciding that they do not have the time, energy, or perhaps ingredients, to cook. It would be interesting to look for differences in the implicit associations made between these two types of fast-food consumers. It is also possible that measures of the implicit associations held by these groups might differ in their ability to predict behaviour as fast-food purchases made at drive-through facilities are likely to be more spontaneous in nature.

One group of researchers who have attempted to explain behaviour from implicit associations is that of Wiers, van Woerden, Smulders, and de Jong (2002). Using an alcohol-diary, they were able to show that implicit associations with alcohol added significantly to the explanation of consumption, although the amount of explanation was smaller than that contributed by explicit attitudes. The current study employed a similar set of analyses, using the IAT and TPB variables in an attempt to predict 'actual' behaviour from fast-food diaries. Unlike Wiers et al., no significant contribution to the explanation of actual behaviour was found from the implicit measures. These differences in results may be a reflection of the differences in behaviour; alcohol consumption, for most, is not as regular as food consumption.

Although arousal IAT effects were shown to add to the prediction of intention, it is most likely that this result is simply an artefact of the combined data sets (fast-food diary data was drawn from the second, quantitative TPB study) because reaching an *intention* to consume fast food surely represents an even more considered and rational process than behaviour, which may be more far more spontaneous. It seems unlikely therefore, that implicit associations should predict something that is intentional and considered. A relationship between implicit associations and intention to consume fast food does not have the same theoretical, nor intuitive support that could be used to explain a relationship between implicit associations and behaviour.

This study also tested the hypothesis that, through path analyses, some support for double dissociation theory (Perugini, 2005) might be found with explicit attitudes predicting deliberative behaviour (self-reported retrospective measures) and implicit associations predicting spontaneous behaviour (fast-food diaries). Although there was no support for this with implicit measures failing to predict either behaviour, this might be attributed to the fast-food diaries not being a true measure of spontaneous behaviour per se.

A final explanation for the inability of these data to explain behaviour may rest within the nature of the participant group. They were drawn from an existing study group where participants had volunteered to take part in a much broader health-study. Therefore, it is likely that this group may have been more health-conscious than the general population and would have had the opportunity to benefit from personal health-related information and recommendations provided by professionals as part of their participation in the larger NWAHS group. It is quite likely that this kind of education and awareness served to ensure that participants had become quite deliberate in their food choices, more so than the less-informed, regular consumer of fast foods where the behaviour may be much more habitual and spontaneous. Conner et al. (2007), for example, found that the extent to which the behaviour could be considered habitual was significantly associated with the strength of the relationship between implicit attitude and behaviour. Therefore, future research might examine the extent to

which fast-food consumption is habitual and how this influences the predictive ability of implicit associations.

In summary, results from this study indicate that the IAT has some capacity to distinguish differences in the nature of implicit associations held by consumers of fast food. Although the implicit associations captured with the IAT did not add significantly to the explanation of fast-food consumption beyond the TPB variables, they did reveal some interesting and valuable group differences in associations with fast food which may be useful in targeting population intervention or prevention strategies.

In their extensive assessment of the IAT, Cunningham et al.(2004) concluded that there is significant evidence that the IAT converges with other measures of implicit and explicit attitudes and that it co-varies appropriately with other variables. What is needed now, according to Cunningham et al., is research that explores the performance of the IAT and identifies when and why certain patterns of correlation occur. In addition to expanding the current knowledge about the implicit associations that people hold with fast food and the apparent lack of influence this has on their consumption rates, this study has also added to the body of knowledge regarding the performance of the IAT when it is applied to fast food; a quite specific area that has received little attention in the published literature to date.

## Chapter Seven

### Conclusion

#### 7.1 The Relationship between Obesity and Fast Food

Other than victims of famine, wealthy Brazilian women living in cities are the only group of people in the world known to have got thinner in the last two decades (Bauer, 2003). Overweight and obesity have reached epidemic proportions in many developed societies, including Australia, where almost 60% of men and women are either overweight or obese (Cameron et al., 2003). The problem is not restricted to adults with the proportion of overweight and obese children also escalating significantly (Braun, 2002; Magarey et al., 2001; Sanigorski et al., 2007).

High levels of overweight and obesity have been cited as one of the leading causes of morbidity and mortality in developed societies (Unger et al., 2004) and both the medical and economic costs of an overweight population are great (Pereira et al., 2005).

Imbalance between the amount of energy consumed and the amount of energy expended is often cited as a major cause of overweight (Bowman, Gortmaker, Ebbeling, Pereira, & Ludwig, 2004; Gillis & Bar-Or, 2003; Henderson & Kelly, 2005; Swinburn, 2003; Woods, 2005). Many researchers have suggested that an important factor in poor dietary habits and associated weight gain is that of fast-food consumption (Duffey et al., 2007; Nelson et al., 2006; Nielsen & Popkin, 2003; Pereira et al., 2005; Rodriguez & Moreno, 2006). Rates of fast-food consumption and fat-intake have been found to be increasing steadily in the United States (Binkley et al., 2000; Ebbeling et al., 2004; French et al., 2000; Nielsen et al., 2002), a trend that has also been noted in Australia (T. Cook et al., 2001).

Modern lifestyles and obesogenic environments have been linked with overweight, and both have been shown to be associated with increases in fast-food consumption. It has been suggested that Australians living in lower socio-economic areas suffer higher rates of overweight (Salmon et al., 2005), and the same populations also have greater access to

fast food (Reidpath et al., 2002). In addition to economic and environmental factors, social change might also be linked to dietary changes. More Australian women are working and people are also spending more time at work (Australian Bureau of Statistics, 2006), reducing the amount of time available for meal planning and preparation, and increasing demand for meal options that are convenient and fast.

As diet, and fast-food consumption in particular, has been highlighted as a possible contributor to increasing overweight and obesity, it is important that the psychological functions associated with eating habits are understood. The Theory of Planned Behaviour (Ajzen, 1988) is widely employed in the study of health-related attitudes, intentions, and behaviours and this thesis applied the theory over two stages. Whereas applications of the theory commonly focus on health-promoting behaviours, the present study applied it to examine a behaviour related to health risks; the factors underlying fast-food consumption.

## **7.2 Framework of the Theory of Planned Behaviour**

The TPB is a cognitive theory, assuming behaviour is based on rational, considered decisions. It also draws on expectancy-value theory, suggesting that behaviour is directed towards maximising positive outcomes (Ajzen, 2002). The model implies that behaviour is directly influenced by intentions, which are, in turn, influenced by three sets of considerations; attitude towards the behaviour, subjective norms, and perceived behavioural control. Attitudes are said to be influenced by beliefs about the likely outcomes of the behaviour as well as the evaluations of these outcomes. Subjective norms are based on the beliefs that an individual holds about the expectations of others who are of importance to them. These norms are also influenced by the individual's motivation to comply with the perceived expectations of others. Finally, perceptions of behavioural control are influenced by beliefs about factors which may either impede or facilitate the behaviour (resources, opportunities etc.) and the strength of each belief. The model also allows for external factors (actual behavioural control) that may influence the behaviour, yet be beyond the volitional control of the individual.

### **7.3 Framework of the Implicit Associations Test**

Generally, the literature has differentiated between attitudes as being either explicit or implicit. Specifically, implicit attitudes are those that influence the individual's behaviour in a spontaneous, automatic, affective manner without conscious cognitive processing (De Houwer, 2002; Greenwald et al., 1998) with explicit attitudes being much more considered and rational.

Typically, explicit attitudes are captured by direct questioning and, as shown by the considerable success of the TPB, can be quite predictive of intention to engage in particular behaviours. However, in many situations behaviour is influenced in a much less considered and more automatic way by underlying, or implicit attitudes (Craeynest et al., 2006) and the Implicit Association Test (IAT) (Greenwald et al., 1998; Greenwald et al., 2003) is purported to be one of the most reliable measures for examining implicit associations (Perugini, 2005). Using computer-administered sorting tasks, the IAT is said to provide some insight into implicit attitudes by measuring differences in response latencies when individuals are asked to categorise concepts by evaluative labels.

### **7.4 Overview of the Studies**

In his recommendations to researchers planning to employ the TPB, Aizen (2002) suggested that qualitative, preparatory research should be conducted with the aim of uncovering the behavioural, normative, and control beliefs. The modal beliefs should then be applied as the foundation for items used in the final qualitative measure. This process formed the basis of the first study in this thesis, which examined specific outcome beliefs and attitudes towards fast-food consumption, as well as beliefs regarding social norms and perceptions of control, intentions to eat fast food, and consumption behaviour. In addition, the qualitative data allowed a definition of fast food to be developed, based on Australian perceptions. Participants' descriptions of how and why they use fast food also provided insight into additional factors that might influence fast-food consumption that may not be captured by the TPB framework.

The second, quantitative study, applied the TPB-based instrument developed from the findings of the first study. The measure also contained four additional measures which



were included in the hope they might add to the amount of variance explained in both intention to consume fast food as well as fast-food consumption. Results from this study indicated that the TPB could be successfully applied to fast-food consumption, although findings also indicated that the TPB measure of affective attitudes (as measured using a semantic differential scale), might not be performing effectively. This finding generated the rationale for the third study which applied the Implicit Associations Test (Greenwald et al., 1998; Greenwald et al., 2003).

The IAT is said to provide insight into automatic, affective associations which are assumed to be related to behaviour (De Houwer, 2002; Greenwald et al., 1998; Perugini & Banse, 2007; Waters et al., 2007), with some researchers drawing parallels between the associations and implicit attitudes (Brunel et al., 2004; Hofmann, Rauch, & Gawronski, 2007; Schwartz, Vartanian, Nosek, & Brownell, 2006). It was hoped that understanding such associations might improve understanding about fast-food consumption. In order to examine this, measures of the implicit associations were applied in conjunction with the TPB model in an attempt to improve the prediction of fast-food consumption.

## **7.5 Key Findings from the Application of the Theory of Planned Behaviour and Implicit Associations Test to Fast-Food Consumption**

Despite indications from previous research that the TPB does not perform as effectively or reliably when applied to dietary behaviour as it does with many other behaviours, the current research has shown that a good proportion of the variance in intention to consume fast food, as well as fast-food consumption, can be explained using this approach. In this study, up to 50% of the variance in intention and behaviour was explained. It is likely that the application of the TPB to the specific behaviour of fast-food consumption, rather than a goal such as 'eating healthily', has aided in the predictive ability of the model. It is also likely that the preparatory research that was conducted impacted on the overall success of the model as it ensured that items used in the questionnaire reflected beliefs about fast-food consumption that were valid for the sample.

Participants in the qualitative study clearly indicated that they believed fast food to be that which is purchased from major franchises and is unhealthy. These core attributes

differentiated fast food from all other types of convenience food. Specifically, participants defined fast food as burgers, hot chips/French fries, fried chicken, and certain pizzas. Participants in the later two studies concurred, also reporting that they believed fast foods to be unhealthy. Despite these beliefs, consumption rates across all three studies tended to be quite high with participants eating fast food once a week on average. Self-serving biases, such as a tendency to underestimate personal health-risks, and positive affective responses to fast food seemed to be factors likely to override health concerns related to fast-food consumption. Results also indicated that participants tended to underestimate the amount of fast food that they consumed.

During the second stage of the research, a quantitative measure based on the Theory of Planned Behaviour was applied and results indicated that taste, satisfaction, convenience, cognitive attitude, normative influence from family and friends, facilitating factors, Consideration of Future Consequences, and self-identification as a healthy-eater were all significant predictors of intention to consume fast food. Concern for personal health, the influence of health experts, and measures of affective attitude were notably non-significant in their prediction of intention to consume fast food. Given that results from the qualitative stage indicated that affective attitudes played a large part in participants' decisions to consume fast food, the third study sought an alternative measure from the semantic differential scale that is recommended for use with the TPB.

The third stage encompassed an application of the Implicit Associations Test (Greenwald et al., 1998; Greenwald et al., 2003) in an attempt to capture more automatic, affective associations with fast food. Differences in response latencies suggested that generally, participants implicitly associated fast food with negative outcomes. The IAT associations did not help to explain fast-food consumption, but did indicate that people who fell into the category of overweight held more positive associations with fast food.

## **7.6 Possible Applications, Limitations, and Methodological Considerations**

### **7.6.1 General**

The TPB models generated by this research suggested that participants associated feelings of guilt, fear of weight gain, unhappiness about the poor nutritional value of

fast food, and concerns about both the environment and the demise of traditional family meal-times with the term 'fast food'. Despite this, participants continued to consume fast food because they like the taste, the convenience, and the associated feelings of satiation. Although there were many concerns associated with fast-food consumption, across the three studies, explicit attitudes towards fast food tended to be slightly positive. If consumption rates are to be reduced, these attitudes may need to be altered through campaigns targeted at perceptions of convenience and satisfaction. This could involve offering healthier alternatives that are also convenient and satisfying.

Interventions might also highlight the social and environmental benefits that may be associated with the alternative foods; for example, healthy foods could be marketed as 'family meals' or with prominent, environmentally-friendly packaging.

Increasing perceptions of self-efficacy, or ability to avoid fast food, could also be effective as this was related to lower consumption rates. This is something that might work most effectively at an individual level. Rather than focussing primarily on weight loss, health professionals might be better placed increasing self-efficacy through exploration of strategies with clients for avoiding or changing situations where a fast-food meal might seem like the most convenient and satisfying option, particularly when the individual is in a situation where they are likely to be influenced by friends or family.

A further point worthy of note is that the participants had a tendency to underestimate the amount of fast food that they were consuming. This point is a matter of concern, particularly in light of findings that many have a tendency to overestimate the amount of fruit and vegetables that they consume (Bogers et al., 2004) or to rate their own personal dietary-related health risks as below average (Hahn & Renner, 1998).

Combined, these errors in estimations indicate that people have a tendency to be biased in their recollections about the various types of food that they consume. For those wanting to lose weight or monitor the amounts of food that they consume from various food-groups, accurate and consistent completion of food journals might be useful.

Results from the qualitative stage of the research also indicated that people may be susceptible to optimistic biases, believing that their own fast-food-related health-risks

are much lower than those of their peers. Furthermore, the extent to which participants considered the future consequences of their behaviour was shown to be negatively related to intentions to consume fast food. If people are to be encouraged to consistently select healthy foods, self-serving biases need to be addressed and people should be encouraged to analyse the longer-term health-risks of frequent fast-food consumption in a more realistic and accurate manner. The efficacy of health messages might also be improved with a focus on some of the longer-term health consequences of poor dietary habits, such as those that have been used successfully in Australian anti-smoking campaigns.

Findings from the quantitative study indicated that frequency of fast-food consumption was positively related to BMI. During examination of the IAT data, group differences based on weight also appeared in the arousal-related associations although similar differences were not mirrored in the valence-related associations. People who were overweight and consumed fast food frequently held more positive arousal associations with fast food than those who were normal weight or obese. Aside from indicating that people who are overweight might be most susceptible to developing and maintaining poor dietary habits and struggling with the consequential weight-related issues, these findings also highlight the importance of the physiological and affective responses to fast food. The results serve to confirm that both taste and feelings of satiation are important drivers of fast-food consumption.

Overall, the TPB model, combined with the IAT findings, explained a moderate amount of the variance in fast-food consumption when compared with other studies predicting dietary choices. However, what is apparent is that there remains a large proportion of the variance unexplained. In particular, the semantic differential measures of attitude performed poorly and attempts to improve the performance through inclusion of implicit associations were not successful.

### 7.6.2 Attitudes

The literature applying the TPB to explain food choices has shown that, typically, attitude is the strongest predictor of intention with perceived behavioural control also tending to perform well. However, measures of attitude generally performed quite

poorly throughout this research. In particular, attempts to capture affective reactions to fast food through a semantic differential scale were ineffective.

Application of the IAT allowed for the measurement of implicit associations with fast food and it was evident that these associations differed from both explicit cognitive and affective attitudes due to differences in direction; implicit associations were negative while all other attitudes were marginally positive. Therefore, it is clear that, in terms of fast-food consumption, implicit associations should be differentiated from affective attitudes. Some researchers have assumed implicit associations captured with the IAT to be the same as affective attitudes, an assumption that could not be made here.

Although the measures used here did manage to capture associations that could be differentiated from other attitudes, inclusion of the associations in overall predictive models was not helpful in explaining fast-food consumption. The overall findings imply that the combination of cognitive, affective, explicit, and implicit attitudes towards fast food are complex and only partially captured in this research.

It could be argued that the semantic differential scales captured the cognitive aspects of attitudes and that the IAT captured the automatic associations with fast food, but that neither of these factors are strong drivers of fast-food behaviour. That is, the results indicate that fast-food consumption is a behaviour that tends to be quite spontaneous (therefore drawing little cognitive consideration), yet is not driven by the implicit associations captured either. Drawing on the qualitative data, factors that participants most often reported influencing their choice of fast-food meals were convenience and taste or gratification. Taste, as a driver of food choice, is a factor that appears to be quite affective and hedonistic in nature. Convenience could be argued to be cognitive in nature, although it might also hold affective qualities as well as it is related to reduced physical and cognitive loads. It is possible that the affective responses associated with both convenience and taste are significant drivers of fast-food consumption, and that a measure successfully capturing these might perform more strongly. Although an attempt was made to capture these responses both through the affective semantic differential measure and the IAT, it is likely that responses reflecting convenience and taste (in particular) would be considered socially and morally undesirable due to their hedonistic nature. Although the time-constraints involved with the IAT tasks are said to

overcome such biases, it is possible that biases about hedonistic food-choices are sufficiently ingrained as to have reached an implicit level as well as being explicit, as suggested by Fazio and Olsen (2003). Therefore, it appears that what is needed to successfully predict fast-food consumption is a measure capable of capturing non-biased affective responses. A tall order perhaps, although an instrument measuring physiological arousal might provide some insight into responses that are deliberately manipulated to reflect well on the individual. Although affective responses were not captured effectively by either semantic differential or IAT, it should be pointed out that participants in the qualitative stage of the research were able to articulate their affective reactions without difficulty suggesting that this might be an appropriate approach to pursue. Alternatively, if quantitative measures are needed, researchers might consider including a social desirability scale in their research. This has been done occasionally with the TPB. For example, Beck and Ajzen (1991) found that a measure of social desirability explained 5% of participant intentions to engage in dishonest behaviour. Although fast-food consumption is less likely to be vulnerable to self-presentation biases than cheating or stealing, it is certainly socially less desirable than some other dietary behaviours such as fruit and vegetable consumption.

Some of the complexity in capturing the attitudes associated with fast-food consumption may also be a reflection of the nature of the behaviour. During the qualitative stage of the research, most participants indicated that fast food was something that they would use as a meal on occasions when they were too busy or tired to prepare a meal. Such reports suggest that fast food is something that tends to be used spontaneously. As the IAT is said to capture associations where there is little cognitive consideration, theoretically, it should capture associations where the behaviour is unplanned. However, it is also possible that the spontaneous nature of fast-food consumption varies with situations. That is, some decisions to consume fast food might be entirely impulsive, such as a snack picked-up at the drive-through, while others might be much more considered, such as a regular meal that is routinely purchased on grocery shopping nights. It is likely that attitudes vary across such behaviours and perhaps the poor performance of attitudinal measures here was related to such differences. Future research examining fast-food consumption might consider the matter of spontaneity of

the behaviour in the hope that differentiating between various levels might improve the performance of attitudinal predictors.

Furthermore, future measures of attitude towards fast food might also extend to include items reflecting levels of self-identification with a relevant referent group. Both Cook et al. (2002) and Sparks and Shepherd (1992) hypothesised that self-identification moderates the relationship between attitude and intention. This was confirmed in the current study with results indicating that the more participants identified themselves with 'healthy-eaters', the less predictive their attitude towards fast food was of their intention to consume it, suggesting that self-identification is not a construct that can be separated entirely from attitudes.

A form of ambivalence might also have been influential in reducing the efficacy of the attitudinal measures. Although the means (and modes) of each of the attitudinal measures were close to the midpoint of the scales, there was indication in the qualitative data that people experienced a good deal of ambivalence, particularly in their affective responses to fast food. That is, most reported liking the taste and convenience, but many also reported feeling ill, guilty, and regretful after consuming a meal. This indicates that anticipatory affective attitudes might differ from attitudes immediately following consumption of a meal. Future research might investigate these apparent variations in affective responses, or control for the amount of time lapsed since the individual has last eaten a fast-food meal.

### 7.6.3 Subjective Norms

Many researchers have found that measures of subjective norm have not been particularly predictive of behaviour (Bogers et al., 2004; Conner, Norman et al., 2002; Mahon et al., 2006; Nejad et al., 2004). Others have argued that subjective norms may be more predictive if they are operationalised differently, suggesting that examination of the influence of individual referent groups might provide more useful information than an aggregation of all referent groups into a single measure. Several studies have taken this approach with some success, finding that peer norms are most influential over adolescent eating (Baker et al., 2003), and that parent, sibling, and teacher norms were all predictive of healthy food choices made by adolescents (Backman et al., 2002). The

findings here support this approach as the results indicated that family and friends were much more significant in their influence over fast-food consumption than health professionals. Research with adolescents has suggested that behaviour that is modelled (descriptive) tends to be more influential than that which is more injunctive in nature. The results here suggest that it is perceptions of what family and friends *think* of fast-food consumption (injunctive), rather than how much fast food they consume themselves, which is influential over adult consumption behaviour. This indicates that different types of normative influence affect different groups, separated by age. These findings combine to suggest that subjective norms may be a useful predictor of food choice, particularly if referent groups are considered individually and injunctive and descriptive norms are separated.

Consistent with a normative influence, the measure capturing individual identification with healthy eating was related to fewer intentions to eat fast food. This suggested that, in situations where there are powerful referent-groups, measures of self-identification may assist in understanding the determinants of the behaviour. This finding also highlights the need to identify separate referent-groups. The results also indicate that, for participants in this study, subjective norm was a stronger predictor of intention to consume fast food for those high in Fear of Negative Evaluation. This suggests that social influence and the need to comply with group norms in particular, influence fast-food consumption. Therefore, it appears that fear of being negatively evaluated, perhaps by friends and family members, is an inherent part of the social influence underlying fast-food consumption or avoidance.

It appears from these findings that it is possible, if people can be encouraged to associate themselves with groups who eat healthily, the influence of these associations might be a promising avenue for reducing fast-food consumption rates as well as maintaining healthier dietary choices over the long-term. Generally, participants reported that their consumption rates were most influenced by family and friends, inferring that, for fast food, these are the most powerful referent groups. Ensuring that family units provide positive social modelling for healthy food choices is a difficult and challenging task but, perhaps not insurmountable given that most parents are keen to do as much as they can for their children's benefit. It does seem however, that attempts to educate parents



about healthy food choices are unlikely to be sufficient on their own; nutritional education needs to be offered in conjunction with pragmatic and affordable meal options that are as convenient and satisfying as fast food.

#### 7.6.4 Perceptions of Behavioural Control

Perceptions of behavioural control have typically performed well in their prediction of both intention and behaviour. The measure performed strongly here as well, predicting behaviour and intention, although subjective norm was a stronger predictor of intention. The results also serve to highlight the advantages of considering self-efficacy as a separate variable from perceptions of behavioural control as suggested by Armitage and Conner (2001). In terms of fast-food consumption, the measure of self-efficacy, a reflection of individual, internal control, was a much stronger performer than the measure of external control factors which failed to reach significance. As was discussed earlier, such findings are probably of greatest interest to those working with people requiring dietary intervention as they indicate the development of strategies targeted at increasing and maintaining perceptions of strong self-efficacy might be effective.

### 7.7 Future Research

The research reported here drew primarily upon the TPB, a theory with its roots in cognitive tradition. Although the findings have gone some way to improving knowledge about some of the prominent variables influencing fast-food consumption, the picture is by no means complete. Cognitive theories assume that people are rational beings, likely to engage in considered thought prior to making decisions, weighing up the possible consequences of each available option. Results from the first two studies indicate that although rational, cognitive assessments do play an important role in food choices, they do not represent the only influences on behaviour or intention to behave. Both the qualitative stage of the research and the application of the IAT to examine associations with fast food indicate that there are a number of conscious and unconscious processes involved in fast-food selection.

The TPB was chosen for this research because although it stems from cognitive theory, it is also sufficiently broad to encompass factors from other approaches explaining food

choice. Perhaps as a reflection of this broad capacity, the TPB performed well overall and also provided some insights as to where research from developmental and physiological perspectives might be applied. For example, there are some links through to developmental approaches through social norms and even the psycho-physiological approaches through attitudes towards the sensory nature of foods.

#### 7.7.1 Potential Contributions from the Developmental Approach

Consistent with developmental approaches, the TPB results suggested that the influence of family and friends was greater than the influence of health professionals. The developmental approach suggests that social learning through modelling, and associative learning through taste and satiation, are influential over food choices and research has reported that this is particularly so for children and adolescents. The results here are congruent, highlighting the family unit as a likely place for people to learn and develop poor food-choices. Consequently, it is also likely that the family unit could be a place where interventions designed to alter these choices could have significant success. Parental influence is of great importance and is associated with a number of obesity-related issues. Parents are stretched for time and find it difficult to shop, prepare, and cook foods on a daily basis. They utilise convenience foods and, as the results from the qualitative study show, it is people under the age of 40 years who are most likely to be consuming fast foods 2-3 times a week. Some of these people are young and single, and many are parents with young families. A concern voiced by several of the participants in the first study is that this cycle will result in more and more people relying on fast foods as younger generations are not exposed to cooking. Traditional family meal times have historically exposed children to food preparation. The increasing use of fast foods could quite conceivably result in a generation of children where few understand the properties of foods and most simply do not have the skills to prepare meals. Research indicates that it is younger people who rely more heavily on fast foods (Nielsen et al., 2002), a trend that could continue to the point that the consumption of fast food becomes an automatic behaviour in many. As discussed earlier, successful interventions at this family level could have significant impacts on future obesity rates although, the processes would have to be pragmatic. A return to the 1950s family unit is not possible, and it is unlikely that families will easily revert to 1950s

style of food preparation and meal times. Energy dense fast foods need to be combated (or even replaced) with equivalent products that offer all of the benefits of convenience and taste, but better nutritional value.

Social influences also gain traction through marketing, an influence which is growing in capacity as quickly as technology develops (Huston et al., 1989). Although only mentioned by two participants in the qualitative stage of this research, marketing aimed at children is widespread, with many strategies focussed on 'capturing the consumer while they are young'. Concerned parents, teacher groups, and many health professionals are advocating for restrictions on advertising to children, particularly through broadcast media such as television and radio. Some believe that restrictions on advertising through broadcast media may simply lead to increased focus on non-broadcast means. Consistent with this, Cowburn and Boxer (2007) found that many food advertisements in children's magazines directed their attention to internet food marketing sites.

Expansions in marketing strategies include not only technological innovation but also development of age-specific marketing, with bright colours and cartoon characters being used to influence the very young, and more sophisticated, adult-like strategies being used to persuade older children (Zhang & Sood, 2002). Marketing specific to food and beverages is very prevalent (Kelly, Smith, King, Flood, & Bauman, 2007; Yngve, 2007) with one of the primary aims being to encourage children as young as two to recognise and differentiate logos and brands (Robinson, Borzekowski, Matheson, & Kraemer, 2007) In the United States, children and youth are the primary focus of food and beverage marketing (McGinnis, Gootman, & Kraak, 2006), a trend that has been linked with growing childhood obesity rates (Joint WHO/FAO expert consultation on diet nutrition and the prevention of chronic diseases, 2003). These trends are being mirrored in other developed countries including the United Kingdom and Australia.

The fact that people are able to learn by association as well as through social influence is something that has not escaped those developing marketing strategies. Marketing people ensure that advertising reflects products in association with the most positive of outcomes. For young children, these associations are made with fun and excitement;

for the adults, they often reflect *savoir faire*, sex appeal or success in some form. Many of these associations are portrayed in an implicit manner, that is, to be implied and adopted, not always through conscious awareness. For example, Mohr, Wilson, Dunn, Brindal, and Wittert (2007) found that factors such as an awareness of billboard advertising and frequency of exposure to commercial print and broadcast media were significant individual predictors of fast-food consumption (beyond other predictors such as age etc.) The fact that marketing was not raised by participants in this research as a strong influence on fast-food consumption suggests that the influence, to a certain extent, may be implicit. Some of the research discussed found that the IAT was successful in capturing brand preferences for certain foods and further research into the implicit influence that marketing has on fast-food preferences, particularly for young children, could be quite revealing.

In summary, the developmental approach offers some explanation for the growing trend to rely on fast food as a meal option through both modelling and associative learning. Both family groups and advertising/marketing are likely to be influential in increasing fast-food consumption rates, and both also offer promising avenues for intervention.

#### 7.7.2 Potential Contributions from the Psychophysiological Approach

The psychophysiological approach suggests that both homeostatic regulation and the sensory properties of food are influential in eating behaviour and food choices, with foods high in fat and sugar offering the greatest rewards. Although the Sensitivity to Reward measure failed to contribute to the overall explanation of fast-food consumption, participant responses from the qualitative stage of the research indicated that many people were influenced to make food choices based on hedonic, reward-related outcomes. The arousal-IAT also demonstrated that implicit associations are made with the arousal-related attributes of fast food indicating that feelings of enticement, gratification, contentment, as well as disgust, and guilt are influential in the selection or avoidance of foods. Some of these adjectives are conceptually related to the reward-like nature of foods, particularly in terms of its sensory properties such as smell, texture, and flavour. Given this, it is believed that the non-significant findings from the

Sensitivity to Reward Scale can be attributed to flaws in the method followed, rather than an indication that fast food does not contribute to any form of reward-state, particularly for those who consume it regularly. That is, the Sensitivity to Reward measure used was a shortened version of a measure translated from its original language of Spanish, and it is likely that the combination of these alterations reduced the efficacy of the measure. Given the persuasive research findings suggesting that Sensitivity to Reward is related to over-eating, BMI, and preferences for foods high in fat and sugar (Davis et al., 2007; Davis & Woodside, 2002; Loxton & Dawe, 2001), it seems that, with careful operationalisation, future research could explore the nature of the relationship between individual differences in sensitivity to the rewarding properties of food and fast-food consumption rates.

## **7.8 Concluding Comment**

Obesity is a complex issue and fast-food consumption is just one contributor amongst many. Factors such as physical and social environments, as well as imbalance in energy intake-expenditure ratios have been implicated in obesity. Combating rising obesity will take a combined contribution from many. Dedicated efforts from communities and government as well as health professionals and researchers from disciplines such as medicine, geography, economics, epidemiology, health sciences, physiology, social sciences, as well as psychology will all be required due to the broad and complex nature of the aetiology of obesity.

One of the key issues related to growing obesity is lifestyle and food-related; Australians are living and eating differently. Family units have altered considerably over the past sixty years with more women in the workforce and more people working longer hours (Australian Bureau of Statistics, 2006). By necessity, food and mealtimes have changed as well. For many families, three home-prepared meals every day is not a viable option and the fast-food industry has been quick to facilitate solutions for those needing cheap, convenient, and satisfying meal options. The results of this research indicate that most Australians rely on fast food to some extent. Although there are some healthier alternatives available through fast-food outlets, these are typically smaller, less satisfying, more expensive options. It is clear from these findings that Australian

demand is high for meals that are tasty, satisfying, and convenient. These are all factors that reflect *immediate* concerns and appear to override concerns about longer-term health risks associated with fast food.

Furthermore, variations in the spontaneity of fast-food consumption appear to have made the behaviour difficult to predict. It is likely that the same variations also make the behaviour difficult to change. Fast food can not be stored and made readily available for consumption; although the cognitive consideration required is admittedly minimal, people deciding on a fast-food meal must still make the effort to either order and wait for a delivery or travel to an outlet to purchase the meal. Such behaviour can not be described as automatic. On the other hand, many people use drive-through access to purchase fast-food meals and snacks, a tendency that could be entirely spontaneous and unplanned. It is likely that researchers investigating fast-food consumption will find that predictors of the behaviour vary depending upon the levels of associated spontaneity and it is important that these differences are understood, particularly in terms of changing fast-food consumption rates. It is likely that planned behaviour, such as fast-food meals consumed on a regular basis, might be most effectively reduced through cognitive changes. Spontaneous fast-food consumption is probably more difficult to alter. Attempts to change behaviour might be made with approaches that target attitudes and beliefs and it seems likely that normative influences might be exploited to both achieve and maintain behavioural change. Approaches that increase self-efficacy and confidence in ability to avoid unhealthy foods, and encourage self-identification with health-conscious referent groups might also be useful as would attempts to intercept and correct optimistic biases. All of these are changes that need to occur over time, perhaps even over generations. In the meantime, the convenience, taste, and satisfaction that a fast-food meal affords need to be countered with healthy alternatives that are just as accessible and gratifying as a burger with fries on the side.

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# **Appendix A**

## **(Study 1)**



Dear North West Adelaide Health Study Participant

You have been randomly selected to participate in a new research project within the North West Adelaide Health Study investigating thoughts and feelings about fast food.

We are pleased to be able to offer you an opportunity to participate in the study to help us understand some of the specific food choices people make. The study will involve a questionnaire conducted over the telephone that will take approximately 15 to 20 minutes and the enclosed information sheet gives you more detail on how the study works.

The researcher Kirsten Dunn will be calling you to discuss your participation in this sub-study following the return of the enclosed consent form.

If you have any questions, please do not hesitate to call Kirsten on (tel) 8303 8911 or Janet Grant, North West Adelaide Health Study Co-ordinator on (tel) 8226 6054.

Your contribution to this study is very important. We very much appreciate your ongoing commitment to the North West Adelaide Health Study and look forward to your continued participation.

Yours sincerely

Dr Richard Ruffin  
Professor of Medicine  
The University of Adelaide  
North West Adelaide Health Service

*encl*



## **"Factors Influencing Food Choices"**

### ***Information Sheet for participants***

#### **INVITATION TO PARTICIPATE**

We invite you to participate in a further research project as part of the North West Adelaide Health Study which we believe is of potential importance to the future of our community's health. However, before you decide whether or not you wish to participate, we need to be sure that you understand

- why we are doing it, and**
- what it would involve if you agreed.**

We are therefore providing you with the following information. Please read it carefully and be sure to ask any questions you have. The researcher conducting the research will be happy to discuss it with you and answer any questions that you may have. You are also free to discuss it with outsiders if you wish. (e.g. family or friends).

#### **You do not have to make an immediate decision.**

Your participation is purely voluntary, and you are under no pressure to participate. Should you agree to participate in the research project, you may change your mind and withdraw at any stage.

#### **What is the study about?**

Researchers from the University of Adelaide and the North West Adelaide Health Study are studying aspects of chronic conditions in the north west Adelaide region. We appreciate your participation in the clinical part of the North Western Adelaide Health Study and we would like to give you an opportunity to participate in a further project examining the food choices that people make. This particular study is being conducted by Kirsten Dunn who is a Ph.D candidate at the University of Adelaide and CSIRO and has a particular interest in the attitudes that people have towards fast food.

#### **Who will manage my treatment if I take part?**

There will be no change to any treatment you receive through the North Western Adelaide Health Service as a result of your participation in this study.

#### **How does the study work?**

If you agree to participate, Kirsten will contact you at a time suitable for you and will ask you a number of questions mainly about your thoughts and feelings regarding fast food. The questionnaire will take approximately 20 minutes to complete.

#### **What are my rights?**

You will be asked to give your written consent to take part in the study. Taking part in the study is voluntary and you can withdraw at any stage. The information collected as part of this study will remain in a secure location at CSIRO for a period of seven years. After this time the information will be destroyed.

#### **What are the risks and / or discomforts in the study?**

It is not anticipated that any risk or discomfort will arise from your participation in this study.

**What will I get out of the study?**

It is not anticipated that you will directly benefit from participation in this study. However, it is hoped that the results of the research will increase knowledge about the food choices we make as a community. It is hoped that this knowledge will ultimately be applied to assist in health-related treatment programs.

**What happens to the results?**

The data collected in the questionnaires will be analysed by the researcher and the results may be published in academic journals, but there will be no way of identifying you as a participant.

**Voluntary Participation-What happens if I say no?**

If you decide you do not want to take part in the study, your involvement in the North West Adelaide Health Study will not be affected nor will the care and attention that you get at the North Western Adelaide Health Service (The Queen Elizabeth Hospital & the Lyell McEwin Health Service) or from your general practitioner change.

**Funding**

This project is funded by the Australian Research Council and is supported by the University of Adelaide and CSIRO.

**What if I have a question about the study?**

If you would like more information about the study or have any questions, you may wish to initially contact the Researcher – Kirsten Dunn on (08) 8303 8911. Alternatively, you may wish to contact the supervisor for this project, Dr Phil Mohr on (08) 8303 8935.

This study has been approved by the University of Adelaide Department of Psychology Human Ethics Subcommittee, the CSIRO Human Research Ethic Committee, and the Management Committee of the North West Adelaide Health Study. Should you wish to speak to a person not directly involved, in particular in relation to matters concerning policies, information about the conduct of the study or your rights as a participant, or should you wish to make a confidential complaint, please contact the convener of the Subcommittee for Human Research in the Department of Psychology, University of Adelaide, Dr Paul Delfabbro on (08) 8303 5744.



North West Adelaide Health Service

**STANDARD CONSENT FORM**

ID: *(id number)*

1. I (the undersigned) *(name)*  
hereby consent to my involvement in the research project entitled the  
  
*Factors Influencing Food Choices*
2. I have read the information sheet, and I understand the reasons for this study. The ways in which it will affect me have been explained and my questions have been answered to my satisfaction. My consent is given voluntarily.
3. The details of the research project have been explained to me, including the expected time it will take.
4. I understand that the purpose of this research project is to improve knowledge in the area, but my involvement may not be of benefit to me.
5. No information about my medical history will be taken. My identity will be kept confidential, and nothing will be published which could possibly reveal my identity.
6. My involvement in the project will not affect my relationship with my medical advisers. I understand I am free to withdraw from the project at any stage without having to give any reasons, and that if I do withdraw from the project it will not affect my treatment at this hospital in the future.

Signed: \_\_\_\_\_

Address: *(address)*

Signature of  
Research Worker: \_\_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Please complete and return your contact details on the next page.



**Name**

\_\_\_\_\_

**Contact phone number**

\_\_\_\_\_

**Preferred contact date and time (please list 3 alternatives)**

Contact preferences	Day/Date	Time
1 <sup>st</sup> preference		
2 <sup>nd</sup> preference		
3 <sup>rd</sup> preference		

Thank you very much for your time and help.

My name is KD. I am calling from the CSIRO and North West Adelaide Health study with regards to a new study that I am conducting about people's attitudes towards fast foods.

You were sent some information about the study in late December and have kindly volunteered to take part in the study. Is this still a convenient time for you?

Do you have any questions about the study before we start?

I am interested in learning more about the choices that people make regarding the foods that they eat (with a particular interest in fast foods).

This questionnaire contains a series of questions designed to gather information about how often and for what reasons people choose a fast food meal.

Taking part in this study is entirely voluntary and you can withdraw at any time you wish.

Please respond as fully as you can to each question. There are no correct or incorrect answers. I am interested in your honest feelings and responses, not in what you think you *should* answer. Please feel free to ask me to repeat or explain any questions if you are unsure.

1. Please indicate which of the following foods *you* would call fast food. Would you say that ..... is a fast food?

<input type="checkbox"/>	BBQ chicken	<input type="checkbox"/>	Pies, pasties, sausage rolls
<input type="checkbox"/>	Food from Hungry Jack's	<input type="checkbox"/>	Food from McDonald's
<input type="checkbox"/>	Restaurant take-away	<input type="checkbox"/>	Food from Subway
<input type="checkbox"/>	Food from food courts	<input type="checkbox"/>	Frozen meals (e.g. from supermarket)
<input type="checkbox"/>	Bakery items	<input type="checkbox"/>	Sandwiches or rolls
<input type="checkbox"/>	Food from noodle bars	<input type="checkbox"/>	Food from KFC
<input type="checkbox"/>	Takeaway/delivered pizza	<input type="checkbox"/>	Food from fish and chip shop

Are there any other foods or food places not already mentioned that you would include in the category?

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Please feel free to explain any of your reasons for including or excluding foods as fast food.

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**When responding to the rest of the questions in this survey, please consider 'fast food' to be those foods that you have indicated in question one.**

2. On average, please indicate approximately how often you eat fast food:

- |                          |                        |
|--------------------------|------------------------|
| <input type="checkbox"/> | Never                  |
| <input type="checkbox"/> | Occasionally           |
| <input type="checkbox"/> | Once per month         |
| <input type="checkbox"/> | Once per fortnight     |
| <input type="checkbox"/> | Once per week          |
| <input type="checkbox"/> | 2-3 times per week     |
| <input type="checkbox"/> | 4-6 times per week     |
| <input type="checkbox"/> | Once per day           |
| <input type="checkbox"/> | More than once per day |

3. When you **think** about eating fast food, what kind of **thoughts** come to mind regarding the food?

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4. What do you like **most** about fast food?

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5. What do you like **least** about fast food?

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6. How do you **feel** when you eat fast food?

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7. What are the **advantages** of eating fast food frequently (3 or more times per week)?

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8. What are the **disadvantages** of eating fast food frequently?

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9. Please list **any other** effects that you associate with eating fast food frequently?

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10. Which people (or groups of people) would **approve** of you eating fast food frequently?

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11. Which people (or groups of people) would **disapprove** of you eating fast food frequently?

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12. Are there any **other people** (or groups of people) who come to mind when you think about eating fast food frequently?

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13. Which people (or groups of people) influence you **the most** in your decisions about what you eat?

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14. If you wanted to eat fast food frequently, what are the sorts of things that would make it **easy** for you to do so?

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15. If you wanted to eat fast food frequently, what are the sorts of things that would make it **difficult** for you to do so?

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16. What **other factors** might influence you to eat fast food?

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17. What other factors might influence you **not** to eat fast food?

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**That is the final formal interview question.**

If you would like, I can arrange for you to receive a summary of the findings of this research. Would you like that?

Postal address

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or

E-mail address

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**Thank you for taking the time to complete this survey. Your efforts are very much appreciated.**

# **Appendix B**

**(Study 2)**





Friday, 14 July 2006

«Title» «Intial» «Surname»  
«Address»  
«Suburb» «State» «Postcode»«Title»  
«Title»

Dear «Title» «Surname»,

Thank you for your continued participation in the North West Adelaide Health Study. You have been randomly selected to participate in a new research project within the North West Adelaide Health Study investigating thoughts and feelings about fast food.

We are pleased to be able to offer you an opportunity to participate in the study to help us understand some of the specific food choices people make. The study will involve completing the enclosed questionnaire that will take approximately 20 minutes, followed by the completion of a simple fast food diary for the period of 7 days. The assistance of people such as yourself is invaluable and the information obtained will help us to understand some of the specific food choices people make.

There will be no cost to participants and your involvement is voluntary. Those who participate in this research will be automatically entered into a draw for a one in twenty chance of winning a \$20 shopping voucher. The enclosed information sheet gives you more detail about the study.

If you have any questions, please do not hesitate to call the researcher, Kirsten on (tel) 8303 8911 or Janet Grant, North West Adelaide Health Study Co-ordinator on (tel) 8226 6054.

Your contribution to this study is very important. We very much appreciate your ongoing commitment to the North West Adelaide Health Study and look forward to your continued participation.

Yours sincerely

Dr Richard Ruffin  
Professor of Medicine  
The University of Adelaide  
Central Northern Adelaide Health Service

*encl*



## **"Factors Influencing Food Choices"**

### ***Information Sheet for participants***

#### **INVITATION TO PARTICIPATE**

We invite you to participate in a further research project as part of the North West Adelaide Health Study which we believe is of potential importance to the future of our community's health. However, before you decide whether or not you wish to participate, we need to be sure that you understand

**why we are doing it, and**

**what it would involve if you agreed.**

We are therefore providing you with the following information. Please read it carefully and be sure to ask any questions you have. The researcher conducting the research will be happy to discuss it with you and answer any questions that you may have. You are also free to discuss it with outsiders if you wish (e.g. family or friends).

**You do not have to make an immediate decision.**

Your participation is purely voluntary, and you are under no pressure to participate. Should you agree to participate in the research project, you may change your mind and withdraw at any stage.

#### **What is the study about?**

Researchers from the University of Adelaide and the North West Adelaide Health Study are studying aspects of chronic conditions in the north west Adelaide region. We appreciate your participation in the clinical part of the North Western Adelaide Health Study and we would like to give you an opportunity to participate in a further project examining the food choices that people make. This particular study is being conducted by Kirsten Dunn who is a Ph.D candidate at The University of Adelaide and CSIRO with a particular interest in the attitudes that people have towards fast food.

#### **Who will manage my treatment if I take part?**

There will be no change to any treatment you receive through the Central Northern Adelaide Health Service as a result of your participation in this study.

#### **How does the study work?**

If you agree to participate, we are asking you to complete the enclosed questionnaire that asks a number of questions mainly about your thoughts and feelings regarding fast food. The questionnaire will take approximately 20 minutes to complete. We also ask that after completing the questionnaire, you keep a very brief food diary giving basic details of any fast foods that you eat for the period of one week and then return to us in a reply paid envelope.

#### **What are my rights?**

Your responses to the questionnaire and your records in your food diary will be completely confidential. Taking part in the study is voluntary and you can withdraw at any stage. The information collected as part of this study will remain in a secure location at CSIRO for a period of seven years. After this time the information will be destroyed.

**What are the risks and / or discomforts in the study?**

It is not anticipated that any risk or discomfort will arise from your participation in this study.

**What will I get out of the study?**

If you agree to take part in this research, your name will be automatically entered into a draw for a one in twenty chance of winning a \$20 shopping voucher.

It is hoped that the results of the research will increase knowledge about the food choices we make as a community and that this knowledge will ultimately be applied to assist in health-related treatment programs.

**What happens to the results?**

The data collected in the questionnaires will be analysed by the researcher and the results may be published in academic journals, but there will be no way of identifying you as a participant.

**Voluntary Participation - What happens if I say no?**

If you decide you do not want to take part in the study, your involvement in the North West Adelaide Health Study will not be affected nor will the care and attention that you get at the Central Northern Adelaide Health Service (The Queen Elizabeth Hospital & the Lyell McEwin Health Service) or from your general practitioner change.

**Funding**

This project is funded by the Australian Research Council and is supported by The University of Adelaide and CSIRO.

**What if I have a question about the study?**

If you would like more information about the study or have any questions, you may wish to initially contact the Researcher – Kirsten Dunn on (08) 8303 8911. Alternatively, you may wish to contact the supervisor for this project, Dr Phil Mohr on (08) 8303 8935.

This study has been approved by The University of Adelaide School of Psychology Human Ethics Subcommittee, the CSIRO Human Research Ethic Committee, and the Management Committee of the North West Adelaide Health Study. Should you wish to speak to a person not directly involved, in particular in relation to matters concerning policies, information about the conduct of the study or your rights as a participant, or should you wish to make a confidential complaint, please contact the convener of the Subcommittee for Human Research in the School of Psychology, University of Adelaide, Dr Paul Delfabbro on (08) 8303 5744.



*As part of new research within the North West Adelaide Health Study, we are interested in learning more about the fast food choices that people make with a particular interest in people's use and perceptions of fast foods. Therefore we are asking for your assistance in completing the following questionnaire.*

***Please read the following instructions before answering the questions***

1. For the purpose of this study, please consider fast foods to be those that most people would consider typical, standard, fast foods such as burgers, chips/fries, pizzas, or deep-fried chicken purchased in ready-to-eat packages from large, franchised chains such as Pizza Hut, Dominos, McDonalds, Hungry Jacks, Kentucky Fried Chicken, or Red Rooster - the food may be either eaten in the restaurant or taken away.
2. Please respond as fully as you can to each question. There are no correct or incorrect answers. We are interested in your honest feelings and responses, not in what you think you should answer.
3. Your answers will remain strictly confidential. Results of the study may be published in a medical journal, but no information that may lead to the identification of any individual will be released.
4. This questionnaire should take approximately 15 minutes to complete.
5. If you have any problems with the questionnaire, please contact:
  - Kirsten Dunn (Study Researcher) on ☎ 8303 8911 or
  - Janet Grant (NWAH Study Co-ordinator) on ☎ 8226 6054.
6. Please return the questionnaire and the fast food diary in the reply paid envelope provided.

**FACTORS INFLUENCING FOOD CHOICES**  
**Questionnaire**

July 2006



## EXAMPLE

### How to fill in this questionnaire

Please circle the place on the following scales that best represents your response to each question.

*For example, if you felt strongly that bananas are healthy, you would respond like this:*

- Bananas are:

healthy    1    2    3    4    5    6    7    unhealthy

*Alternatively, if you did not feel strongly either way about the health benefits of bananas, you would respond like this:*

- Bananas are:

healthy    1    2    3    4    5    6    7    unhealthy

## SECTION 1

### Factors Influencing Food Choices

1. Please tick the most appropriate box to indicate, on average, how often you eat fast food

- |    |                        |                          |
|----|------------------------|--------------------------|
| 1. | Never                  | <input type="checkbox"/> |
| 2. | Occasionally           | <input type="checkbox"/> |
| 3. | Once per month         | <input type="checkbox"/> |
| 4. | Once per fortnight     | <input type="checkbox"/> |
| 5. | Once per week          | <input type="checkbox"/> |
| 6. | 2-3 times per week     | <input type="checkbox"/> |
| 7. | 4-6 times per week     | <input type="checkbox"/> |
| 8. | Once a day             | <input type="checkbox"/> |
| 9. | More than once per day | <input type="checkbox"/> |

**Please circle the place on the following scales that best represents your response to each question**

Please assume the term 'frequently' to mean 3 or more times a week

2. To me, eating fast food frequently is:

- |     |            |   |   |   |   |   |   |   |                |
|-----|------------|---|---|---|---|---|---|---|----------------|
| 2a. | harmful    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | beneficial     |
| 2b. | quick      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | time consuming |
| 2c. | convenient | 1 | 2 | 3 | 4 | 5 | 6 | 7 | inconvenient   |
| 2d. | unpleasant | 1 | 2 | 3 | 4 | 5 | 6 | 7 | pleasant       |
| 2e. | cheap      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | expensive      |

3. When I eat fast food, I feel:

- |     |                |   |   |   |   |   |   |   |              |
|-----|----------------|---|---|---|---|---|---|---|--------------|
| 3a. | happy          | 1 | 2 | 3 | 4 | 5 | 6 | 7 | unhappy      |
| 3b. | self-conscious | 1 | 2 | 3 | 4 | 5 | 6 | 7 | self-assured |
| 3c. | inadequate     | 1 | 2 | 3 | 4 | 5 | 6 | 7 | capable      |
| 3d. | enticed        | 1 | 2 | 3 | 4 | 5 | 6 | 7 | disgusted    |
| 3e. | guilty         | 1 | 2 | 3 | 4 | 5 | 6 | 7 | carefree     |
| 3f. | lethargic      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | energetic    |
| 3g. | unashamed      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | ashamed      |
| 3h. | disappointed   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | gratified    |
| 3i. | well           | 1 | 2 | 3 | 4 | 5 | 6 | 7 | unwell       |
| 3j. | content        | 1 | 2 | 3 | 4 | 5 | 6 | 7 | discontent   |
| 3k. | worried        | 1 | 2 | 3 | 4 | 5 | 6 | 7 | calm         |
| 3l. | unenthusiastic | 1 | 2 | 3 | 4 | 5 | 6 | 7 | enthusiastic |

**Please circle the place on the following scales that best represents your response to each question**

**4. I have complete control over the number of times I will eat fast food over the next month**

definitely false    1    2    3    4    5    6    7    definitely true

**5. Fast food tastes good**

strongly disagree    1    2    3    4    5    6    7    strongly agree

**6. Eating tasty food is:**

extremely unimportant    1    2    3    4    5    6    7    extremely important

**7. I get good value for money when I buy a fast food 'packaged meal deal'**

strongly disagree    1    2    3    4    5    6    7    strongly agree

**8. When buying food, getting good value for money is:**

extremely unimportant    1    2    3    4    5    6    7    extremely important

**9. I feel satisfied after eating fast food**

strongly disagree    1    2    3    4    5    6    7    strongly agree

**10. Feeling satisfied after eating is:**

extremely unimportant    1    2    3    4    5    6    7    extremely important

**11. I am able to treat/reward myself with fast food**

strongly disagree    1    2    3    4    5    6    7    strongly agree

**12. Treating/rewarding myself is:**

extremely unimportant    1    2    3    4    5    6    7    extremely important

**Please circle the place on the following scales that best represents your response to each question**

Please assume the term 'frequently' to mean 3 or more times a week

**13. Eating fast food frequently is good for my health**

strongly disagree    1    2    3    4    5    6    7    strongly agree

**14. Maintaining my health is:**

extremely unimportant    1    2    3    4    5    6    7    extremely important

**15. For me, eating fast food frequently is likely to result in weight gain**

strongly disagree    1    2    3    4    5    6    7    strongly agree

**16. Maintaining my weight in a healthy range is:**

extremely unimportant    1    2    3    4    5    6    7    extremely important

**17. Eating fast food frequently is very convenient for me**

strongly disagree    1    2    3    4    5    6    7    strongly agree

**18. For me, having a source of convenient food is:**

extremely unimportant    1    2    3    4    5    6    7    extremely important

**19. Eating fast food frequently reduces the amount of work I have to do (e.g. planning, preparing, and cleaning up)**

strongly disagree    1    2    3    4    5    6    7    strongly agree

**20. Reducing the amount of work I have to do surrounding meal times (e.g. planning, preparing, and cleaning up) is:**

extremely unimportant    1    2    3    4    5    6    7    extremely important

**21. Eating fast food frequently saves me time**

strongly disagree    1    2    3    4    5    6    7    strongly agree



**Please circle the place on the following scales that best represents your response to each question**

Please assume the term 'frequently' to mean 3 or more times a week

**22. Saving time on food preparation is:**

extremely unimportant    1    2    3    4    5    6    7    extremely important

**23. Eating fast food enables me to eat meals wherever I want (e.g. restaurant/car/home)**

strongly disagree    1    2    3    4    5    6    7    strongly agree

**24. Being able to eat wherever I want is:**

extremely unimportant    1    2    3    4    5    6    7    extremely important

**25. Eating fast food frequently is relatively cheap compared to restaurant meals**

strongly disagree    1    2    3    4    5    6    7    strongly agree

**26. Saving money on food is:**

extremely unimportant    1    2    3    4    5    6    7    extremely important

**27. Frequently eating in fast food restaurants allows me to 'get out'**

strongly disagree    1    2    3    4    5    6    7    strongly agree

**28. 'Getting out' when I feel that I want to is:**

extremely unimportant    1    2    3    4    5    6    7    extremely important

**29. Eating fast food frequently is likely to disrupt traditional family meal times**

strongly disagree    1    2    3    4    5    6    7    strongly agree

**30. Maintaining traditional family meal times is:**

extremely unimportant    1    2    3    4    5    6    7    extremely important

**Please circle the place on the following scales that best represents your response to each question**

Please assume the term 'frequently' to mean 3 or more times a week.

**31. Eating fast food frequently reduces the opportunities that children have to learn about food**

strongly disagree      1      2      3      4      5      6      7      strongly agree

**32. It is important that children learn about food**

strongly disagree      1      2      3      4      5      6      7      strongly agree

**33. Eating fast food frequently is habit forming**

strongly disagree      1      2      3      4      5      6      7      strongly agree

**34. Habitual fast food consumption is:**

extremely bad      1      2      3      4      5      6      7      extremely good

**35. Eating fast food frequently encourages an inactive lifestyle**

strongly disagree      1      2      3      4      5      6      7      strongly agree

**36. Inactive lifestyles are:**

extremely bad      1      2      3      4      5      6      7      extremely good

**37. Eating fast food frequently is detrimental to the environment**

strongly disagree      1      2      3      4      5      6      7      strongly agree

**38. Protecting the environment is:**

extremely unimportant      1      2      3      4      5      6      7      extremely important

**Please circle the place on the following scales that best represents your response to each question**

Please assume the term 'frequently' to mean 3 or more times a week.

	definitely false							definitely true
39. I am likely to eat fast food frequently over the next month	1	2	3	4	5	6	7	
40. The people in my life whose opinions I value eat fast food frequently	1	2	3	4	5	6	7	
41. Most people who are important to me think that I should eat fast food frequently	1	2	3	4	5	6	7	
42. Generally, members of my family think that I should eat fast food frequently	1	2	3	4	5	6	7	
43. I like to do what these members of my family think I should	1	2	3	4	5	6	7	
44. Generally, my friends think that I should eat fast food frequently	1	2	3	4	5	6	7	
45. I like to do what these friends think I should	1	2	3	4	5	6	7	
46. Health experts think that I should eat fast food frequently	1	2	3	4	5	6	7	
47. I like to do what health experts think I should	1	2	3	4	5	6	7	
48. It would be impossible for me not to eat fast food frequently over the next month	1	2	3	4	5	6	7	
49. Those close to me expect me to eat fast food frequently	1	2	3	4	5	6	7	
50. Those who are close to me eat fast food frequently	1	2	3	4	5	6	7	
51. In the last week, how many times have you eaten fast food?	_____							

**Please circle the place on the following scales that best represents your response to each question**

Please assume the term 'frequently' to mean 3 or more times a week.

	strongly disagree							strongly agree
52. The lifestyle that I lead means that I will have little spare time over the next month	1	2	3	4	5	6	7	
53. Having little spare time makes it more likely that I will eat fast food frequently	1	2	3	4	5	6	7	
54. I tend to feel guilty about eating some foods	1	2	3	4	5	6	7	
55. Feeling guilty about eating fast food prevents me from eating it frequently	1	2	3	4	5	6	7	
56. Sometimes I experience cravings for some foods	1	2	3	4	5	6	7	
57. Experiencing cravings for fast food makes it more likely that I will eat it frequently	1	2	3	4	5	6	7	
58. Most of the time I eat meals alone	1	2	3	4	5	6	7	
59. Eating alone makes it much easier for me to eat fast food frequently	1	2	3	4	5	6	7	
60. I am unable to prepare my own food because I do not know how to cook	1	2	3	4	5	6	7	
61. As I do not know how to cook, I tend to eat fast food frequently	1	2	3	4	5	6	7	
62. I have to be careful about how much money I spend	1	2	3	4	5	6	7	
63. The cost of fast food prevents me from eating it frequently	1	2	3	4	5	6	7	
64. Given my lifestyle and/or taste preferences, it is likely that I will eat fast food frequently over the next 4 weeks	1	2	3	4	5	6	7	

**Please circle the place on the following scales that best represents your response to each question**

Please assume the term 'frequently' to mean 3 or more times a week.

		strongly disagree						strongly agree					
65. I have to be careful about what I eat because of my weight	1		2		3		4		5		6		7
66. Concern about my weight prevents me from eating fast food frequently	1		2		3		4		5		6		7
67. If I wanted to, I could avoid eating fast food frequently over next month	1		2		3		4		5		6		7
68. I have to be careful about what I eat because of my health	1		2		3		4		5		6		7
69. Concern about my health prevents me from eating fast food frequently	1		2		3		4		5		6		7
70. Because of where I live, I have no access to fast food outlets	1		2		3		4		5		6		7
71. Being unable to access fast food prevents me from eating it frequently	1		2		3		4		5		6		7
72. How often I will eat fast food over the next month is mostly up to me	1		2		3		4		5		6		7

If you live with an illness or a disability, please tick the box and answer questions 73 and 74 by circling the place on the scales that best represents your response. If not, please proceed directly to question 75 on the following page.

**73. I am unable to prepare my own food because of an illness or disability**

strongly disagree    1    2    3    4    5    6    7    strongly agree

**74. Being unable to prepare my own food due to an illness or disability, I tend to eat fast food frequently**

strongly disagree    1    2    3    4    5    6    7    strongly agree

**Please circle the place on the following scales that best represents your response to each question**

	extremely uncharacteristic of me							extremely characteristic of me
75. I consider how things might be in the future, and try to influence those things with my day-to-day behaviour	1	2	3	4	5	6	7	
76. I usually choose food because it is convenient or tasty rather than because it is good for my health	1	2	3	4	5	6	7	
77. Often I engage in a particular behaviour in order to achieve outcomes that may not result for many years	1	2	3	4	5	6	7	
78. I only act to satisfy immediate concerns, figuring the future will take care of itself	1	2	3	4	5	6	7	
79. My behaviour is only influenced by the immediate (i.e. a matter of days or weeks) outcomes of my actions	1	2	3	4	5	6	7	
80. My convenience is a big factor in the decisions I make or the actions I take	1	2	3	4	5	6	7	
81. I am willing to sacrifice my immediate happiness or well-being in order to achieve future outcomes	1	2	3	4	5	6	7	
82. I think it is important to take warnings about negative outcomes seriously even if the negative outcome will not occur for many years	1	2	3	4	5	6	7	
83. I think it is more important to perform a behaviour with important distant consequences than a behaviour with less-important immediate consequences	1	2	3	4	5	6	7	
84. I generally ignore warnings about possible future problems because I think the problems will be resolved before they reach crisis level	1	2	3	4	5	6	7	

**Please circle the place on the following scales that best represents your response to each question**

	extremely uncharacteristic of me							extremely characteristic of me
85. I think that sacrificing now is usually unnecessary since future outcomes can be dealt with at a later time	1	2	3	4	5	6	7	
86. I only act to satisfy immediate concerns, figuring that I will take care of my future problems that may occur at a later date	1	2	3	4	5	6	7	
87. Since my day-to-day work has specific outcomes, it is more important to me than behaviour that has distant outcomes	1	2	3	4	5	6	7	
88. I often avoid certain foods because I am concerned about my health	1	2	3	4	5	6	7	
89. I worry about what people will think of me even when I know it doesn't make any difference	1	2	3	4	5	6	7	
90. I am unconcerned even if I know people are forming an unfavourable impression of me	1	2	3	4	5	6	7	
91. I am frequently afraid of other people noticing my shortcomings	1	2	3	4	5	6	7	
92. I rarely worry about what kind of impression I am making on someone	1	2	3	4	5	6	7	
93. I am afraid that others will not approve of me	1	2	3	4	5	6	7	
94. I am afraid that people will find fault with me	1	2	3	4	5	6	7	

**Please circle the place on the following scales that best represents your response to each question**

	extremely uncharacteristic of me							extremely characteristic of me
95. Other people's opinions of me do not bother me	1	2	3	4	5	6	7	
96. When I am talking to someone, I worry about what they may be thinking about me	1	2	3	4	5	6	7	
97. I am usually worried about what kind of impression I make	1	2	3	4	5	6	7	
98. If I know someone is judging me, it has little effect on me		1	2	3	4	5	6	7
99. Sometimes I think I am too concerned with what other people think of me	1	2	3	4	5	6	7	
100. I often worry that I will say or do the wrong things	1	2	3	4	5	6	7	



**Please circle the place on the following scales that best represents your response to each question**

	strongly disagree							strongly agree
101. I think of myself as a healthy eater	1	2	3	4	5	6	7	
102. I think of myself as someone who is concerned with healthy eating	1	2	3	4	5	6	7	
103. I think of myself as someone who is concerned with the health consequences of what I eat	1	2	3	4	5	6	7	
104. I think of myself as someone who enjoys the pleasures of eating	1	2	3	4	5	6	7	

**Please tick the box on the following scales that best represents your response to each question.**

	NO	YES
105. Do you often do things to be praised?	<input type="radio"/> <input type="checkbox"/>	<input type="checkbox"/>
106. Do you like being the centre of attention at a party or a social gathering?	<input type="checkbox"/>	<input type="checkbox"/>
107. Would you be tempted to do something unfair if it meant that you would get something for your own benefit?	<input type="checkbox"/>	<input type="checkbox"/>
108. Would you like to be described as someone who has influence over others?	<input type="checkbox"/>	<input type="checkbox"/>
109. Do you often find yourself strongly motivated by money?	<input type="checkbox"/>	<input type="checkbox"/>

## COMMENTS

Please feel free to make any additional comments below.

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## Summary Research Findings

Please tick one of the boxes below to indicate whether or not you would like to receive summary findings from this research.

- I would like the summary findings to be posted out to me.
- I would like the summary findings emailed to me (Please provide email address)  
Email Address \_\_\_\_\_
- I don't wish to receive the summary findings
- 

***Thank you very much for taking the time to complete this questionnaire.***

***Please make sure that you have answered all the questions.***

***Please return this questionnaire in the reply paid envelope provided.***

If you have any problems or questions in completing this questionnaire,  
Please telephone Kirsten (Study Researcher) on ☎ 8303 8911 or  
Janet (NWAH Study Co-ordinator) on ☎ 8226 6054.

## SECTION 2 Fast Food Diary Sheet

Please complete the following fast food diary giving basic details of any fast foods that you eat for the period of one week (it doesn't matter which day you begin the diary) see example day. Please place a strike through the box if you don't eat fast food.

	Breakfast	Morning Tea	Lunch	Afternoon Tea	Dinner	Snacks
<i>Example day</i>	/	/	<i>KFC Chicken Burger and small fries</i>	/	<i>Large Pizza Hut pizza</i>	/
Monday						
Tuesday						
Wednesday						
Thursday						
Friday						
Saturday						
Sunday						

**Please consider Fast Food as:**

Burgers, chips/fries, pizzas, or deep-fried chicken purchased in ready-to-eat packages from large, franchised chains such as Pizza Hut, Dominos, McDonalds, Hungry Jacks, Kentucky Fried Chicken, or Red Rooster - the food may be either eaten in the restaurant or taken away.

# **Appendix C**

## **(Study 3)**



May 2007

Name of pt  
Address 1  
Suburb SA 5000

Dear (<merge Preferred name field>)

Thank you for your continued participation in the North West Adelaide Health Study, which contributes valuable health information to the South Australian community.

We have much pleasure in enclosing an invitation to attend the launch of the North West Adelaide Health Study Stage 2 Report by Dr Tony Sherbon, Chief Executive of the South Australian Department of Health, on *Monday, 4<sup>th</sup> June 2007, from 2.00 pm to 3.30 pm at the Adelaide Town Hall*. We do hope you will be able to come!

If you have access to a computer, we are also seeking your help with a new research project. The enclosed information sheet entitled "**The nature of people's feelings towards different foods**" explains a study that is investigating how people feel about various types of food, and to understand some of the specific food choices people make. This study involves completing one or two computer-administered tasks, followed by brief online questionnaires **using your ID number <merge ID field>** on the following website:

<http://psychology.adelaide.edu.au/expts/foodstudy.html>

We will also be calling you over the next few weeks to gain additional important health-related information via a 15 minute telephone interview, followed by a questionnaire that can be either posted out or emailed to you. Once again, there will be no cost to participants and your involvement is voluntary.

If you have any questions about any of studies mentioned above or about the launch, please call the Study Coordinator, Janet Grant, on (tel) 8226 6054 or (freecall) 1800 635 352.

We do appreciate the time and effort that you continue to give to us. We look forward to speaking with you in the telephone follow-up, and hope to see you at the launch.

Yours sincerely

Dr Richard Ruffin  
Principal Investigator, North West Adelaide Health Study  
Professor of Medicine, The University of Adelaide

encl



**"The nature of people's feelings towards different foods"**

***Information Sheet for participants***

**INVITATION TO PARTICIPATE**

We invite you to participate in a further research project as part of the North West Adelaide Health Study which we believe is of potential importance to the future of our community's health. However, before you decide whether or not you wish to participate, we need to be sure that you understand

**why we are doing it, and  
what it would involve if you agreed.**

We are therefore providing you with the following information. Please read it carefully and be sure to ask any questions you have. The researcher conducting the research will be happy to discuss it with you and answer any questions that you may have. You are also free to discuss it with outsiders if you wish (eg family or friends).

**You do not have to make an immediate decision.**

Your participation is purely voluntary, and you are under no pressure to participate. Should you agree to participate in the research project, you may change your mind and withdraw at any stage.

**What is the study about?**

Researchers from the University of Adelaide, University of South Australia, and the North West Adelaide Health Study are studying aspects of chronic conditions in the north-west Adelaide region. We appreciate your participation in the clinical part of the North Western Adelaide Health Study and we would like to give you an opportunity to participate in a further project examining how people feel about various types of food. This particular study is being conducted by Kirsten Dunn who is a PhD candidate at The University of Adelaide and CSIRO Human Nutrition.

**What does the study involve?**

The study uses a computer-administered test called the Implicit Association Test (IAT) which is designed to generate information that will assist in better understanding how people feel about various foods. This study asks you to complete one or two IAT tasks. These tasks are quite simple and involve responding to images and words related to foods. Each task will only take about ten minutes to complete. You will also be asked to complete a brief online questionnaire following each IAT. You may choose to complete one or both tasks. If you decide to complete both the tasks, we recommend that you make time for a break in between. You may even elect to complete the tasks on different days.

The researcher would also like to be able to link your responses from these IAT tasks with the information that you provided through your participation in the fast food study last year.

If you **DO NOT** want your responses to the two studies to be linked together, please tick the box below, sign where indicated and return this sheet in the reply-paid envelope provided.

**I do not wish for my responses in the two studies to be combined.**

**Name:** \_\_\_\_\_

**Signed:** \_\_\_\_\_

### **If I do want to take part in this study, what do I do next?**

As the IAT is a computer administered test, the study is being conducted online. If you would like to take part, all you need do is:

- allow yourself **10 minutes** of time per task when you will be free from distractions and interruptions;
- log onto the website <http://psychology.adelaide.edu.au/expts/foodstudy.html>
- select the **fast food task** and follow the prompts;
- complete both tasks and go into a draw to **win one of four \$50 shopping vouchers**.

### **What will I get out of the study?**

If you agree to take part in this research and **complete both tasks**, your name will be automatically entered into a draw for a chance to **win one of four \$50 shopping vouchers**.

It is hoped that the results of the research will increase knowledge about the food choices we make as a community and that this knowledge will ultimately be applied to assist in health-related treatment programs.

### **What happens to the results?**

The data collected in the questionnaires will be analysed by the researchers and the results may be published in academic journals, but there will be no way of identifying you as a participant.

### **Who will manage my treatment if I take part?**

There will be no change to any treatment you receive through the North Western Adelaide Health Service as a result of your participation in this study.

### **What are my rights?**

Taking part in the study is voluntary and you can withdraw at any stage. The information collected as part of this study will remain in a secure location at CSIRO for a period of seven years. After this time the information will be destroyed.

### **What are the risks and/or discomforts in the study?**

It is not anticipated that any risk or discomfort will arise from your participation in this study.

### **Voluntary Participation - what happens if I say no?**

If you decide you do not want to take part in the study, your involvement in the North West Adelaide Health Study will not be affected nor will the care and attention that you get at the North Western Adelaide Health Service (The Queen Elizabeth Hospital & the Lyell McEwin Health Service) or from your general practitioner change.

### **Funding**

This project is funded by the Australian Research Council and is supported by The University of Adelaide, the University of South Australia and CSIRO.

### **What if I have a question about the study?**

If you would like more information about the study or have any questions, you may wish to initially contact the researcher, Kirsten Dunn, on (08) 8303 8911. Alternatively, you may wish to contact the supervisor for this project, Dr Phil Mohr, on (08) 8303 8935. This study has been approved by the University of Adelaide, School of Psychology Human Ethics Subcommittee; the University of South Australia Human Research Ethics Committee; the CSIRO Human Research Ethics Committee; the Ethics of Human Research Committee of The Queen Elizabeth Hospital and the Lyell McEwin Health Service; and the Management Committee of the North West Adelaide Health Study. Should you wish to speak to a person not directly involved, in particular in relation to matters concerning policies, information about the conduct of the study or your rights as a participant, or should you wish to make a confidential complaint, please contact either the Executive Officer of the University of South Australia Human Research Ethics Committee on (08) 8302 3118 or the convener of the Subcommittee for Human Research in the School of Psychology, University of Adelaide, Associate Professor Paul Delfabbro on (08) 8303 5744.

*Thank you very much for your time and assistance.*



**"How do you feel about different foods?"**

*Instruction pages for participants*

## **Initial General Instructions**

### **PAGE 1**

To make it easier for yourself:

- close down any other programs that you have running
- try to minimise any other distractions around you

Supply relevant IT hints such as:

- turn brightness setting to maximum
- enable JavaScript

If you would like to exit the study, simply close the page.

[Click here to begin](#)

### **PAGE 2**

You will be asked to complete three tasks.

In two separate IAT tasks, you will be asked to sort words and pictures into categories as quickly and accurately as you can. These tasks should not take you more than five minutes each.

A final task will ask you to answer some brief questions about your thoughts with regards to fast foods as well as some details about yourself.

[Click here to continue](#)



## Valance IAT

### PAGE 1

In the next task, you will be presented with a set of words or pictures and you will be asked to sort them into groups.

You will be asked to sort them as quickly as you can, but try to keep your error-rate as low as possible. Going too slowly or making too many mistakes will mean that it will not be possible to interpret your results.

This part of the study will take about 5 minutes.

[Click here to continue](#)

### PAGE 2

Please read through the following category labels and the items that belong to each of the categories. You will be asked to sort the words and images according to these categories.

<b>Positive</b>	<b>Negative</b>	<b>Fast Food</b>	<b>Non Fast Food</b>
Beneficial	Harmful	Images of fast	Images of non-
Quick	Time-consuming	foods	fast foods
Pleasant	Unpleasant		
Convenient	Inconvenient		
Cheap	Expensive		
Exciting	Tedious		

[Click here to continue](#)

### PAGE 3

- Place your left index finger on the E key and your right index finger on the I key on your keyboard
- On the next screen, two labels at the top will tell you which words or images goes with each key
- Each word or image has a correct classification. These are all fairly easy.
- The test will not give you any results if you go too slowly. Please try to go as quickly as you can.
- Expect to make a few mistakes because you are trying to go quickly. That is OK.
- For best results, please try to avoid distractions and stay focussed.

[I am ready to begin](#)

**FAST FOOD**

**NON FAST FOOD**

Put your middle or index fingers on the **E** and **I** keys of your keyboard.

Images representing the categories at the top of the screen will appear one-by-one in the middle of your screen.

When the item belongs to a category on the left, press the **E** key with the finger on your left hand.

When the item belongs to a category on the right, press the **I** key with the finger on your right hand.

Items belong to only one category.

If you make a mistake, an **X** will appear. You can fix this by pressing the other key.

This is a timed sorting task. **GO AS QUICKLY AS YOU CAN** while making as few mistakes as possible. Going too slowly or making too many errors will result in a score that cannot be interpreted.

Press the **SPACE BAR** to begin.

If you move away from the task, you may need to click inside the border to continue.

**POSITIVE**

**NEGATIVE**

Put your middle or index fingers on the **E** and **I** keys of your keyboard.

Words representing the categories at the top of the screen will appear one-by-one in the middle of your screen.

When the item belongs to a category on the left, press the **E** key with the finger on your left hand.

When the item belongs to a category on the right, press the **I** key with the finger on your right hand.

Items belong to only one category.

If you make a mistake, an **X** will appear. You can fix this by pressing the other key.

This is a timed sorting task. **GO AS QUICKLY AS YOU CAN** while making as few mistakes as possible. Going too slowly or making too many errors will result in a score that cannot be interpreted.

Press the **SPACE BAR** to begin.

If you move away from the task, you may need to click inside the border to continue.

**FAST FOOD**  
**or**  
**POSITIVE**

**NON-FAST FOOD**  
**or**  
**NEGATIVE**

See above, the four categories you saw separately now appear together.

Remember, each item belongs to only one group. For example, pictures of fast food belong to the **fast food** category, pictures of non-fast food belong to the **non-fast food** category, positive words belong to the **positive** category and negative words belong to the **negative** category.

Use the **E** and **I** keys to categorise items into the four groups on the left and right. Correct any errors by hitting the other key.

Press the SPACE BAR to begin.

If you move away from the task, you may need to click inside the border to continue.

**FAST FOOD**  
**or**  
**POSITIVE**

**NON-FAST FOOD**  
**or**  
**NEGATIVE**

Sort the same four categories again.

Remember to go as quickly as you can while making as few mistakes as possible.

Use the **E** and **I** keys to categorise items into the four groups on the left and right. Correct any errors by hitting the other key.

Press the SPACE BAR to begin.

If you move away from the task, you may need to click inside the border to continue.

PAGE 8 - STEP 5

**NON-FAST FOOD**

**FAST FOOD**

Notice above, there are only two categories and they have switched positions.

The category that was previously on the left, is now on the right and the category that was previously on the right, is now on the left.

Please practice with this new configuration.

Use the **E** and **I** keys to categorise items left and right. Correct any errors by hitting the other key.

Press the SPACE BAR to begin.

If you move away from the task, you may need to click inside the border to continue.

PAGE 9 - STEP 6

**NON-FAST FOOD**

**or**

**POSITIVE**

**FAST FOOD**

**or**

**NEGATIVE**

See above, the four categories now appear together in a new configuration. Remember, each item belongs to only one group.

Use the **E** and **I** keys to categorise items into the four groups left and right. Correct any errors by hitting the other key.

Press the SPACE BAR to begin.

If you move away from the task, you may need to click inside the border to continue.

**NON-FAST FOOD**  
**or**  
**POSITIVE**

**FAST FOOD**  
**or**  
**NEGATIVE**

Sort the same four categories again. Remember to go as quickly as you can while making as few mistakes as possible.

Use the **E** and **I** keys to categorise items into the four groups left and right. Correct any errors by hitting the other key.

Press the SPACE BAR to begin.

If you move away from the task, you may need to click inside the border to continue.

# Psychosomatic IAT

## PAGE 1

In the next task, you will be presented with a set of words or pictures and you will be asked to sort them into groups.

You will be asked to sort them as quickly as you can, but try to keep your error-rate as low as possible. Going too slowly or making too many mistakes will mean that it will not be possible to interpret your results.

This part of the study will take about 5 minutes.

[Click here to continue](#)

## PAGE 2

Please read through the following category labels and the items that belong to each of the categories. You will be asked to sort the words and images according to these categories.

<b>Positive</b>	<b>Negative</b>	<b>Fast Food</b>	<b>Non Fast Food</b>
Enticed	Disgusted	Images of fast	Images of non-
Carefree	Guilty	foods	fast foods
Energetic	Lethargic		
Robust	Unwell		
Gratified	Disappointed		
Content	Discontent		

[Click here to continue](#)

## PAGE 3

- Place your left index finger on the **E** key and your right index finger on the **I** key on your keyboard
- On the next screen, two labels at the top will tell you which words or images goes with each key
- Each word or image has a correct classification. These are all fairly easy.
- The test will not give you any results if you go too slowly. Please try to go as quickly as you can.
- Expect to make a few mistakes because you are trying to go quickly. That is OK.
- For best results, please try to avoid distractions and stay focussed.

[I am ready to begin](#)

**FAST FOOD**

**NON FAST FOOD**

Put your middle or index fingers on the **E** and **I** keys of your keyboard.

Words or images representing the categories at the top of the screen will appear one-by-one in the middle of your screen.

When the item belongs to a category on the left, press the **E** key with the finger on your left hand.

When the item belongs to a category on the right, press the **I** key with the finger on your right hand.

Items belong to only one category.

If you make a mistake, an **X** will appear. You can fix this by pressing the other key.

This is a timed sorting task. **GO AS QUICKLY AS YOU CAN** while making as few mistakes as possible. Going too slowly or making too many errors will result in a score that cannot be interpreted.

Press the **SPACE BAR** to begin.

If you move away from the task, you may need to click inside the border to continue.



**POSITIVE**

**NEGATIVE**

Put your middle or index fingers on the **E** and **I** keys of your keyboard.

Words representing the categories at the top of the screen will appear one-by-one in the middle of your screen.

When the item belongs to a category on the left, press the **E** key with the finger on your left hand.

When the item belongs to a category on the right, press the **I** key with the finger on your right hand.

Items belong to only one category.

If you make a mistake, and **X** will appear. You can fix this by pressing the other key.

This is a timed sorting task. **GO AS QUICKLY AS YOU CAN** while making as few mistakes as possible. Going too slowly or making too many errors will result in a score that cannot be interpreted.

Press the **SPACE BAR** to begin.

If you move away from the task, you may need to click inside the border to continue.

**FAST FOOD**  
**or**  
**POSITIVE**

**NON-FAST FOOD**  
**or**  
**NEGATIVE**

See above, the four categories you saw separately now appear together.

Remember, each item belongs to only one group. For example, pictures of fast food belong to the **fast food** category, pictures of non-fast food belong to the **non-fast food** category, positive words belong to the **positive** category and negative words belong to the **negative** category.

Use the **E** and **I** keys to categorise items into the four groups on the left and right. Correct any errors by hitting the other key.

Press the SPACE BAR to begin.

If you move away from the task, you may need to click inside the border to continue.

**FAST FOOD**  
**or**  
**POSITIVE**

**NON-FAST FOOD**  
**or**  
**NEGATIVE**

Sort the same four categories again.

Remember to go as quickly as you can while making as few mistakes as possible.

Use the **E** and **I** keys to categorise items into the four groups on the left and right. Correct any errors by hitting the other key.

Press the SPACE BAR to begin.

If you move away from the task, you may need to click inside the border to continue.

PAGE 8 - STEP 5

**NON-FAST FOOD**

**FAST FOOD**

Notice above, there are only two categories and they have switched positions.

The category that was previously on the left, is now on the right and the category that was previously on the right, is now on the left.

Please practice with this new configuration.

Use the **E** and **I** keys to categorise items left and right. Correct any errors by hitting the other key.

Press the SPACE BAR to begin.

If you move away from the task, you may need to click inside the border to continue.

PAGE 9 - STEP 6

**NON-FAST FOOD**

**or**

**POSITIVE**

**FAST FOOD**

**or**

**NEGATIVE**

See above, the four categories now appear together in a new configuration. Remember, each item belongs to only one group.

Use the **E** and **I** keys to categorise items into the four groups left and right. Correct any errors by hitting the other key.

Press the SPACE BAR to begin.

If you move away from the task, you may need to click inside the border to continue.

**NON-FAST FOOD**  
**or**  
**POSITIVE**

**FAST FOOD**  
**or**  
**NEGATIVE**

Sort the same four categories again. Remember to go as quickly as you can while making as few mistakes as possible.

Use the **E** and **I** keys to categorise items into the four groups left and right. Correct any errors by hitting the other key.

Press the SPACE BAR to begin.

If you move away from the task, you may need to click inside the border to continue.

## Factors Influencing Food Choices

I am interested in learning more about the food choices that people make with a particular interest in people's use and perceptions of fast foods.

For the purpose of this study, please consider fast foods to be those that most people would consider typical, standard, fast foods such as burgers, chips/fries, pizzas, or deep-fried chicken purchased in ready-to-eat packages from large, franchised chains such as Pizza Hut, Dominos, McDonalds, Hungry Jacks, Kentucky Fried Chicken, or Red Rooster. The food may be that which is either eaten in the restaurant or taken away.

Please respond to each question. There are no correct or incorrect answers. I am interested in your *honest* feelings and responses, not in what you think you *should* answer.

1. Please click the most appropriate box to indicate, on average, how often you eat fast food

<input type="checkbox"/>	Never
<input type="checkbox"/>	Occasionally
<input type="checkbox"/>	Once per month
<input type="checkbox"/>	Once per fortnight
<input type="checkbox"/>	Once per week
<input type="checkbox"/>	2-3 times per week
<input type="checkbox"/>	4-6 times per week
<input type="checkbox"/>	Once a day
<input type="checkbox"/>	More than once per day

**Please click on the place on the following scales that best represents your response to each question.**

**Please assume the term 'frequently' to mean 3 or more times a week**

2. To me, eating fast food frequently is:

harmful	1	2	3	4	5	6	7	beneficial
quick	1	2	3	4	5	6	7	time consuming
convenient	1	2	3	4	5	6	7	inconvenient
unpleasant	1	2	3	4	5	6	7	pleasant
cheap	1	2	3	4	5	6	7	expensive
exciting	1	2	3	4	5	6	7	tedious

3. When I eat fast food, I feel:

enticed	1	2	3	4	5	6	7	disgusted
guilty	1	2	3	4	5	6	7	carefree
energetic	1	2	3	4	5	6	7	lethargic
unwell	1	2	3	4	5	6	7	robust
gratified	1	2	3	4	5	6	7	disappointed
discontent	1	2	3	4	5	6	7	content

Please assume the term 'frequently' to mean 3 or more times a week and click the place on the following scales that best represents your response to each question.

	strongly disagree							strongly agree
4. The people in my life whose opinions I value eat fast food frequently	1	2	3	4	5	6	7	
5. Most people who are important to me think that I should eat fast food frequently	1	2	3	4	5	6	7	
6. Those close to me expect me to eat fast food frequently	1	2	3	4	5	6	7	
7. Those who are close to me eat fast food frequently	1	2	3	4	5	6	7	
8. I have complete control over the number of times I will eat fast food over the next month	1	2	3	4	5	6	7	
9. How often I will eat fast food over the next month is mostly up to me	1	2	3	4	5	6	7	
10. It would be impossible for me not to eat fast food regularly over the next month	1	2	3	4	5	6	7	
11. If I wanted to, I could avoid eating fast food regularly over the next month	1	2	3	4	5	6	7	
12. I am likely to eat fast food frequently over the next month	1	2	3	4	5	6	7	
13. Given my lifestyle and/or taste preferences, it is likely that I will eat fast food frequently over the next 4 weeks	1	2	3	4	5	6	7	

Finally, please provide some general information about yourself.

14. Age:

15. Sex:            Male           

                        Female           

16. Education level:            Secondary education           

  TAFE or other  
  accredited qualification           

  University degree           

  Postgraduate education           

17. Height (in cms)           

18. Weight (in kgs)           

**Please feel free to make any additional comments.**

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**Thank you very much for taking the time to complete this questionnaire.**

A summary of the findings of this research can be forwarded to you as soon as they have been completed. If you would like to receive a copy, please provide either the postal or email address that you would like them to be sent to.

Postal address

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or e-mail address

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