

Exploring fast food consumption behaviours and social influence

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- Contents -

- List of Tables -	v
- List of Figures -	vi
- Overview of Chapters -	vii
- Summary -	viii
- Declaration -	x
- Acknowledgements -	xi
1 Chapter One: Obesity, changing eating patterns and fast foods	1
1.1 Obesity	1
1.1.1 Global increase in obesity rates	2
1.1.2 Direct and indirect consequences of obesity	4
1.1.3 Energy equilibrium: An explanation for obesity	5
1.2 Eating patterns and changing diets	7
1.2.1 The increase in the consumption of meals prepared away from the home and nutritional implications	7
1.3 Understanding fast food consumption	9
1.3.1 Defining fast foods	9
1.3.2 Fast food consumption in Australia	13
1.3.3 The fast food consumer	16
1.3.4 Why do people consume fast food?	17
1.3.5 Underlying reasons for the shift toward 'convenience' foods	19
1.4 Fast food and obesity	21
1.4.1 Fast food consumption, weight gain and obesity: A review of existing studies	22
1.4.2 Energy density: How fast food may promote overconsumption	28
1.4.3 Meal deals: How fast food environments may encourage consumption	30
1.5 Summary of literature	31
1.6 Objectives of the current research	32
2 Chapter Two: A study of the current macronutrient profile of fast food in Australia	34
2.1 Methods	35
2.1.1 The construction of 'traditional' fast food meals	36
2.1.2 Healthier alternatives	37
2.1.3 Nutritional calculations	37
2.2 Results	38
2.3 Discussion	42
2.3.1 Summary of analysis	45
3 Chapter Three: Social influence and food intake - A review of the literature	46
3.1 Modelling and social norms	47
3.1.1 Social Modelling	47
3.1.2 Social Norms	51
3.1.3 Normative overeating	56
3.2 Social Facilitation	57
3.2.1 Social facilitation and eating behaviours	58
3.2.2 The time-extension hypothesis	60
3.2.3 Beyond duration	64
3.3 Relationships: the potential moderator of social influence	67
3.3.1 Sources of influence	68

3.3.2	Research on relationships and social influence	70
3.4	Social Influence and fast food	73
3.4.1	Environmental Pressure	73
3.4.2	Normative influence and social facilitation	74
3.4.3	The 'who' of social influence	75
3.4.4	Fast food behaviours	76
3.5	Aims of subsequent studies	77
4	Chapter Four: Development of the Fast Food Survey and Preliminary Examination of Social Influences on Fast Food Consumption	78
4.1	Development of the Fast Food Survey (FFS)	79
4.1.1	The Fast Food Choices Program (FFCP)	81
4.1.2	Measuring Correlates of Consumption	83
4.2	Surveying at the Royal Adelaide Show	86
4.2.1	Procedure	86
4.2.2	Assessment of outliers	88
4.2.3	Adjustments to orders	88
4.2.4	Recoding	89
4.3	Results	90
4.3.1	Usability	90
4.3.2	Final sample	90
4.3.3	The relationship between demographic factors and fast food consumption	92
4.3.4	Fast food behaviours	94
4.3.5	Fast foods eaten and the potential for overconsumption	99
4.3.6	The influence of micro-environmental pressures on fast food consumption	102
4.3.7	Social influences and fast food consumption	104
4.4	Discussion	108
4.4.1	The Fast Food Survey: Strengths and limitations	109
4.4.2	Demographic characteristics and fast food consumption	110
4.4.3	Behaviours, motivators and context surrounding fast food consumption	112
4.4.4	Fast food: Potential for overconsumption	113
4.4.5	Social influences and fast food consumption	114
4.4.6	Conclusions from the initial FFS	117
5	Chapter Five: Social influences on amount of fast food consumed in one visit - Testing a structural model	119
5.1	Testing existing social influence models in fast food	119
5.1.1	Extending Feunekes et al.'s model of social facilitation to fast food consumption	121
5.1.2	The goal of the current study	123
5.1.3	Using survey methods to explore social influence	124
5.2	Procedure	126
5.2.1	A brief introduction to Internet methods	126
5.2.2	Pilot testing of the Fast Food Survey (FFS) delivered on the Internet	127
5.2.3	Recruitment methods and outcomes	128
5.3	Approach to analysis	129
5.3.1	Descriptive data	129
5.3.2	Methods for modelling	130
5.3.3	Limiting the reverse relationship between time spent eating and the amount eaten	131
5.4	Data adjustments and recoding	133
5.4.1	Assessment of outliers	133
5.4.2	Adjustments to reported fast food orders and variable recoding	133

5.4.3	Coding free-response items _____	135
5.5	Results from descriptive data _____	137
5.5.1	Demographic characteristics of the final sample _____	137
5.5.2	Reported fast food behaviours _____	138
5.5.3	Relationships between social variables _____	139
5.5.4	Conclusions from descriptive analyses _____	140
5.6	Modelling increased energy intake from fast food items _____	142
5.6.1	Confirming the model of social facilitation in fast food intake _____	142
5.6.2	Conclusions from preliminary modelling _____	146
5.6.3	The effect of 'who' is present in the model of social facilitation _____	149
5.6.4	Personal relationships and social facilitation – conclusions _____	152
5.6.5	Expanding the model of social facilitation for fast food intake _____	154
5.6.6	Conclusions from modelling fast food intake in males and females _____	159
5.6.7	Altered intake in those people eating in the presence of others _____	160
5.6.8	Conclusions from the analysis of those who ate with others _____	162
5.7	Conclusions from the FFS administered through the Internet _____	163
5.7.1	The model of social facilitation for fast food consumption _____	163
5.7.2	The indirect effects of the presence of others on intake at a single fast food eating occasion: Meal duration and eating atmosphere _____	164
5.7.3	How who is present influences intake when consuming fast food _____	166
5.7.4	Micro-environmental influences on fast food consumption _____	167
5.7.5	Sex differences, women and social influence during fast food consumption _____	168
5.7.6	Limitations of the current study _____	169
5.7.7	Directions for future research _____	171
6	Chapter Six: Fast food consumption, minimal eating and impression management _	174
6.1	Women and eating lightly: A review of the literature _____	175
6.1.1	Impression management and sex roles: Mechanisms behind minimal eating norms _	180
6.1.2	Fast food and impression management _____	182
6.1.3	Aims of the current study _____	183
6.2	Method _____	186
6.2.1	Development _____	186
6.2.2	Piloting _____	187
6.2.3	Procedure _____	189
6.2.4	Calculation of energy intake _____	191
6.2.5	Data screening _____	192
6.3	Preliminary statistics _____	193
6.3.1	Descriptive data _____	193
6.3.2	Covariates _____	194
6.4	Hypothesis testing _____	196
6.4.1	Analysis of the effects of the presence of others _____	196
6.4.2	Lone diners and reading _____	197
6.4.3	Intra-group matching of intake _____	198
6.4.4	Minimal eating norms _____	200
6.5	Discussion _____	202
6.5.1	Time-extension in a fast food restaurant _____	203
6.5.2	Matching norms and their influence on fast food consumption _____	203
6.5.3	Evidence of minimal eating in fast food consumption _____	205
6.5.4	Lone diners and reading _____	207
6.5.5	Conclusions _____	208

6.6	A Cross-Cultural Comparison of Fast Food Behaviours in a Naturalistic Environment	211
6.6.1	Assessing eating behaviours in a Norwegian sample	214
6.6.2	Results	215
6.6.3	Dining at McDonald's in Norway compared to Australia	216
6.6.4	Discussion and conclusions	217
7	Chapter Seven: A summary of the findings and implications of the current research	221
7.1	Overview of current research	222
7.2	Social influence and fast food consumption behaviours	224
7.2.1	Social facilitation and the time-extension hypothesis	224
7.2.2	Minimal eating norms and gender	226
7.2.3	Where do norms start and finish?	229
7.2.4	The 'who' factor of social influence	230
7.2.5	Do social influences affect fast food consumption?	232
7.3	Unravelling fast food consumption	233
7.3.1	The culture surrounding fast food consumption	234
7.3.2	Fast food consumption behaviours and the potential for weight gain	236
7.3.3	Integrating knowledge of fast food behaviours and social influence for health promotion	239
7.4	Conclusion	240
	References	242
	Appendix 1: Paper on macronutrient profile of fast foods in Australia	I
	Appendix 2: Nutritional information following Fast Food Survey	VIII
	Appendix 3: Fast Food Survey Questions + Information Sheet	X
	Appendix 4: Example screenshots of Fast Food Survey (FFS)	XVIII
	Appendix 5: Completed piloting form	XXIII
	Appendix 6: Request for participation in Fast Food Survey to NWAHS members	XXVI
	Appendix 7: Summary of Exploration of Portion Size Items	XXVII
	Appendix 8: Data collection instrument for the observational study	XLV

- List of Tables -

Table 1: Example definitions used in previous studies about 'fast foods'.	11
Table 2: Description of the demographic characteristics of the sample ($n=116$).	91
Table 3: Frequency of fast food consumption in pilot sample ($n=116$) [†] .	92
Table 4: Total variance explained (Adjusted R^2), beta values and significance levels for a model predicting the amount of energy consumed at a fast food eating occasion using demographic factors ($n=116$).	93
Table 5: Frequency of meal types, location and time of consumption for the RAS sample ($n=116$).	95
Table 6: Coded categories and associated frequencies for both open-response items.	99
Table 7: Energy (KJ) and fat content of fast food consumed by pilot participants [†] .	100
Table 8: Mean response to items measuring social influence on eating.	104
Table 9: Correlations between energy consumed and ratings of the eating environment for whole sample ($n=116$).	105
Table 10: Models for social variables predicting energy intake at a fast food eating occasion. Total variance (Adjusted R^2), betas and alphas are presented for each predictor ($n=91$).	108
Table 11: Description of the demographic characteristics of the Internet sample ($n=407$).	137
Table 12: Frequency of fast food behaviours reported by the Internet sample ($n=407$).	138
Table 13: Correlation values (Pearson's r) for the social facilitation measures ($n=407$).	140
Table 14: Correlation values (Pearson's r) for the social facilitation measures. Values for females ($n=272$) are presented above the diagonal, values for males ($n=135$) are below the diagonal.	143
Table 15: Total variance explained (Adjusted R^2) and beta values for the dependent variables <i>energy intake</i> (Energy), <i>time spent eating</i> (Time) and <i>pleasantness of atmosphere</i> (Atmos) for both male and female respondents in the Internet sample.	144
Table 16: Total variance explained (Adjusted R^2) and beta values for the dependent variables <i>energy intake</i> (Energy), <i>time spent eating</i> (Time) and <i>pleasantness of atmosphere</i> (Atmos) for both male and female respondents in the Internet sample in the model including separated interpersonal relationships.	150
Table 17: Total variance explained (Adjusted R^2) and beta values for the dependent variables <i>energy intake</i> (Energy), <i>time spent eating</i> (Time) and <i>pleasantness of atmosphere</i> (Atmos) for both male and female respondents in the Internet sample for the expanded model.	155
Table 18: Predictors of energy intake (with associated Beta values) in female participants who reported eating with at least one other person ($n=204$).	161
Table 19: Description of the sample as frequency data ($n=298$).	193
Table 20: Comparison of energy consumed (KJ) and time spent eating between different levels of the variables measured*.	194
Table 21: Frequency of matching orders for groups of different sizes and different sex composition.	198
Table 22: Means and standard deviations for KJ consumption from fast food items for both two-way (sex by sex composition) and three-way interaction effects (sex by sex composition by group size)*.	201
Table 23: Demographic characteristics of the samples of consumers observed in Oslo ($n=48$) and Adelaide ($n=298$).	215

- List of Figures -

Figure 1: Percentage of Australians making fast food purchases in last four weeks*.	13
Figure 2: McDonald's, Hungry Jack's, Pizza Hut and KFC restaurants in the Adelaide metropolitan Area. Red circles indicate multiple restaurants within a 1 kilometre radius.	15
Figure 3: The percentage of daily guidelines of macronutrients accounted for by traditional fast food meals.	39
Figure 4: The percentage of daily guidelines of macronutrients accounted for by healthier fast food meals.	40
Figure 5: Feunekes et al.'s (1995) tested model of social facilitation. NB. Numbers next to arrows represent path/beta values	61
Figure 6: Mean time spent eating for different group sizes at the reported fast food eating occasion ($n=116$).	106
Figure 7: Box plots for time spent eating from the Internet sample (InternetSs; in blue) and the fair sample (RASSs; in green).	126
Figure 8: First-time visitors to www.fastfoodstudy.com.au with recruitment dates and associated recruitment methods labelled.	129
Figure 9: Activities preceding consumption according to the response categories from the Internet (blue) and fair (green) samples.	136
Figure 10: Reasons for fast food consumption from the Internet sample (blue) and the fair sample (green).	136
Figure 11: Significant paths from group size to energy intake from fast food items in males ($n=131$).	145
Figure 12: Significant paths from group size to energy intake from fast food items in females ($n=266$).	145
Figure 13: Significant paths from interpersonal relationships to energy intake from fast food items in males ($n=131$).	150
Figure 14: Significant paths from interpersonal relationships to energy intake from fast food items in females ($n=266$).	151
Figure 15: Significant paths for interpersonal relationships, time spent eating and energy intake from fast food items in males ($n=131$).	156
Figure 16: Significant paths for interpersonal relationships, time spent eating and energy intake from fast food items in females ($n=263$).	156
Figure 17: Interaction effects for subject sex, group composition and group size on KJ intake from fast foods.	202

- Overview of Chapters -

Chapter One:

Reviews the literature on obesity, shifting eating patterns, fast food consumption and any associations between them.

Chapter Two:

Presents nutritional profiles comparing macronutrients of selected fast food meals available in Australia.

Chapter Three:

Reviews the existing literature on the social influences on eating behaviours.

Chapter Four:

Describes the development of the Fast Food Survey (FFS) and an initial study exploring demographic, environmental and social correlates of fast food consumption.

Chapter Five:

Presents a model of social facilitation that is tested and refined in the context of fast food consumption in a second FFS sample.

Chapter Six:

Explores how minimal eating norms could alter fast food intake and presents an observational study followed by a smaller cross-cultural study.

Chapter Seven:

Summarises the findings and implications of the current research.

- Summary -

There has been an increase in the consumption of convenience-style foods. This change has occurred concurrently with a global rise in obesity rates which has led to some researchers blaming the increased consumption of 'big brand' fast foods (such as McDonald's) for expanding waistlines. Nutritional profiling in the initial study showed that the energy provided in a typical fast food meal seemed 'appropriate' in terms of a general daily intake but that increased meal sizes, poor ordering decisions and choice of fast food restaurant could influence energy balance and long-term health outcomes.

Even though fast foods are occupying a larger part of the diet, limited previous research has explored how social influences (including modelling, social norms and social facilitation) may increase the intake of fast foods. Therefore the aim of this dissertation was to explore environmental, social and demographic influences on the amount of fast food consumed at a single eating occasion.

The Fast Food Survey (FFS) was developed and administered to two samples to collect information – including the item/s eaten and any social, environmental or demographic influences that surrounded the consumption – on participants' most recent visit to one of the large fast food chains in Australia. Results from an initial sample ($n=116$) revealed both the effectiveness of the program that delivered the FFS and support for the hypothesis that environmental and social factors could influence the amount of fast food consumed.

A second study using the FFS aimed to test and develop an existing model of social facilitation (originally developed using 'general' eating behaviours) in the specific context of fast food consumption. Accordingly, a larger sample ($n=407$) was recruited

via the Internet. Following path analysis, there was support for the time-extension hypothesis in the current data; eating with other people predicted the time spent eating which subsequently predicted energy consumption from fast food items. Beyond the simple effects of time-extension, further modelling showed that environmental factors, including reasons, for consumption could be associated with increased fast food intake.

Analysis of data from the second FFS study showed that men and women were influenced differently by their eating environment – there was a negative direct effect of other people on women’s energy intake from fast food items. The theory of minimal eating suggests that gender roles may alter eating behaviours and offers some explanation for this result. An observational study was conducted in McDonald’s to assess how the presence of male and female company could influence fast food intake in both sexes. A comparison of energy intake by participant sex, group size and the sex composition of the group revealed support for minimal eating norms – men eating with other men ate the most food, while women eating with men ate the least food.

Overall, the chapters presented in this dissertation show that, in a fast food consumption context, multiple social influences occur. Therefore, despite changes in the types of food being consumed, the mechanisms altering eating behaviours may be relatively stable. Given the potential association between weight gain and the consumption of fast foods, understanding these influences is a first step toward future intervention.

- Declaration -

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Emily Brindal
April 2010

- Acknowledgements -

“La reconnaissance est la mémoire du coeur”

Gratitude is the memory of the heart

- Jean Baptiste Massieu

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1 Chapter One: Obesity, changing eating patterns and fast foods

1.1 Obesity

Seidell (2000) emphasised the seriousness of the rising rate of obesity by referring to it as a “worldwide epidemic”. Subsequent publications have also noted the global scale of the problem (Wadden, Brownwell, & Foster, 2002). Obesity has been investigated for over 40 years (e.g., Schachter, 1968), and there is an extensive body of recent research that has attempted to identify causes for the escalating rates of incidence in diverse countries.

Generally, Body Mass Index (BMI) is used as a population-level indicator of obesity. BMI is calculated by dividing weight by height squared; this provides an indication of weight relative to height. A BMI between 25 and 29 is generally considered overweight while 30 and above is considered obese in Europeans (World Health Organisation, 1995). There is slight variation in these cut-offs for different ethnic populations (World Health Organisation & International Association for the Study of Obesity - International Obesity Task Force, 2000). There has been criticism of BMI as a measure of obesity as it does not make any allowance for body shape or muscle mass. More fundamentally, BMI has limited scope as a predictor of obesity-related health problems such as metabolic syndrome¹. In clinical settings, it is recommended that obesity be measured through assessment of fat distribution, such as waist circumference and hip to waist ratio, as these methods of measurement have been shown to be better predictors of health risks associated with obesity (Haslam & Wittert, 2009; Public Health Service National

¹Metabolic syndrome describes the presence a group of common risk factors for myocardial infarction in an individual. These risk factors include poor glycemic control, abdominal obesity, dyslipidemia and hypertension (Haslam & Wittert, 2009).

Institutes of Health National Heart Lung and Blood Institute, 1998; Seidell & Flegal, 1997). In the past, BMI has been most commonly used to define obesity².

1.1.1 Global increase in obesity rates

Although varying methodologies and definitions of obesity used in national surveys limit direct cross-national comparisons, multiple nations' reports indicate similar increases in the rates of obesity. One analysis of the US National Health and Nutrition Examination Survey (NHANES) indicated that while rates of obesity were stable throughout the 1980s, in the past 20 years they have doubled (Baskin, Ard, Franklin, & Allison, 2005). The national prevalence of obesity among American adults is now reported to be 30.4% (Baskin et al., 2005). In New Zealand, the Ministry of Health (2004) published a report which tracked the rates of obesity between 1977 and 2003. It showed the gradual and consistent rise in rates of obesity throughout the time span, with rates increasing from approximately 10% to just over 20%. In some 'non-Western' countries, similar patterns have been observed. For example, in Korea, in the seven years from 1995 to 2001, obesity rates rose from 13.9% to 30.6%³ of the population (Kim, Ahn, & Nam, 2005). In the UK, recent estimates of the prevalence of obesity suggest about 24% of the population is obese (Rennie & Jebb, 2005). In other parts of Europe, the 'obesity epidemic' has been less clearly established. Between 1993 and 2003, rates of obesity amongst Polish women rose from 8.9% to 15%. However, a similar trend was not observed for men in Poland (Milewicz et al., 2005).

Australia has not been untouched by the rising rates of obesity. In 1995, results of the National Nutrition Survey revealed an 18% prevalence of obesity amongst Australians

²It has been suggested that estimations of obesity rates would be higher if waist circumference were more commonly used as a population estimate of the problem (Haslam & Wittert, 2009).

³The authors used a more stringent definition of obesity (BMI = 25) than in the European and Australasian reports which use the standard BMI of 30. This was justified by the researchers given the different shape of Asian people.

(Jackson, Ball, & Crawford, 2001). In 2000, the AusDiab study also provided a snapshot of obesity in the Australian population indicating that 20.5% of the 11,247 participants were classified as obese⁴ (Dunstan et al., 2001). Subsequent follow-up assessments of the same sample indicated a 1.4 kilogram (kg) weight increase over five years⁵ (Barr et al., 2006). Follow-up assessments also revealed that twice as many people who were overweight when first surveyed became obese than went back to 'normal' weight. The Australian Institute of Health and Welfare published a report tracking obesity from 1980 to 2001 (Dixon & Waters, 2003). This revealed a similar rise in the prevalence of obesity to that reported in other countries. The number of obese adults rose from 9.3% in 1980 to 16.2% in 2001⁶.

The popular media have recently reported that Australia's rate of obesity has surpassed North America's (McLean, 2008a). Reports labelling Australians as the world's fattest people appeared in media internationally (Larter, 2008). These reports were based on a report published by the Baker Institute (Stewart, Tikellis, Carrington, Walker, & O'Dea, 2008) which indicated that 26% of Australians are obese – a rate higher than previous estimates. It is likely that the sample upon which this study was based was poorly representative of the general population. The institute took the heights and weights of 10,000 people who went to a free blood pressure check on an awareness day for Cardiovascular Disease (CVD). Therefore, given the nature of the survey, it may have attracted a higher number of obese people than one would reasonably expect from the population. There has been a body of research about the association between CVD and obesity (Australian Institute of Health & Welfare [AIHW] & National Heart Foundation of

⁴AusDiab is a prospective cohort study assessing diabetes and associated disorders, including overweight and obesity, using a variety of physical examinations. In the first phase of the study, 11,247 people completed physical assessments (Dunstan et al., 2001).

⁵ Only those who were 65 and older lost weight during the five-year period.

⁶ Results were reported by sex. These percentages were averaged to get an approximate estimate of the rate of obesity for the combined adult population.

Australia, 2004; Grundy, 2004; Poirier et al., 2006). Although there may be some contention regarding the exact rate of obesity in Australia, it is clear that the current rate of obesity is higher than it was 20 years ago. This indicates that Australia is experiencing a similar trend to the rest of the world, with rising rates of obesity.

1.1.2 Direct and indirect consequences of obesity

As obesity rates rise, so does the number of people likely to suffer from obesity-related disorders including diabetes, heart disease and cancer, all of which are associated with morbidity and mortality (James et al., 2004; NSW Centre for Public Health Nutrition & NSW Department of Health, 2003; O'Brien & Webbie, 2001). Some authors have predicted that obesity will soon pass smoking as one of the leading causes of preventable death (Sibbald, 2002). As individuals get heavier and the prevalence of obesity-related health problems increases, so does the demand on the healthcare system. This makes increasing rates of obesity a serious public health issue and a motive for research to identify its causes. In Australia a report from the National Preventative Health Taskforce (2008) has recently outlined the actual costs of obesity indicating that "high body mass was responsible for 7.5% of the total burden of disease and injury" (p.5) in 2003.

Further escalating the cost of obesity are the indirect, negative effects of obesity including the stigma currently associated with 'fatness'. Despite global increases in body weight, what is considered the ideal body has not changed to resemble this shift. Children as young as four have demonstrated a desire for an 'ideal' body⁷ (McLean, 2008b). Many obese people suffer the damaging consequences of the prejudice they experience (see, Harris & Walters, 1991; Puhl & Brownell, 2001, 2003; Roehling, 1999;

⁷ Unpublished study based on McCabe's work at Deakin University.

Wadden & Stunkard, 1985). Research comparing children's stigmatisation of obese children has shown that this prejudice is one that has increased since the 1960s (Latner & Stunkard, 2003). The existence of such prejudice further supports the societal pressure to conform to ideal body shapes. This kind of pressure amongst a population increasingly less likely to achieve such ideals may increase the prevalence of body image and eating disorders. There is a large body of literature and research on such issues (see McCabe & Ricciardelli, 2001a, 2001b; McCabe & Ricciardelli, 2003; Ricciardelli & McCabe, 2001). Klaczynski, Goold and Mudry (2004) showed that the more people valued the body image ideal, the greater their attempt to control overweight. They also reported a perception that obesity was caused by personal shortcomings.

Finally, one of the other consequences of obesity is that it may promote obesity in future generations. There is some evidence that obese mothers are more likely to have obese offspring (Shankar, Harrell, Gilchrist, Ronis, & Badger, 2007). Furthermore, obese parents are more likely to raise obese children (Epstein, Wing, & Valoski, 1985; Maffei, Talamini, & Tato, 1998; Whitaker, Wright, Pepe, Seidel, & Dietz, 1997). Some studies have also suggested that the odds of becoming obese can increase simply through knowing a person who becomes obese (Christakis & Fowler, 2007). If obesity promotes future obesity, it is unsurprising that obesity rates are rising. In the literature debate surrounds whether or not obesity is truly classifiable as a "disease" (Heshka & Allison, 2001), nevertheless, the transferrable nature obesity could be its most serious consequence.

1.1.3 Energy equilibrium: An explanation for obesity

A series of publications have explored the factors that might contribute to increasing rates of obesity. Investigations of the epidemiology of obesity have explored the

disruption to energy equilibrium. According to the energy equation, obesity occurs when more energy is consumed than is expended. Variables likely to increase energy intake, decrease expenditure, or both, can therefore be identified as risk factors for obesity. The equilibrium approach underlies most of the research exploring the factors likely to contribute to obesity (e.g., Dodd, Welsman, & Armstrong, 2008; Gerber & Corpet, 1999; Goris & Westerterp, 2008; Rodriguez & Moreno, 2008; Wells, Ashdown, Davies, Cowett, & Yang, 2007); it provides a useful starting point from which hypotheses can be developed.

The search for the potential causal pathway to obesity has focused on delineating the contributions of diet and food choice, physical activity and predilection for sedentary pastimes, genetic influences, environmental and system variables that impact on food intake and physical activity, and approaches that have synthesised a variety of potential contributors (Livingstone, 2000; Swinburn, Caterson, Seidell, & James, 2004; Weinsier, Hunter, Heini, Goran, & Sell, 1998). Other clinical research has endeavoured to establish causality through experimental interventions; only limited success is reported, with weight maintenance difficult to maintain after the initial weight loss⁸ (Scheen, 2002). Although some of these interventions have focused on physical activity (Barr et al., 2006; Wadden et al., 1997; Wing, 1999), the majority have looked at modifying foods consumed in combination with lifestyle factors (Brinkworth et al., 2004; Shai et al., 2008; Tay, Brinkworth, Noakes, Keogh, & Clifton, 2008; Yackobovitch-Gavan, Nagelberg, Demol, Phillip, & Shalitin, 2008).

Regardless of divergent views as to whether energy expenditure or intake is more crucial for maintaining energy balance, both views are based on the premise that energy

⁸There may be physiological reasons for this that involve the regulation and defence of fat mass (See, Levin, 2004, 2007; Levin & Dunn-Meynell, 2000; Mauer, Harris, & Bartness, 2001).

equilibrium (or energy balance) is an important aspect to weight maintenance, weight loss and weight gain. Despite limited success in weight maintenance, clinical trials and interventions have shown that targeting factors relevant to energy equilibrium can be a successful method for weight loss.

1.2 Eating patterns and changing diets

1.2.1 The increase in the consumption of meals prepared away from the home and nutritional implications

As a variety of technologies have become more accessible, food processing has become more common in industry and in the home (Earle, 1997; Popkin, 2001). One of the most attractive qualities of food processing is that it can make foods much more convenient to obtain and consume consequently, meals prepared away from home are now widely available and inexpensive. The increase in the consumption of meals prepared away from home has been witnessed in several different populations. For example, Cox and Foster (1985) noted a shift toward restaurant eating and the use of convenience stores in the mid-1980s. More recently, Kant and Graubard (2004) reported that between 1987 and 2000 the number of commercially prepared meals⁹ eaten per week by individuals increased by 11% to 2.77 meals per week. They also supported the commonly held belief that meals prepared away from home have different nutritional qualities to traditional, home-cooked meals and are energy dense, observing a relationship between the number of commercially prepared meals eaten and overall energy intake. How this impacted on overweight and obesity was not clear, and it cannot be assumed that greater energy intake automatically results in increased weight¹⁰.

⁹ Defined as those prepared in restaurants, fast food places or cafeterias including those eaten in, taken away or delivered.

¹⁰ Although the average commercially prepared meal is energy dense (thus increasing energy intake), people consuming these meals compensate by increasing their energy expenditure or eat less throughout the day and therefore keep their energy intake balanced. Unfortunately, given the constraints of the data, the authors could not report specifically on the participants' amount of physical activity.

Data from the USDA's Continuing Survey of Food Intakes by Individuals (CSFII; *What We Eat in America Survey*) provided a more detailed picture of changing meal patterns in the US. The CSFII is a nationwide survey that was undertaken across 50 states between 1994 and 1996. It required participants to recall their intake over a 24-hour period on two non-consecutive days, three to ten days apart. Other details recorded were the time and definition of eating occasions, water intake, the source of food, and information about height and weight (U.S. Department of Agriculture, 1997). Data were obtained for individuals two years of age or older (the intake of children being reported by the adult interviewee). The sample contained 16,103 cases including over 9,000 individuals above the age of 20. People with low incomes were slightly oversampled (J. Goldman & Borrud, 1997).

Lin and Frazao (1999) compared nutritional data collected in 1977 by the USDA to the CSFII data from 1995. They found that, during this timeframe, the nutritional quality of foods prepared at home increased more than the quality of foods prepared away from the home. The authors noted that foods prepared away from home were typically higher in fats. Guthrie, Lin and Frazao (2002) used the same datasets to establish whether there had been a shift towards consuming meals and snacks prepared away from home. They reported that 1.78 times the percentage of total dietary calories consumed came from items prepared away from home between 1994 and 1996 compared to 1977. Guthrie et al.'s analyses further confirmed the notion that these foods are more energy dense, higher in fat and less nutritious (lower in fibre, iron and calcium).

Guthrie et al. (2002) assessed the sources of calories from foods prepared away from home and reported that fast foods were the highest source of food prepared away from home at 12%, followed by foods eaten from restaurants, which accounted for 10%. In a

slightly different analysis of the CSFII data, Binkley, Eales and Jekanowski (2000) substantiated Guthrie et al.'s findings, showing that a large volume of foods prepared away from home are being consumed and that 'fast food' accounts for a high proportion of these foods.

1.3 Understanding fast food consumption

It is clear that meals prepared away from home comprise a larger part of Westernised diets. Data reported from the CFSII also suggests foods prepared away from home are energy dense. Papers from Guthrie et al. (2002), Binkley et al. (2000) and Kant and Graubard (2004) implicate fast foods in the shift toward the consumption of food prepared away from the home. Thus it appears that fast foods are important contributors to current Western diets and potentially implicated in the association between dietary change and rising rates of obesity.

1.3.1 Defining fast foods

Fast food is a specific variety of convenience food which is commonly associated with high energy density. Yet, there has been ambiguity in the definition of fast food in the existing empirical research. Some studies have preferred to leave definition of the phrase open to their participants. 'Fast food' in the CSFII questionnaire refers to food purchased from a "fast food place, pizza place" without defining fast food places for participants (U.S. Department of Agriculture, 1997). Other studies have used the style of service to differentiate fast foods from other convenience foods (Driskell et al., 2006). Even within analyses of the same study, definitions used to analyse the data have differed. Pereira et al. (2005) combined cafeteria, restaurant and fast foods in their definition of fast food. Whereas a different analysis of the same data separated the definition into restaurant and fast food categories (Duffey, Gordon-Larsen, Jacobs,

Williams, & Popkin, 2007). See Table 1 (on the following page) for examples of papers which have used the term 'fast food' and how this term has been defined.

In an empirical context it is important to have a clear definition of what constitutes fast food to improve both the validity and reliability of research in the area. A study by Dunn, Mohr, Wilson and Wittert (2007) showed that the definition of fast food can be inconsistent even within a single sample. They allowed participants to define fast foods from a list of different food items. They found that although people indicated a very broad definition of fast food when asked what style of foods classified as fast food (including burgers, fish and chips, meat pies and pasties, and bought sandwiches), when discussing fast food they gave examples which focussed only on 'traditional' fast food items such as burgers and chips from large franchises. These data are supported by research showing that most 'fast food' purchases are burgers, fries and pizza (Driskell et al., 2006).

One crucial step in arriving at a clear definition of fast foods is the differentiation of fast foods from convenience foods as a category. This distinction needs to occur because there is a wide array of foods that can be labelled convenience foods (from frozen meals to meat pies to pre-packaged salads). Fast food fits comfortably within the convenience food group, but it remains a distinct sub-category of this group. Using the style of service typical to *fast food* restaurants can distinguish fast food from other convenience foods. Even with this further refinement, the definition is still inclusive of an extensive range of foods. For example, Asian-cuisine places in local food courts could match this description but may not be associated with *fast food* by the average consumer.

Table 1: Example definitions used in previous studies about 'fast foods'.

Author/s	Definition of fast food used	Specific examples offered
CARDIA study:		
Duffey, Gordon-Larsen, Jacobs, Williams, and Popkin (2007)	"Big brand" fast food companies	Burger King, Wendy's, Arby's, Pizza Hut and Kentucky Fried Chicken
Pereira et al. (2005)	Foods from cafeterias, restaurants and fast food companies	
CSFII: U.S.		
Department of Agriculture (1997)	Food from a "fast food place, pizza place"	None
Driskell, Meckna and Scales (2006)	Food from a fast-food restaurant – somewhere food can be ordered, purchased and received within roughly ten minutes	None
French, Harnack and Jeffery (2000)	Meals from fast food restaurants	None
French, Story, Neumark-Sztainer, Fulkerson and Hannan (2001)	Food from "fast food restaurants"	McDonald's, Burger King etc.
Guthrie, Lin and Frazao (2002)	Those purchased from a fast food place that had quick service but did not have waiters or table service	None
Jeffery, Baxter, McGuire and Linde (2006)	"Fast food" restaurants, quick service burger, quick service roast beef, and quick service pizza parlour	McDonald's, Long John Silver's, Taco Bell
Popkin, Siega-Riz, Haines and Jahns (2001)	Fast food	Mexican food, Chinese food, french fries, hamburgers and cheeseburgers
Reidpath, Burns, Garrad, Mahoney and Townsend (2002)	Five largest quick-service restaurants in Australia	McDonald's, Hungry Jack's, KFC, Pizza Hut or Red Rooster
Roy Morgan (2006)	"Fast food"	Initially none, then asked about purchases from McDonald's, KFC, Subway, Hungry Jack's and Domino's (Pizza)
Unger et al. (2004)	Something to eat from fast food restaurants	MacDonalds (sic), Burger King, Dominoes (sic), Pizza Hut, Taco Bell, or other fast-food restaurants

It appears that the clearest and most consistent definition of fast foods is one that involves “big brand” fast foods (Duffey et al., 2007). Reidpath et al. (2002) classified fast food as all the items available from the five largest quick-service¹¹ restaurants in Australia. As these restaurants represent the majority of national fast food chains, they should be representative of the cultural understanding of fast food within the general population. Defining fast food in this way also restricts the number of potential foods and restaurants that can be included within the category. This limit is crucial for both researchers and participants to ensure homogeneity in interpretation.

In Reidpath et al.’s original definition of fast food, the top five fast food chains in Australia were McDonald’s, Hungry Jack’s (a.k.a. Burger King), KFC (Kentucky Fried Chicken), Pizza Hut, and Red Rooster (Reidpath et al., 2002). Since this publication, two new dominant companies have emerged in the fast food market in Australia: Domino’s Pizza and Subway. Domino’s Pizza now claims to be “Australia’s largest pizza maker”, having had 360 stores open across Australia in 2005 (Domino's Pizza Enterprises Ltd., 2005). Subway has also cemented its place amongst the major fast food chains in Australia. McDonald’s, KFC and Subway alone account for over 65% of market share for takeaway meals in Australia (Burke, 2007). Subway is a different style of fast food where its customers choose between a predetermined set of ingredients to create their own six-inch or foot-long roll with filling. Subway is also different from the traditional style of fast food as it actively promotes a healthy image to consumers. For example, Subway spokesperson Jared Fogle reports having lost “245 pounds” on the Subway diet and is their self-proclaimed “weight-loss hero” (Doctor’s Associates Inc., 2002). Roy Morgan (2006) data support the shift in market share since the Reidpath et al. paper. Many

¹¹ Quick-service restaurant is a term used in the industry that is synonymous with fast food restaurant. As is the case with the term ‘fast food’, there is no clear definition as to what exactly constitutes “quick-service”.

people in the study indicated that they had eaten from Subway and/or Domino's Pizza in the past four weeks. The percentages for people reporting eating fast food from different fast food chains can be seen in Figure 1.

NOTE:
This figure is included on page 13
of the print copy of the thesis held in
the University of Adelaide Library.

Figure 1: Percentage of Australians making fast food purchases in last four weeks*.

*Data reconstructed from Roy Morgan press release September 15, 2006

Q: How many times have you visited or purchased (fast food or from [company name]) in the last four weeks?

The "big brand" characterisation of fast food is useful for defining fast foods. The actual companies that are the in the top fast food chains will shift relative to market trends and cohorts. Therefore, researchers will need to be wary of these shifts when establishing which fast food companies represent a large portion of the market share in a given time and location.

1.3.2 Fast food consumption in Australia

Although CFSII data indicate that fast food is occupying a large part of the diet in the US, there is limited data about fast food habits in Australia. Data about food spending from the Australian Bureau of Statistics *Household Expenditure Survey* (2000) support data in the US showing that foods prepared away from the home are becoming an increasing

part of the diet. At the time of the survey, an average of \$127 per week was spent on foods and non-alcoholic beverages, with meals eaten away from home occupying the largest percentage of this spending (26.77%). Furthermore, takeaway and fast foods accounted for 55.88% (\$19 per week) of all meals eaten out. Therefore, it appears that, as in the US, convenience foods are occupying a large part of the diet in Australia.

It is undeniable that big brand fast foods are readily available in Australia. Major fast food restaurants exist in all the metropolitan centres. For example, in Adelaide (Australia's fifth largest city: Australian Bureau of Statistics, 2007) there are multiple fast food locations in all metropolitan regions with many suburbs having several restaurants (see Figure 2 on the following page).

Despite the high number of quick-service restaurants, it is difficult to determine how many Australians are actually consuming fast food. A survey conducted by Independent Grocers of Australia (IGA) suggested that 57% of people eat fast food at least once a week (FOODweek, 2008). A large report on fast food consumption conducted by market research company Roy Morgan (2006) aimed to get a snapshot of fast food consumption habits across Australia. Between July 2005 and June 2006, the company asked 25,000 Australians aged 14 years and over if they had purchased fast food in the four weeks preceding the interview. Sixty-three percent of respondents (over 15,000 people) indicated that they had consumed fast food in the past month. A comparison of these data with results collected internationally by Roy Morgan showed that proportionately fewer Australians reported having fast food than people in the US (80%) and New Zealand (67%), but more than in the UK (56%). Mohr, Wilson, Dunn, Brindal and Wittert (2007) reported that 32.7% of 17,354 respondents to a nationwide AC Nielsen survey

indicated that they consumed 'dine in' fast food several times per week. Only 15.6% of this sample indicated that they never consumed dine in fast foods.

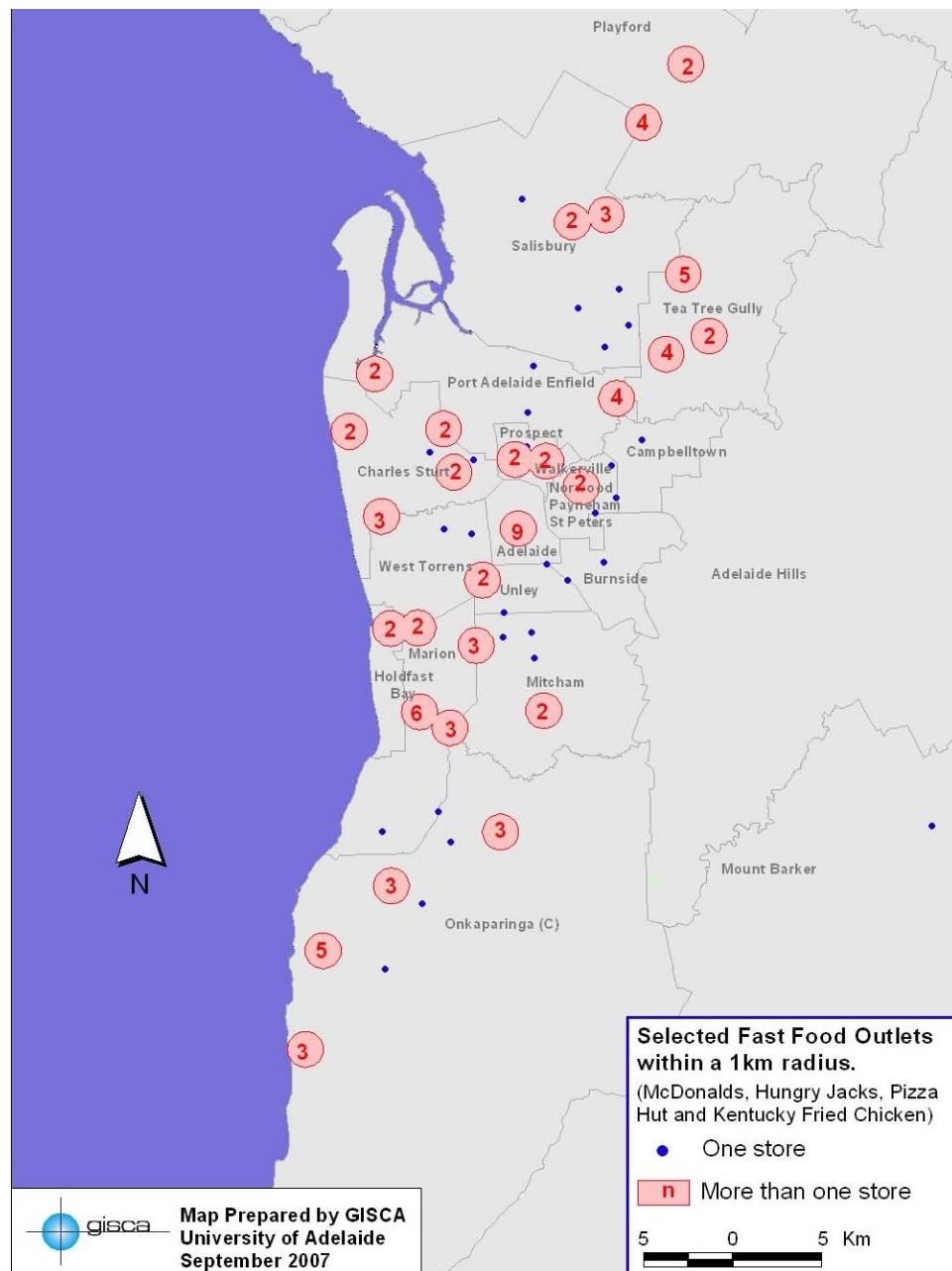


Figure 2: McDonald's, Hungry Jack's, Pizza Hut and KFC restaurants in the Adelaide metropolitan Area. Red circles indicate multiple restaurants within a 1 kilometre radius.

1.3.3 *The fast food consumer*

Dunn, Mohr, Wilson and Wittert (2008) reported that people had negative stereotypes about the 'typical' fast food consumer. They noted that, generally, participants' description of someone who eats fast food included "a lesser individual, lacking in knowledge or self-control, and possibly driven by hedonistic or economic factors" (p.333). These are similar conceptions to those associated with obese people (Cowan, Cowan, Hiler, Smalley, & Sehnert, 1992; Lobera, Fernandez, Gonzalez, & Millan, 2008). Although this perception of a fast food consumer is negative and judgemental and, despite the fact that a high portion of Australians report having consumed fast foods within a month, fast foods may be more attractive to some consumers than others. In the US, data from the CSFII indicate that close to a third of the people surveyed ate fast food during a typical day, with older males of higher income reporting higher intakes (Bowman & Vinyard, 2004). A different analysis of the complete CSFII data indicated that a high proportion of fast food consumers are children (Paeratakul, Ferdinand, Champagne, Ryan, & Bray, 2003). In their sample of adults, Jeffery et al. (2006) reported that there was a relationship between having children and eating at fast food restaurants. This may indicate that children are attracted to fast food which may, in turn, attract their parents. Aside from families, there is also evidence that young adults are regular consumers of fast food. For example, Schroder et al. (2007) reported that fast food consumers were more likely to be younger and more educated than non-fast food consumers. The CARDIA study of young adults reported that white women were the least frequent fast food consumers (Pereira et al., 2005). However, this analysis of the data was restricted to adults and excluded those under the age of 20. In the US, some researchers have asserted that fast food intake occurs frequently in adolescence age groups stating that up to 75% of adolescents eat fast food at least once a week (French

et al., 2001). Others have reported that adolescents eat fast food on average between two and three times a week (Unger et al., 2004).

The typical demographic characteristics of frequent fast food consumers appear similar in Australian samples. For example, it has been estimated that 22% of adolescents in Australia eat fast food items everyday (Savidge, Ball, Worsley, & Crawford, 2007). Mohr et al. (2007) analysed predictors of frequency of fast food consumption in their large national sample. They reported that being younger (under 45), having a higher income and greater fondness for technology were all variables associated with more frequent fast food consumption. Being male was also a significant predictor of frequency of takeaway consumption. Occupational status and education level were the only demographic factors that did *not* significantly predict patronage.

1.3.4 Why do people consume fast food?

Many studies investigating the reasons why people consume fast foods have pointed to convenience. The IGA survey reported that people generally eat fast food because of convenient locations and time constraints (FOODweek, 2008). Schroder and McEachern (2005) surveyed 100 undergraduate students and reported that fast food purchases in the UK were mostly impulsive (57%) with a small subset of people routinely eating fast food (26%). They reported that brand value, nutritional value, ethical value and food quality together accounted for over 50% of the variance in fast food purchasing behaviour. Recently, Bryant and Dundes (2008) surveyed Northern American and Spanish people about their perceptions of fast foods. They found that most people rated taste and flavour as important factors for encouraging fast food consumption. Cultural differences were apparent, with US students rating value-for-money as more important than Spanish students. In a separate US study exploring the reasons for fast food

consumption in college students, similar factors were reported; most people rated convenience as a factor influencing their consumption. Cost and menu choices also related to the number of fast food meals purchased (Driskell et al., 2006).

Aside from the obvious benefits of fast food (it is quick, easy and generally cheap), some researchers have also reported on how experiential aspects of fast food are attractive to consumers. A survey of Korean fast food users discovered that fast food consumption was not purely a utilitarian behaviour. Park (2004) reported that hedonic aspects of fast food were likely to determine which restaurant consumers visited. Such factors related to the experience of eating fast food including the taste and the eating environment. Other studies have suggested that there may be factors in a fast food environment beyond the food and convenience that attract people to fast food. For example, a small percentage (14%) of people in Bryant and Dundes' (2008) survey indicated that they liked the ability to socialise at fast food restaurants. Driskell et al. (2006) reported that a third of the women in their study cited social reasons to explain their fast food consumption.

The experiential drivers of consumption may affect certain groups more than others. Fast food restaurants may be distinct from other 'eating out' places as they are in convenient locations, are open long hours and provide low-cost foods. These qualities, amongst others, may attract certain groups of people to fast food restaurants. For example, older people may be attracted to fast food locations as they provide a convenient and accessible place for socialising (Cheang, 2002).

Ultimately, there are many aspects reported that attract people to fast food. Factors that guide consumer choice in multiple contexts have been documented and explored. These

factors have included familiarity, price and taste (Prescott, Young, O'Neill, Yau, & Stevens, 2002; Steptoe, Pollard, & Wardle, 1995), but consumer choice is a complex behaviour which cannot be defined by rating the importance of a series of factors (Scheibehenne, Miesler, & Todd, 2007). In real world situations, food decisions are made within the context of time pressures, specific environments, individual preferences and social variables. Social cognition research and theory suggests that decisions will generally be made in ways which require the least cognitive load, often called heuristics (Petty & Cacioppo, 1986; Shah & Oppenheimer, 2008). It is only in ideal situations where choices can be made by weighing all important, relevant factors. The model of food cognition suggests that important criteria are weighed in order to make food decisions. The amount of time available to make these decisions will shift choices from the best option to the most ideal one at the time (Scheibehenne et al., 2007). Price is usually amongst important predictors of food choice but not consistently because context will change the factors that are important. Ultimately, choice will be driven by factors that will fulfil the most important need at the time (Scheibehenne et al., 2007).

1.3.5 Underlying reasons for the shift toward 'convenience' foods

It is clear that there has been a trend for people to eat fewer home-prepared meals, preferring the convenience of 'fast' foods and other pre-prepared meals. Although there have been many surveys reporting on the shift in eating patterns and exploring the reasons for fast food consumption, there are few papers exploring why convenience seems to be a current driver of food choices. There is some indication that convenience may even outweigh personal preference. In the IGA survey, an overwhelming majority of respondents (91.5%) indicated that they would prefer to cook their own meals rather than eat fast food (FOODweek, 2008). Possible explanations for why there is an increased demand for convenience foods are discussed below.

Time scarcity. Jabs and Devine (2006) introduced the concept of time scarcity when they were exploring food choices. Time scarcity is the perceived absence of time to get daily tasks done. With increasing demands on time, free time becomes more valuable and increases the need to multitask. Indeed, eating now occurs simultaneously with other activities. For example, one in five American people report eating in the car (Glanz, 2002). Such shifts may have negative dietary outcomes. In general, eating while distracted has been related to increased intake (Bellisle, Dalix, & Slama, 2004). Television viewing is a specific example of multitasking while eating. The negative dietary outcomes of eating while watching television have been widely investigated (Moray, Fu, Brill, & Mayoral, 2007; Motl, McAuley, Birnbaum, & Lytle, 2004; Snoek, van Strien, Janssens, & Engels, 2006; Stroebele & de Castro, 2003; Van den Bulck & Van Mierlo, 2004). Families who frequently eat together in front of the television generally demonstrate less healthy eating patterns (Coon, Goldberg, Rogers, & Tucker, 2001). As feelings of time scarcity grow, food choices are likely to change (Jabs & Devine, 2006).

Changing food culture. Slow food movement supporters suggest that many foods away from the home are consumed because food has become a less central part of daily interaction (see Petrini, 2003). Supporters of the movement believe that food needs to re-establish itself as part of social interactions rather than being an empty sustenance or vice. One of the underlying sentiments associated with these values is the idea that as less traditional, home-cooked food is consumed, the nutritional and social value of food in a culture falls (Slow Food, 2008). Indeed, some adolescents report having no family meals during the week (Neumark-Sztainer, Hannan, Story, Croll, & Perry, 2003). If pre-prepared foods are purchased, families lose the opportunity to spend time together learning about the preparation and qualities of different foods. White (2007)

hypothesised that food preparation skills could predict the healthiness of a diet.

Therefore, the culture that surrounds food and food preparation could be an important factor for healthy food choices.

1.4 Fast food and obesity

It is clear that there has been both a rise in the prevalence of obesity and a shift in eating patterns. The fact that these changes have occurred across a similar timeframe has led many people to suggest that changes in eating patterns may have negative health outcomes for the population. In Korea, for example, there was a dramatic increase in the prevalence of obesity throughout the 1990s (Kim et al., 2005), while during the same timeframe the popularity of takeaway foods also grew (Park, 2004). These changes may be purely coincidental and offer no indication of causality. Nevertheless, these are the very style of associations that have led to the exploration of fast foods as a potential contributor to the obesity epidemic.

In the public, the blame for obesity has regularly been shifted away from changes in eating patterns to large fast food corporations such as McDonald's. In recent years, two feature films have been produced that specifically, and negatively target McDonald's (*Supersize Me* and *Fast Food Nation*). These films alone have reached audiences of millions and in some cases have been shown to alter consequent dietary behaviours (Cottone & Byrd-Bredbenner, 2007). In Australia, fast food has not been immune to such negative attention. Recently, researchers have publicly criticised organisations such as Cricket Australia for the sponsorship they accept from fast food companies (Colagiuri & Caterson, 2008).

The high visibility and advertising expenditure of companies like McDonald's may contribute to the large volume of negative publicity that they receive. McDonald's claim that they sell, "more than 75 hamburgers per second, of every minute, of every hour, of every day of the year" (Spencer, Frank, & McIntosh, 2005: p.379), demonstrating the sheer scope of the corporation. Furthermore, the fast food industry has been estimated to be worth USD99.6 billion globally (Datamonitor, 2005).

1.4.1 Fast food consumption, weight gain and obesity: A review of existing studies

The potential reach of the effects of fast food consumption may be the reason why, to date, multiple research reports have been initiated to explore the relationship between obesity and fast food. If the industry is indeed adding to the obesity epidemic, it could be a highly influential contributor as it accounts for a substantial portion of current food intake.

Some authors have associated the locality of fast food restaurants with obesity. For example, Reidpath et al. (2002) suggest that the higher density of fast food locations in poorer postal districts in Australia (according to socioeconomic status) creates an environment that promotes obesity. The authors did find a higher density of fast food outlets in the poorer of 267 postal districts in Melbourne, Australia. This study highlights one of the primary limitations of ecological data – it does not indicate how many people are actually overweight in these environments or if people in areas with a high density of fast food restaurants actually consume more fast food. Furthermore, studies that have surveyed residents in the US have failed to support the suggestion that close proximity to fast food restaurants (at home and at work) results in higher intake of fast food or to the BMI status of the residents (Jeffery, Baxter, McGuire & Linde, 2006).

The CSFII data has been used to assess the effect of fast food on other food choices and weight status (Bowman, Gortmaker, Ebbeling, Pereira, & Ludwig, 2004; Bowman & Vinyard, 2004; Paeratakul et al., 2003). Paeratakul et al. (2003) demonstrated that fast food use was related to lower intake of healthier foods, such as vegetables¹². This trend appears to be consistent when applied to the diets of children as well as adults in the CSFII data (Bowman et al., 2004; Paeratakul et al., 2003). Bowman and Vinyard noted that fast food consumers had slightly higher odds of being overweight. Binkley, Eales and Jekanowski (2000) reported that those who reported eating fast food in the CSFII were on average from .8 to 1kg heavier than those who did not. However, these comparisons are limited by the fact that those subjects classified as eating food prepared away from home and fast food were determined only on the basis of the foods consumed in one or two 24-hour periods of dietary recall and not general dietary habits.

French, Harnack and Jeffery (2000) compared the use of fast food restaurants over a three-year period among North American women. All participants were enrolled in a weight loss intervention. Their pre-intervention data indicated a positive relationship between the regularity of fast food consumption and being younger, unmarried and heavier, and having higher BMI and lower income. The authors also confirmed previous assertions that energy intake increases with the intake of fast food. Furthermore, the results confirm Paeratakul et al.'s (2003) finding (taken from the CSFII data) showing that the consumption of vegetables decreases with increasing frequency of visits to fast food restaurants. More television viewing was also associated with greater fast food consumption. Rates of participation in physical activity were not linked to frequency of fast food consumption. When analysing data at the end of the intervention period,

¹² Jeffery et al. (2006) supported these associations in a separate sample. After surveying over 1000 US residents, they reported that eating fast food was negatively related to vegetable consumption and positively related to BMI.

French et al. (2000) found that an increase of only one fast food meal a week was associated with a daily energy intake increase of 234.4 kilojoules (kJ) and a weight gain, over and above the average weight gain, of .72kg. The findings of this study offer what appears to be the most comprehensive picture of both the fast food user and the effects that frequency of fast food consumption can have on diet and weight status.

French, Story, Neumark-Sztainer, Fulkerson and Hannan (2001) reported similar results based upon the examination of fast food use among adolescents in the US. Students who reported eating fast food demonstrated poorer food choices and an increased energy intake. The study revealed some other interesting findings which paint the picture of the fast food consumer. A positive relationship was revealed between eating fast food and the amount of unhealthy food available at home as well as the amount of similar convenience foods eaten (food from restaurants, snacks and pre-prepared meals). As was reported for the adults, it appeared that the more fast food eaten by consumers, the more time the consumer spent watching television.

A study of the fast food habits of African-Americans has confirmed the negative effects that eating fast food can have on the diet. After surveying roughly 650 college students, Satia, Galanko and Siega-Riz (2004) reported that higher frequency of fast food consumption was significantly associated with lower vegetable intake and higher fat intake. Similar findings have also been reported amongst Spanish populations (H. Schroder, Fito, Covas, & Investigators, 2007).

Evidence showing relationships between unhealthy behaviours (eating energy dense food and some sedentary activities) appears to be robust and is supported by the results of Utter, Neumark-Sztainer, Jeffery and Story (2003). While not specifically investigating

the intake of fast food, they suggested that bad dietary behaviours (including higher consumption of fried foods) and hours spent in sedentary activities were associated with higher BMI. From these data it appeared that it was only certain sedentary behaviours (specifically, frequent television viewing) that related to unhealthy dietary patterns – some sedentary activities (doing homework and reading) were actually related to better dietary habits.

If eating unhealthy, energy-dense food is related to spending more time doing activities low in energy expenditure, according to the equilibrium approach, this is likely to result in obesity. It is exactly these types of associations that amplify the potential of fast food as a risk factor for obesity. Of particular concern is the relationship between television viewing and fast food consumption. Many authors have noted the negative effects that television viewing can have on both physical activity and health. For example, it has been suggested that the resting metabolic rate in children is actually lower when watching television than when resting (Klesges, Shelton, & Klesges, 1993). However, this finding has not been consistently supported by subsequent research (Cooper, Klesges, DeBonc, Klesges, & Shelton, 2006; Dietz, Bandini, Morelli, Peers, & Ching, 1994). When exploring the increasing rate of obesity in children in Australia, Olds and Harten (2001) pointed to changing lifestyles as a reason for the increase. They argue that increased screen time (watching television) and higher motor vehicle usage are potentially more important for accounting for rises in childhood obesity than a single factor such as fast food consumption. Jeffery and French (1998) reported a positive relationship between increased television viewing and fast food consumption and BMI. This effect was found in women only. The study also found that television viewing predicted weight gain in women with high incomes. The authors concluded that fast foods and television viewing may be contributing to obesity rates in the US.

Two analyses of data from the Coronary Artery Risk Development in Young Adults (CARDIA) study have further explored fast food consumption and weight gain associations. The CARDIA study is “a prospective epidemiologic study of the determinants and evolution of cardiovascular disease risk factors among young adults” (Duffey et al., p.202). One aspect of the CARDIA study examined the effects of fast food intake over a longer period of time (15 years) than previous longitudinal research. Similar to French et al.’s (2000) results, an initial analysis of CARDIA data revealed that increases in the number of fast food (and/or restaurant) meals eaten resulted in rises in body weight (Pereira et al., 2005). Subsequent analysis of the data by Duffey et al. (2007) separated fast foods from restaurant foods, comparing the frequency of big brand fast food and restaurant food consumption between years seven and ten of the study. They discovered that increases in fast food consumption over the three-year timeframe were associated with increases in BMI while increases in restaurant food consumption were not. They also note that those people eating fast food more frequently at both time periods had a higher BMI (Duffey et al., 2007).

Not all studies have found associations between fast food and weight status. Simmons et al. (2005) explored BMI and fast food consumption in people living in rural Australia. They reported that BMI was generally higher in people in rural areas compared to metropolitan areas. They found that there was no relationship between BMI and fast food consumption, further concluding that the availability of fast food is unrelated to obesity. The study showed that those people who reported not eating takeaway food had a lower waist circumference than those eating takeaway foods. It therefore does not completely dismiss a relationship between fast food consumption and weight.

Nevertheless, these results indicate that caution needs to be made when extrapolating results to different populations.

Rosenheck (2008) recently completed a systematic review of the literature exploring the effects of fast food consumption. In total, the review included 16 studies. The author concluded that there was some evidence of a link between fast food consumption and the risk of weight gain, but emphasised that this link cannot be extrapolated to a causal relationship. Despite lack of causation in this relationship, the author pointed to the association between fast food intake and increased energy intake. The author also noted that the relationship between the consumption of fast food and increased energy intake is more strongly evident in the literature than a direct association between fast food intake and obesity.

There seems to be evidence of an association between fast food intake and weight gain in the literature. It is important to understand the way in which fast food could associate with positive energy balance and even obesity. Despite a lack of evidence for a direct link between fast food intake and obesity, the positive relationship between eating fast food, certain sedentary behaviours, and consumption of other fatty or energy dense foods, and the negative association with healthy eating, all point to a pattern of overall obesogenic¹³ living which may result in weight gain and, in the long-term, obesity.

Nutritional and environmental characteristics of fast foods have been more commonly cited as reasons for the weight gain that has been seen in people who eat fast foods. The South Australian government enquiry into fast food consumption and obesity points to

¹³ Swinburn has focused his research on investigating 'obesogenic' environments (e.g., Swinburn, Egger, & Raza, 1999). An obesogenic environment is one which promotes obesity by increasing food consumption (particularly of energy dense foods) and/or decreasing physical activity. Beyond obesogenic environments, there may be certain behaviours that cluster together that act to promote obesity.

the composition of fast food as a potential driver for the relationship between weight gain and fast food consumption (Social Development Committee, 2007).

1.4.2 Energy density: How fast food may promote overconsumption

Multiple studies analysing the CSFII data comment on the nutritional composition of fast food and how this may have deleterious effects on dietary intake (Bowman et al., 2004; Bowman & Vinyard, 2004; Paeratakul et al., 2003). All attempt to illustrate that fast food is energy dense and, when included as part of an 'everyday' diet, increases energy intake. Bowman and Vinyard (2004) did this by stating that, when consumed, a meal of fast food provided more than 33% of typical daily energy needs and fat intake – they also showed that fast food consumption was related to failure to meet several nutritional recommendations. Bowman et al. (2004) showed that energy intake was higher in fast food consumers compared to non-consumers in 9 to 19 year olds. Results from each of the studies showed that the food is energy dense and that energy intake was higher on days when fast food was eaten compared to days when it was not.

Prentice and Jebb (2003) have tried to verify the relationship between fast food and obesity. They suggest a 'mechanistic link' between the two. Firstly, they note the positive correlation between the rising accessibility of fast food and rates of obesity. Secondly, using nutritional information provided by fast food restaurants, they show that fast food is high in fat and therefore energy dense. Lastly, they posit that energy dense foods create "passive overconsumption". This term refers to the idea that the human biological system is flawed at recognising the presence of energy dense foods and does not compensate for the increased energy intake (which results from the fact that fats contain almost twice the energy content of other macronutrients) in subsequent food

intake¹⁴. Following this line of reasoning, Prentice and Jebb suggest that fast food promotes overconsumption which in the long-term results in obesity. Their assertions are plausible, but do not prove a causal linkage.

Other authors have also analysed fast foods to establish how their nutritional content could be considered energy dense and therefore promote weight gain. Malouf and Colagiuri (1995) investigated the nutritional content of meals from several major fast food chains to establish the effect that different amounts of fast food consumption would have on recommended daily intakes. They concluded that even one meal of fast food a week unfavourably affects the diet by increasing energy and fat intake and lowering fibre consumption. The authors offered no justification for the meals they constructed beyond the fact they were constructed from the menus of the fast food chains of interest. The McDonald's meal, for example consisted of a Big Mac, large fries and a medium thick shake. This is an unusual combination of items which would have to be purchased separately as there is no current 'meal' that consists of these items in these sizes. A standard Big Mac with large fries would come with a large Coca-Cola. A Coca-Cola would lessen the total fat intake. Furthermore, since this paper was published, the nutritional content of many fast food items has changed. In contrast to Malouf and Colagiuri's paper, Rice, McAllister and Dhurandhar (2007) recently demonstrated that a weekly diet composed entirely of fast food could actually be healthier than the typical diet in the US. This perspective was quickly retorted with Stender, Dyerberg and Astrup (2007) citing dangers inherent to highly energy dense foods and large portion sizes. They also disagree with the fat content of fast food items used in Rice et al.'s paper. Stender et al. argue that the constituents of fast food are not constant worldwide and that in food

¹⁴ Passive overconsumption is a term used frequently when discussing the consumption of fats. See Blundell and MacDiarmid (1997) for a full description of the physiological drivers behind passive overconsumption.

items available in countries outside the US, fast food remains high-fat (especially in trans-fatty acids).

1.4.3 *Meal deals: How fast food environments may encourage consumption*

Aside from the nutritional composition of fast foods, the way in which they are sold may also encourage overconsumption. Meal deals offer a variety of items packaged together for a single price. Typically, a fast food 'meal' consists of a burger, a side order (usually chips or fries) and a drink. Given that price and convenience are amongst the strongest predictors of food choice (Prescott et al., 2002; Steptoe et al., 1995), it is likely that meal deals contribute to the popularity of fast food. They have two components that may result in excessive consumption: increasing portion size through upsizing and by the inclusion of a sugar-sweetened beverage.

Upsizing. Some authors have explored whether meal deals and supersizing are areas where the food industry has helped promote obesity (Edwards, Engström, & Hartwell, 2005). Upsizing is something that characterises big brand fast food environments. This generally denotes increasing the size of the side orders that accompany a burger or chicken item. It was this very aspect of McDonald's' meal deals that received negative publicity in the film *Supersize Me*¹⁵. By paying 12% more, on average, an Australian consumer can have 23% more energy and 25% more fat (Cameron-Smith, Bilsborough, & Crowe, 2002). This alone is not a problem unless considered in relation to research showing that when people are served more food, they eat more (Jeffery et al., 2007; Wansink, Painter, & North, 2005; Wansink & Park, 2001). These environmental pressures on food consumption potentially link fast food to excessive consumption.

¹⁵ Soon after the film debuted, McDonalds discontinued their supersize option in the US. The option to upsize from small to medium, or medium to large still exists globally in fast food restaurants.

Soft drinks. Fast food meals are usually accompanied with a sugar-laden beverage, with many fast food companies dealing uniquely with one soft drink producer¹⁶ (for example, Coca-Cola or Pepsi). It has been suggested that fast foods and associated beverage consumption may be responsible for a large proportion (40%) of the increase in caloric sweetener consumed per day in the US over the past 30 years (Popkin & Nielsen, 2003). Papers analysing the CFSII data indicate that respondents who ate fast food drank twice the amount of sugar-sweetened beverages than those who reported not consuming fast food (Bowman & Vinyard, 2004). Both studies indicated that fast food consumption was associated with increased soft drink intake. This relationship is cause for concern when considered in light of the research relating soft drink consumption to body fat (Gillis & Bar-Or, 2003), the increased risk of obesity (per additional daily serving of soft drink; Ludwig, Peterson, & Gortmaker, 2001) and weight gain (Raben, Vasilaras, Moller, & Astrup, 2002). If soft drinks promote weight gain and fast food consumption encourages soft drink consumption, then this relationship could be potentially harmful.

1.5 Summary of literature

The current review of the literature on eating patterns, fast food consumption and obesity has shown that there has been a shift in Westernised eating patterns with increases in the purchase and consumption of convenience-style foods, predominantly fast foods. This shift is important because there has been some suggestion that fast food consumption relates to obesity – a serious and rising global issue. The published literature on fast food reviewed suggested that convenience was a major driver for consumption and that increasing time pressures and changing cultural values of food may underlie this drive. Although many researchers have explored fast food and obesity, evidence suggests fast food consumption is more directly related to weight gain than

¹⁶ This kind of practice is also referred to as ‘multibranding’ – each fast food company has an agreement as to which companies provide their beverages.

obesity. Several authors have proposed that this association results from the typical nature of big brand fast foods; they are high-fat and energy dense.

1.6 Objectives of the current research

The first objective of this research will be to determine the nutritional composition of different styles of fast food currently available in Australia. If most fast foods are energy dense, then it is indeed possible that increased consumption results in energy imbalance and weight gain. There is a large variety of fast foods available in the current fast food market which may mean that high energy density is not a predetermined quality of fast food. It is important to develop a more comprehensive and relative understanding of whether and how eating fast food could result in weight gain. A nutritional analysis of typical, popular fast food meals in Australia will attempt to achieve this objective.

The key objective of this research will be to explore how social influences relate to the intake of fast foods. The literature on social influences (including modelling, social norms and social facilitation) on eating behaviour reviewed in Chapter Three suggests that a variety of social factors are associated with increased intake at meal and snacking occasions. Therefore, subsequent studies presented in this dissertation will aim to assess how social influences can increase the intake of big brand fast foods. There are limited data available about fast food consumption behaviours and consequently these behaviours will be assessed using an explorative approach. This initial approach will be used with the intention of discovering whether social, environmental and demographic variables are associated with fast food consumption. The aim of subsequent studies will be to refine the understanding of any relationship between social influences and fast food consumption. This will include: (1) testing whether existing social facilitation models (that have been primarily developed from data on 'at home' eating occasions)

apply to fast food consumption, (2) tailoring the model of social facilitation to include factors potentially relevant to fast food consumption, (3) assessing the effects of other social influences within the model of social facilitation and (4) investigating how social norms can alter intake at a fast food eating occasion.

The proposed objectives and research will contribute to previous research in several ways. Firstly, despite the common tendency for fast food consumption to be associated with the obesity epidemic, there is limited research that describes fast food consumption behaviours. Secondly, although there is literature discussing social influences on eating behaviours, this has not been applied to fast food consumption. Fast food consumption represents an important focus for research on eating behaviours as it occupies an increasing part of Westernised diets, but more importantly, increases in the consumption of fast foods may associate with weight gain. Finally, previous studies have tended to focus only on one form of social influence at eating occasions. This research will attempt to explore the affects of multiple social influences.

2 Chapter Two: A study of the current macronutrient profile of fast food in Australia

As eating patterns change, more people than ever before are eating foods prepared away from home. Fast food purchases account for the highest proportion of spending on these foods (Australian Bureau of Statistics, 2000). With more consumers looking for a 'quick bite', the number of fast food chains has increased and existing chains have updated their menus to meet increasing demand. McDonald's, for example, have made many 'healthy' changes to their menu. These include the creation of the "healthy choice" menu; shrinking the size of many of their items; changing the composition of their meat products to contain more meat and less fat; swapping cooking oils; and one McDonald's has even trialled selling Sprite Zero to lessen the local community's intake of added sugars (M. J. Johnson, 2005). On the other hand, KFC publicly rejected making changes to their menu including changing their oils (Burke, 2007).

In the past, fast food consumption has been associated with weight gain on the basis that fast foods are energy dense and promote other unhealthy behaviours. However, new menus and fast food chains in the current eating environment offer consumers continual choice which means that the decision for a person to consume fast food is not accompanied with any pre-determined outcomes as they can choose between a variety of chains and different menu options. Yet, many researchers have previously assumed that fast food is energy dense and few have actually explored how energy dense different varieties of fast food are. Given the current variety in fast foods, there is likely to be variety in the nutritional composition of many fast foods. For example, Stender, Dyerberg and Astrup (2007) showed that levels of total fat in seemingly identical meals

could differ dramatically between countries. It is therefore a hasty assumption that *all* fast foods are energy dense and it is important that researchers know the nature of the food they are discussing.

In their nutritional analysis of fast foods, Malouf and Colagiuri (1995) showed that an Australian fast food meal could raise overall fat intake and have generally adverse effects on eating patterns. The market has changed so dramatically since the publication of this paper that it is unclear how 'unhealthy' fast food in the current market is. Undoubtedly, as Rice, McAllister and Dhurandhar (2007) attempted to demonstrate, choices can be made that alter the impact that eating fast food has on a consumer's health. Whether this translates to current, Australian fast foods is unknown. Exploring the nutritional content of Australian fast foods will help clarify this. Furthermore, identifying healthier fast food choices may facilitate the development of useful nutritional advice for consumers.

The aim of the following analysis was to examine the impact of 'traditional' as compared to 'healthier choice' meals on energy consumption and macronutrient composition both between and within the most popular fast food restaurants in Australia¹⁷.

2.1 Methods

Six of the major food chains in Australia were chosen for comparison: McDonald's, Hungry Jack's, KFC, Domino's Pizza, Red Rooster and Subway. These chains account for a large portion of the fast food market share in Australia. The top three of these companies (McDonald's, KFC & Subway) alone account for over 65% of market share for takeaway meals (Burke, 2007). The Australian-based websites of the corporations were

¹⁷ Sections of this chapter have been published in *Obesity Research and Clinical Practice*. See Appendix 1 for the complete version of this paper.

accessed and the manufacturer's nutritional information was collected in October of 2005. The accuracy of the data was not assessed. At the end of 2005, a follow-up visit to restaurants in the Adelaide CBD and surrounding suburbs was used to check whether menu information was current. When inconsistencies were found, they were resolved by follow-up phone calls to the company information lines¹⁸. Two types of items were chosen from each chain: a meal constructed from traditional items and a healthier alternative.

2.1.1 The construction of 'traditional' fast food meals

'Traditional' fast food meals were constructed to resemble a packaged meal, including a burger, fries or chips and a sugar-sweetened beverage. The burgers were chosen if they could be considered a signature burger synonymous with the fast food chain (e.g., a Big Mac from McDonald's). Burgers were also selected on the basis that they were highly comparable between chains. Domino's Pizza and Subway do not sell burgers and these were substituted with the most popular item sold from the menu of each company; the portion sizes were chosen to be similar to the weight of burgers from the other chains. This meant that a 6" rather than 12" roll from Subway was included. The Domino's Pizza meal deal included items that were not packaged for individuals (2 pizzas, a garlic bread and 1.25 litre Coca-Cola), so three slices of pizza were chosen as a portion because this was roughly the weight of the burger items. The beverage size was based on a single, average-sized serve (250 millilitres) according to the serving information on the larger bottle.

¹⁸ Some of the options that had nutrition information available on the company websites no longer sold these products. For example, KFC no longer offered "Mashies". The most significant difference was that Red Rooster did not list any of their 'healthier' options on their website as these had been recently introduced and the website had not been updated. To obtain nutritional data for these products, a phone call was made and the description and accompanying nutritional information for these products was used to determine the meals included in this analysis.

2.1.2 Healthier alternatives

Healthier items were drawn from those marketed as a healthier choice (e.g., “low in fat”) and were selected to represent a close alternative to the burger items, thus salads were excluded. These items were generally baguettes. Baguettes were analysed with no side orders because at all but one chain, they were sold as a single-item ‘meal’ or with a bottle of water. At McDonald’s a variety of choices were available that were marketed as ‘healthy’ and were considered reasonable replacements for the signature burger. Although a lean beef burger represents the closest match, the baguette with the lowest energy content was included since it was the most comparable to the healthier items selected from the other fast food locations. Domino’s Pizza and KFC had no marketed healthier alternatives at the time of data collection. Therefore no healthy alternatives were included for these chains.

2.1.3 Nutritional calculations

Kilojoule (KJ) and macronutrient information for both types of meal from the six chains was converted into percentage of daily allowance as determined from nutrient guidelines. This allowed comparison between chains while also giving fast food consumption a daily context. It is worth noting that McDonald’s use this format, which they refer to as Guideline Daily Amounts (GDAs) for giving nutritional information on their products.

Choosing a general daily KJ amount on which to base daily macronutrient requirement is difficult because energy requirements vary according to individual factors. However, a KJ amount was chosen to allow a standard for comparison. *Nutrient Reference Values for Australia and New Zealand* (National Health and Medical Research Council, 2006) provides a range of recommended daily intakes separated by age group, sex, size and

physical activity level (PAL). For women between the ages of 19 and 39 who are fairly sedentary (PAL 1.4), the midpoint daily energy recommendation is 8400KJ. The midpoint of energy requirements for women in the *Australian Guide to Healthy Eating* (AGHE: Kellett, Smith, & Schmerlaib, 1998) is slightly less conservative at 9250KJ. However, the more conservative value was chosen as it corresponds with the American Daily Value system which uses 2000kcal (8400KJ), an amount deemed appropriate for females 19 to 30 years old. McDonald's GDA for energy is also based on this amount.

To calculate daily guideline amounts for macronutrients, percentages of energy from macronutrients listed in the AGHE were referred to. Midpoint values of the range for adults were used. The resulting percentages were 55%, 18% and 27% of daily energy from carbohydrates, proteins and fat respectively. The AGHE recommends that no more than one third of the total fat consumed should be saturated; this value was also incorporated into the daily intake. Conversion of gram amounts of macronutrients to KJs used the standards in *Codex Alimentarius* where 1 gram of carbohydrate or protein is equal to 17KJ and 1 gram of fat is equal to 37KJ (Codex Alimentarius Commission, 2006).

2.2 Results

Figures 3 and 4 summarise macronutrient intakes from various item choices at each of the fast food chains.

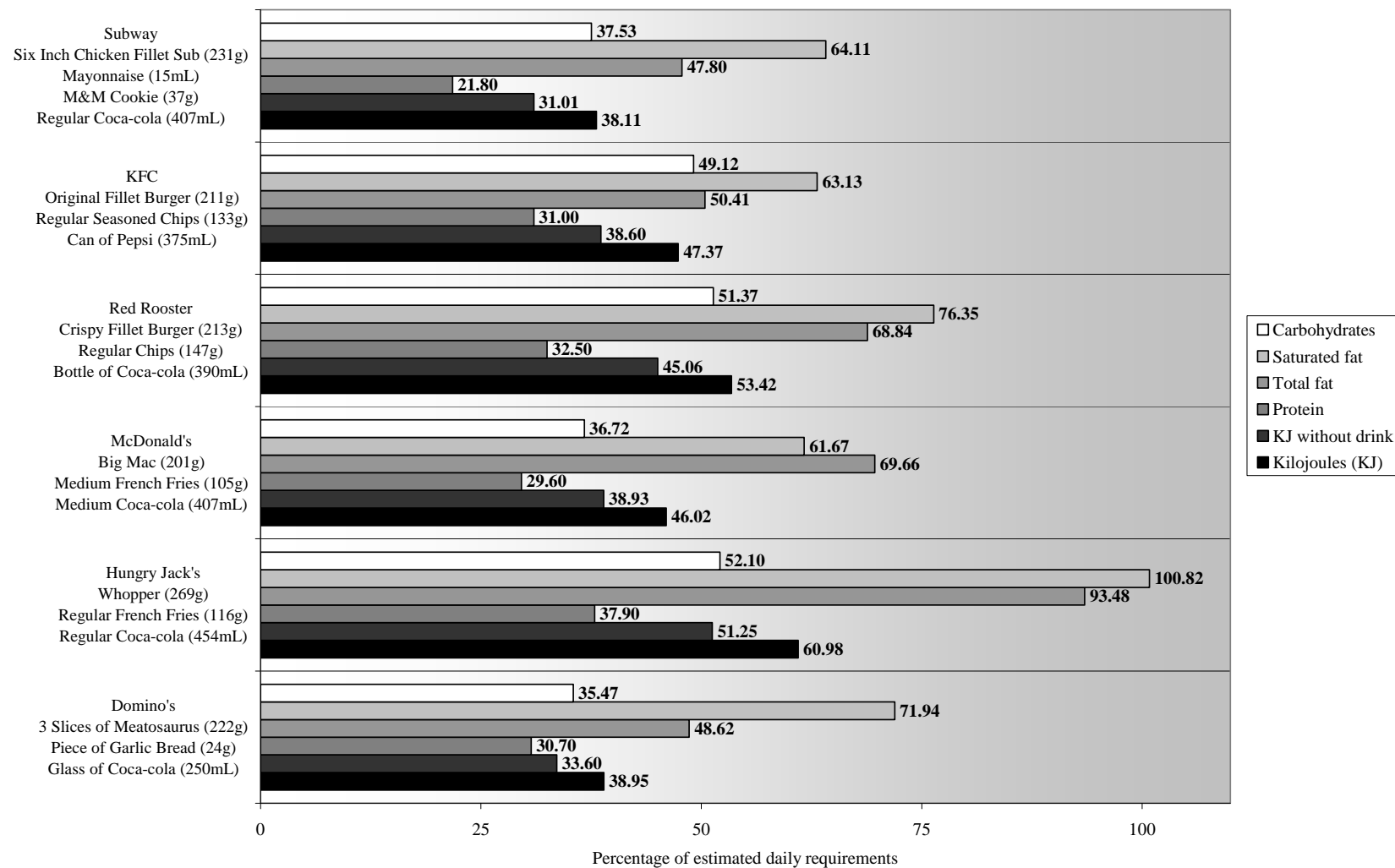


Figure 3: The percentage of daily guidelines of macronutrients accounted for by traditional fast food meals.

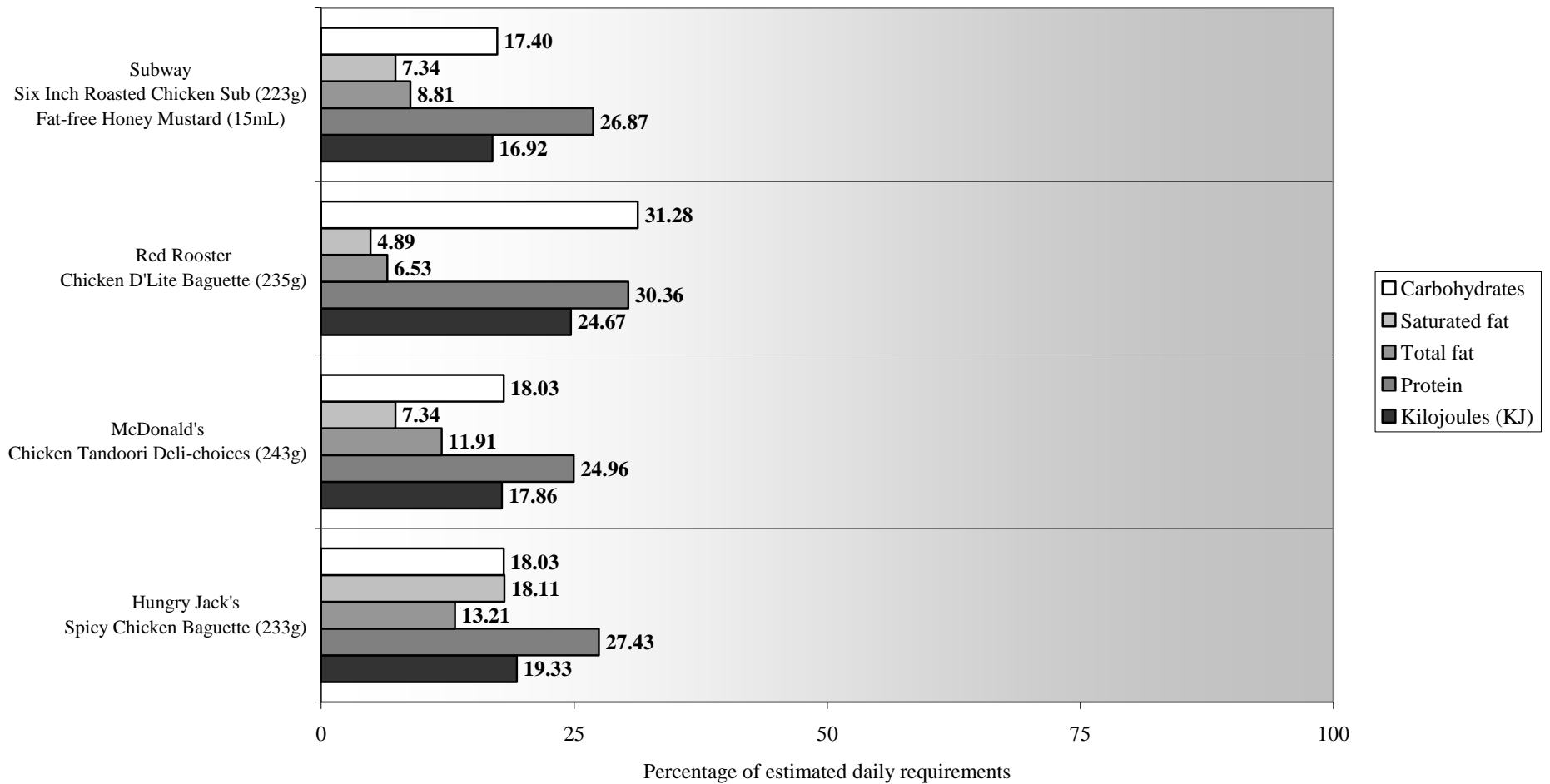


Figure 4: The percentage of daily guidelines of macronutrients accounted for by healthier fast food meals.

The average KJ from the traditional fast food meal was 47.5% of the 8400KJ daily energy requirement. The meal at Hungry Jack's provided the most energy but also had the largest portion sizes. In this regard, the meal which was constructed for Domino's Pizza most likely benefited from the smaller-sized side order and drink and accounted for the lowest KJ amount. With and without a beverage, the Subway meal represented the lowest KJ intake.

The traditional fast food meals accounted for high amounts of the daily guideline for fat. The Original Fillet Combo from KFC was the only meal that provided less than 30% of its total energy from fat (28.7%). Whopper (Hungry Jack's) and Big Mac (McDonald's) meals provided more than 40% of total energy through fat. Despite the fact that the traditional meal from Subway represented the lowest percentage of KJ for a meal, analysis of its energy ratio revealed that it provided 33.9% of its overall energy through fats. All the traditional meals contained enough saturated fat to account for close to two thirds of the daily guideline amount. The Hungry Jack's meal contained enough saturated fat for an entire day's intake; equivalent to almost two complete Subway Chicken Fillet Sub meals (Subway) in saturated fat.

Replacement 'healthy choice' items accounted for considerably less of the daily guideline for energy, fat and carbohydrates than traditional meals while generally retaining the amount of protein. Fats were reduced most notably by the healthy choices. Healthy options accounted for 39 to 80% of the daily amount for fats compared to the traditional meals. The healthy option at Hungry Jack's was again the highest in total fat. However, in comparison to the Whopper Meal (Hungry Jack's), the Spicy Chicken Baguette (Hungry Jack's) also represented the largest decrease in the amount of energy and fat provided when comparing traditional and healthier fast foods meals. Despite offering the lowest

amounts of fat, Red Rooster's Baguette was the highest in total KJ. This difference was mainly accounted for by the energy contribution of protein. Subway's healthier option represented the smallest decrease of the percentage of carbohydrate and overall energy and showed a slight increase in terms of protein.

2.3 Discussion

The results showed that selectivity in fast food chain patronage can affect energy intake by 50%; all fast food is not the same. This amount can be halved again through the purchase of a healthy alternative at most fast food chains. Removing a sugar-sweetened beverage also offers an easy way to reduce energy intake from a fast food meal. This finding reinforces Rice et al.'s (2007) argument that fast food can be eaten in a non-detrimental fashion. Awareness of the effect of choice could help consumers who frequent fast food restaurants by improving the healthiness of the items selected. It also is an indication that not all fast foods are directly comparable in terms of potential health outcomes.

This study is limited predominantly by three factors. First, it is restricted to the comparison of only a small number of items in a sea of fast food choices. These items were chosen to be representative of both traditional and healthier fast food choices, and aimed to characterise both ends of the broad spectrum of fast foods available. Including further items for comparison would primarily increase the descriptive value of the comparison, while not changing the underlying value of the message. Second, the nutritional comparisons in this study were undertaken using the information provided by the companies. While some may question the validity of such information, the absence of independently obtained nutritional information for all the items made the use of manufacturer's nutritional information a necessity. Using the publicly available

information also limited the comparison to macronutrients because it is difficult to obtain details surrounding the food composition with regard to many key micronutrients. Third, daily guideline amounts offer only a rough guide for many consumers. The information is useful for comparing food choice and providing general information on a public health level, however, direct nutritional intervention should be tailored to individuals.

There were sizeable differences in the KJ and macronutrient content of fast food items both between and within fast food restaurants. Much of the difference between chains was a direct result of portion size. Unsurprisingly, the chains with the bigger burgers provide more of all the macronutrients. Given that larger portion sizes have been consistently shown to promote food intake (Wansink, Painter & North, 2005; Wansink & Park, 2001), this is an important element to consider when considering how fast food meals may influence intake. The size of the meal purchased can be easily modified within the restaurant by ordering a smaller meal. However, there are environmental factors in a fast food restaurant that may increase the pressure to have larger meals which also need to be considered. For example, 'value meals' promote increased intake by appealing to individual desires for a 'good deal' (Vermeer, Steenhuis, & Seidell, 2009).

The occasional 'traditional' fast food meal as a meal replacement is not in itself going to upset the daily energy balance, especially if it is eaten in place of the main meal of the day. There is no agreed definition about what constitutes a meal but if it is supposed that a meal provides 30% (up to 50%, if it is a 'main' meal) of daily energy, a fast food meal could be incorporated into a day's intake without compromising energy balance.

Although fast food consumption has been associated with weight gain (French et al., 2000), not all people consuming fast food are overweight. Given the other obesogenic

behaviours that tend to be associated with fast food consumption it may be that eating fast food is unhealthy in combination with other behaviours such as consuming less vegetables (Paeratakul, Ferdinand, Champagne, Ryan & Bray, 2003) and watching more television (French, Harnack & Jeffery, 2000; Mohr, Wilson, Dunn, Brindal & Wittert, 2007). Thus, as Olds and Harten (2001) suggested, focussing on fast food alone is a narrow approach to curbing the much-publicised obesity epidemic.

On the other hand, it is clear from the results that the fat content of the traditional fast food meal is high. In fact, one of the traditional fast food meals provides enough fat to account for an entire day's intake (the Hungry Jack's Whopper meal). Although not associated directly with obesity, diets high in 'bad' fats, such as saturated and trans-fats, are associated with other negative health consequences, including the increased risk of cardiovascular disease (Hu et al., 1997; Lichtenstein et al., 2003) and even dementia (Kalmijn et al., 1997). The healthier fast food choices are focussed on reducing the fat content of the meals and do notably lessen the fat provided. Choosing a healthy choice is therefore a way for consumers to reduce overall fat intake from fast food, furthermore reducing the energy density of their meals¹⁹.

The consumption of a traditional fast food meal does not solely explain weight gain, although there is validity in the argument that traditional fast foods from big brand fast food companies are energy dense (Prentice & Jebb, 2003; Stender et al., 2007). The cumulative effect of fast food consumption in combination with other obesogenic behaviours (watching more television and eating other energy dense foods) is likely to

¹⁹ There are further changes that can be made to traditional items that can reduce the amount of fat they contain. For example, as suggested in the South Australian government enquiry, changes to cooking methods have proven beneficial in reducing the amount of saturated and trans fats in 'traditional' meals (Social Development Committee, 2007). While some companies have pursued such changes, including the use of better oils (B. Smith, 2006), other companies have been more reluctant to change their cooking techniques (Burke, 2007).

have negative outcomes for health and weight status. Given the nutrient profile of meals commonly consumed from quick-service restaurants, it seems very likely that increasing the frequency with which such food is eaten could have negative health consequences, including weight gain.

2.3.1 Summary of analysis

The study presented in this chapter compared a variety of big brand fast food items (both traditional and healthier) in order to gain a better understanding of the nutrient content of the readily available and also most commonly purchased items from the most popular outlets in the quick-service restaurant sector in Australia. It revealed that there were clear differences between the overall energy and fat contents of meals both within and between different fast food chains. However, traditional fast food items were high in fat and energy dense. Within a supply-and-demand framework, the greater variety of these items relative to the limited healthier choices would suggest that the traditional items that are more commonly purchased and consumed. However, there is little published data on this. Nevertheless, factors that increase the amount of fast food consumed may lead to both higher energy and fat intake. Therefore further exploration of fast food consumption and factors that may be related to its consumption is justified. The next section will review literature that explores how a variety of social influences can encourage food intake.

3 Chapter Three: Social influence and food intake – A review of the literature

The literature reviewed in Chapter One highlighted the extent to which the obesity ‘epidemic’ might be linked back to the increasing energy density of the Western diet. It also highlighted that fast food consumption may be a contributor to this change. In Chapter Two, nutritional profiles were developed for different types of fast food to explore how increases in fast food consumption or poor ordering decisions could have deleterious health consequences such as weight gain. This study showed that increases in the consumption of traditional fast foods (i.e., meals consisting of burgers and fries) from big brand fast food companies (i.e., McDonald’s, Burger King etc.) could relate to weight gain and potentially to obesity in the long-term, thus addressing the initial objective of this research which was to explore the way in which fast foods could be contributing to the obesity epidemic. The second major objective of this research was to explore how social influences relate to fast food consumption.

Food decisions, such as what to eat (including food and volume), how often, when and with whom, are made within complex eating environments. These environments are multifaceted and it is difficult to determine how decisions about eating will be made in any given context (Scheibehenne, Miesler & Todd, 2007). The Boundary Model of Overeating (Herman, Olmsted, & Polivy, 1983; Herman & Polivy, 1984) has emphasised the importance of the environment to eating decisions, suggesting that in the context of modern, Western food consumption, eating rarely occurs when people are hungry. According to this model, eating commonly occurs in a “zone of biological indifference” that makes people more susceptible to environmental cues and social norms which dictate when and how much intake should occur. By this logic, if the norms and cues that

a social environment provides encourage consumption these environments become ones that could also promote overconsumption. Therefore, social factors could be a potentially important predictor of excess energy intake.

The research literature suggests that social variables have an important influence on eating behaviour. When discussing social influences, Pfeffer (1985, p.400) writes, “the effect of others in the individual’s environment on both attitudes and behavior is one of the oldest and most prominent themes in the literature of both sociology and social psychology”. Although current definitions tend to consider social influences to be purposeful (see, Caildini, 1993), in the context of eating behaviours, ‘social influence’ refers to by-products of the complex social interactions occurring between individuals in a natural environment. There have been various types of social influence identified as potentially altering food consumption. These perspectives have both shared features and unique ones. Research concerned with social influence can be broadly divided into two major theoretical perspectives: modelling and social normative theory, and social facilitation theory. Both have been linked to food intake and provide a basis for suggesting that changes in fast food intake at an eating occasion might be linked to social variables.

3.1 Modelling and social norms

3.1.1 Social Modelling

Literature using the modelling approach dominated early research into the effects of social factors on food intake. Modelling theory is based on the premise that learning occurs through observing others (Bandura, 1977). Social learning is operationalised by measuring the extent to which a target behaviour (e.g., having a second helping at a buffet) is taken up by an individual after exposure to the demonstration of that

behaviour in the modeller. Because meals are consumed frequently in social settings (Marshall, 1995) there is strong potential for social learning to occur. Furthermore, there are many potential credible and influential models for eating behaviour: parents (especially at a young age), colleagues, friends, and even celebrities (to whom exposure occurs through the media).

Social modelling has been shown to be an important influence on a range of health behaviours, most notably smoking (Leatherdale, Brown, Cameron, & McDonald, 2005) and the consumption of alcohol (M. D. Wood, Read, Mitchell, & Brand, 2004). Social modelling of food choices and intake has also been examined. The core features of modelling studies include the use of a highly controlled laboratory setting and the manipulation of the independent variable conditions (i.e., the social model) through the use of a confederate. This is usually a person (ideally blind to the hypotheses or aims of the study) who is directed to behave in a way designed to potentially influence another's behaviour. Often, when examining food consumption, modelling studies have involved augmentation and inhibition conditions. In the former, it is hypothesised that the confederate actions will subsequently increase the target behaviour (e.g., amount of food consumed) whereas in the latter, the confederate actions will decrease the behaviour of the participant.

In an early example of the modelling studies on food consumption, Rosenthal and McSweeney (1979) tested normal and overweight students' receptivity to external food consumption cues. Their study was underpinned by Schachter's (1971) externality theory of obesity. This theory posits that obesity results from individual differences in receptiveness to external cues in the environment. More specifically, it is suggested that obese people are less attuned to their internal satiety cues and rely on external cues to

determine their hunger levels and make food choices. It is based on the hypothesis that an obese person has difficulty regulating their energy intake effectively and is more likely to be guided by external variables, including other people's behaviour. Using this theoretical basis, Rosenthal and McSweeney proposed that the extent to which the rate and volume of consumption would be altered by a confederate's modelling would vary between obese and non-obese participants. They tested these hypotheses in two experiments. In the first, participants were told that the study involved getting to know someone over a meal. They were then placed with a confederate who ate either quickly or slowly. During the lunch, the confederate who consumed food at a fast rate was able to increase significantly the speed with which the participant ate. Contrary to predictions, this influence was more pronounced for the 'normal' weight participants.

In the second study Rosenthal and McSweeney (1979) investigated the amount of food being consumed, rather than rate of consumption. They argued that this measure was likely to be a better correlate of obesity. The confederates ate either a "large" or "small" number of crackers in front of the participant, whose intake amount was also monitored. Participant intake among the obese was not predicted by exposure to the model although exposure to a male confederate did lead to increased intake across weight groups. Although neither of Rosenthal and McSweeney's experiments provided support for Schachter's (1971) theory, they do suggest that food consumption rate and amount can be influenced by social contextual variables. Other studies during this time period (e.g., J. C. Conger, Conger, Costanzo, Wright, & Matter, 1980; Miller & Ginter, 1979; Nisbett & Storms, 1974) also supported the finding that while confederates can be used successfully to alter food intake, the effects they create are no different for obese and non-obese subjects.

de Luca and Spigelman (1979) also used Schachter's (1971) externality theory to investigate the effects of a model on snack intake. They paired obese and non-obese subjects with obese and non-obese confederates to observe differences in consumption of different candies (M&Ms and "jube" lollies). In all conditions the confederate ate ten lollies. The results indicated that obese participants ate more lollies when they were placed in the presence of an obese model than when in the company of a non-obese model. The same was true for non-obese participants (i.e., they ate more lollies with a non-obese model than with an obese one). Although differences in consumption were larger for obese participants, the results offer little support for Schachter's theory, because all subjects were sensitive to the effect of the confederate and responded in equivalent ways to different models. The study can be interpreted as showing the influence of social stigmatisation; obese people may have felt more comfortable eating lollies with another obese person (believing they would be judged less severely) and therefore experienced disinhibition. Taken with Rosenthal and McSweeney's (1979) results, this finding would suggest that social modelling has a pronounced impact on intake. The results also suggest that the type of model (obese versus non-obese in this case) present can alter the effect.

Goldman, Herman and Polivy (1991) hypothesised that the level of hunger an individual experienced would change their receptiveness to social modelling. In their second experiment, subjects were asked to deprive themselves of food for either a long (24-hour) or a shorter period of time (4-hour). The latter group were also given a preload (i.e., a milkshake on arrival) to minimise their hunger. Participants were told they were taking part in a taste-test, and placed in a room with a confederate who ate either large or small amounts of the target food. Contrary to expectations, both groups were equally susceptible to social influence. Furthermore, although the fasted participants reported

being significantly more hungry than the non-fasted participants, they did not avail themselves of the 'all-you-can-eat' opportunity. Interpretation of the result was somewhat compromised by inability to confirm 24-hour abstinence in the fasted group and the failure to measure perceived palatability of the food provided in the experimental manipulation.

There is sufficient empirical data to suggest that the eating patterns of others (complete strangers, in most cases) changes intake and therefore that eating is malleable to social influences. The modelling literature is largely experimental, meaning that the ecological validity is questionable. The major gap in modelling research identified by Herman, Roth and Polivy (2003) is the failure of most researchers to tie their results back to theory; modelling studies appear to be more concerned with showing the effects and differences in susceptibility between groups of subjects than explaining their observation of a general modelling effect. This could be due, in part, to the fact that although the studies are described as "modelling" studies, whether social learning as defined by Bandura (1977) is achieved remains debatable. The outcomes of the above modelling studies do not demonstrate a level of learning so much as conformity. They resemble the original conformity studies by Asch (1955) that showed that social pressures could change subjects' rating of line length. Within a given context or situation, conformity can be likened to compliance where people follow others' behaviour or expectations to get award or avoid punishment (being judged negatively in the current case: Wiggins, Wiggins, & Vander Zanden, 1994).

3.1.2 Social Norms

The concept of social norms and the extent to which this influences an individual's behaviour is the fundamental premise underlying sociology and social psychology.

Cialdini and Trost (1998, p.152) define social norms as “rules and standards that are understood by members of a group, and that guide and/or constrain social behaviour without the force of laws”. The concept of a meal is one norm that influences food intake behaviour and exists within every culture. The people partaking of the meal have a shared appreciation of what foods are eaten together as well as when and where it is appropriate to eat certain foods (Aikman & Crites, 2005).

Roth, Herman, Polivy and Pliner (2001) described two social norms that govern eating: a matching norm and a minimal eating norm. The former norm, based on the principle of conformity, involves matching levels of intake to that of others; this is the result commonly observed in the modelling literature. The minimal eating norm describes how the eater engages in impression management by demonstrating control over their intake. This norm exists in societies where the ‘ability’ to limit consumption is viewed as desirable. Pliner and Chaiken (1990) have helped validate the minimal eating norm. They showed that the number of crackers eaten, in their study, related negatively to ratings of femininity of a female participant. Martin, Pliner and Lee (2004) further explored impression management and found that the weight status of the person being observed could change perceptions surrounding eating.

The notion of minimal and matching norms originated from a study by Roth et al. (2001). In a modified modelling-style study, they substituted the normal confederate with an ‘absent’ confederate; details of a previous participant’s behaviour (including lists of responses) were provided to the experimental participants. The list (often ‘accidentally’ left behind) provides participants with the details like the number of crackers eaten by various participants. An additional condition was also introduced into the revised experimental paradigm; the experimenters manipulated whether subjects

were observed or not. This manipulation was designed to test whether participants' eating behaviour was driven more by the necessity to conform to the norms provided (as represented by the list) or the need for impression management (as manipulated by "other" person observations). The results indicated that participants conformed to the standards set by the absent confederates in the augmentation (eating more) and inhibition (eating less) conditions compared to the 'no norm' (control) condition, when eating alone. However, when being observed by a person who was not eating, participants did not conform to the constructed norms. This indicated that (a) absent confederates could be effective models for intake; (b) norms could be used to manipulate intake; and (c) that social norms could be rejected if they conflicted with impression management needs.

Leone, Pliner and Herman (2007) later attempted to assess whether matching or minimal eating norms would dominate in a situation in which the normative behaviour was ambiguous. Using absent confederates, they presented participants with both minimal eating and matching norms simultaneously. No clear adherence to either norm was witnessed. They suggested that without clear direction in the way of norms, confusion resulted and participants ate as much as they wanted. In their second study, Leone et al. made the confederate information more clear and found that people more closely matched their behaviour to the absent confederate. The authors concluded by suggesting that in situations that are designed to encourage intake, eating will be inhibited by norms.

Leone et al.'s (2007) study can be viewed as supportive of the social normative interpretation of modelling influences on eating. In a series of publications, Herman, Roth and Polivy (2003) have developed a comprehensive overview of normative theory.

They propose that eating norms (e.g., matching norms) exist as a result of the inherent ambiguity surrounding what is an appropriate amount to consume. In this 'haze of uncertainty', the way in which others behave is used to guide and determine food intake. Normative theory is a development of aspects of the Boundary Model of Overeating, which suggests that in today's society eating occurs in a zone of biological indifference (Herman & Polivy, 1984).

Herman et al. (2003) describe the social normative model of eating as essentially inhibitory meaning that cessation cues are those which dictate consumption when eating in the presence of other people. Herman et al. suggest that there is an abundance of cues in the environment that encourage intake (e.g., availability of palatable food, great variety and easy availability) and it is only when deciding when to cease eating that people become attentive to social cues and use them to guide behaviour. There is evidence to support the notion that cues such as palatability can drive and increase consumption. de Castro, Bellisle, Dalix and Pearcey (2000) report that palatability accounts for only a small amount of variance in meal size (<5%) in free living humans²⁰. Although this finding initially appears to disagree with Herman et al.'s (2003) suggestion, de Castro et al. (2000) further write that although palatability accounts for little variance, it remains significant even with the inclusion of various factors including the time of day and the number of people present. They also posit that the low variance accounted for could be an artefact of the fact that generally foods consumed are pleasant as people do not aspire to eat unpleasant foods (especially in a 'free-living' environment). The authors use the finding that only 9.3% of meals recorded in diet diaries were rated as unpleasant to support this idea. Thus, palatability might be enough to initiate intake as is suggested by social normative theory.

²⁰ This describes people who were not in a clinical setting. "Free-living" means participants were simply asked to keep a diary of their intake as they carried on their life as 'normal' for them.

The social normative model of eating (and overeating) has attracted some criticism. One involves the very nature of norms; they exist at the community, group, family, situational and even personal level. Each set of norms may act to affect amount eaten at any one time. For example, Herman and Polivy (2005) describe “situational” and “personal” norms that might guide behaviour in specific eating situations (e.g., a buffet at a party versus cocktails at a dinner). The constraints of the situation may set limits on judgements of appropriate portion sizes just as the individual’s personal beliefs about food might define norms for appropriate behaviour.

Studies such as that by Roth et al. (2001) have empirically demonstrated the existence of multiple norms and further indicated that they can be of varying strengths while also being conflicting (encouraging and inhibiting intake). Discovering how norms may mediate and moderate each other presents a challenge for future research on norms. For example, there may be situational factors that moderate the effect of social norms observed in existing studies. Pliner and Mann (2004) showed that food preferences could moderate the effects of social norms. Using absent confederates, their study revealed that although subjects did conform to the implied social norm (i.e., increased the number of cookies eaten in the augmentation norm) for palatable cookies, the effect of the implied norm on the consumption of unpalatable cookies was not significant. Using these results, Pliner and Mann questioned the influence of norms when explaining food preference and argued that although the amount eaten can be manipulated through the use of norms, preferences remain relatively stable. Although this appears to challenge the effectiveness of utilising social influence as a mechanism for achieving improvements to the quality of food consumed, other studies have shown the importance of modelling in the development of healthy food preferences and food

choices. After analysing the results of their focus groups, Kubik, Lytle and Fulkerson (2005) reported on the importance of role models in making healthier food choices (and increasing the likelihood of being active).

Regardless of whether actual food choices are driven by social norms, there is certainly strong empirical evidence to conclude that the amount eaten is, at least partially, influenced by the perceived actions of others, suggesting a role for social influence in overeating. Social norms may have a strong influence on eating behaviour and are an important consideration in research of eating behaviours.

3.1.3 Normative overeating

Herman, Polivy and Leone (2006) have extended their social norm research to propose the normative model of overeating. The normative model of overeating is designed to account for the increasing prevalence of obesity and incorporates multiple forms of social influence as well as some other crucial environmental factors. It posits that certain norms can be held responsible for permitting and encouraging overeating. According to this theoretical perspective, Type I overeating arises in response to environmental pressure. The authors cite the 'toxic' environment in which we exist and how this provides cues for overeating. They mention two factors that create this 'dangerous' environment. The first factor is portion size. There is a lot of evidence showing that there is a tendency for individuals to eat what is put in front them. Even if it is not all eaten, simply having a larger portion size reliably increases intake (e.g., Wansink & Park, 2001). The fact that increasing portion sizes is a constituent of changing eating patterns makes the toxicity of portion size even more important within contemporary eating environments. Another factor which the authors believe help creates Type I overeating is social influence. They note the results from social facilitation theories (discussed

below) which have shown that eating with others promotes greater food intake. The model also considers the findings from modelling and normative approaches²¹. Therefore the model considers social influences on intake while also accounting for environmental factors.

Essentially Type II overeating (disinhibition) is seen when otherwise restrained eaters lose their restraint. Rather than reverting to consuming 'normal' amounts following the loss of restraint, these eaters lose all restraint and overeat. Type II overeating is not as widely witnessed as Type I. It is suggested that Type II overeating affects only 'dieters'. How and when this style of overeating occurs is unclear. Herman et al. (2006) suggest that distress, cravings and eating any forbidden items may ruin the diet, in the eyes of the dieter, resulting in disinhibited eating. This effect may also be the result of ego-depletion (Kahan, Polivy, & Herman, 2003). According to this notion, dieters use a high level of their ego strength to 'stick to' their diets and it is easy for their ego to become depleted and for them to fail. This could have long-term consequences; failure as a self-perceived dieter could have negative consequences for self-perception and promote further failure. Weight cycling (dieting/bingeing/dieting) may have negative implications for both mental and physical health (U.S. Department of Health and Human Services, 2008).

3.2 Social Facilitation

Uziel (2007) recently described social facilitation as "the most basic effect of our social environment on behavior: the effect of the mere presence of others near us" (p. 593).

Allport (1920) was the first to define social facilitation, describing it as the way in which

²¹ Although in their theory of normative overeating, Herman et al. (2003) separates modelling and social norm theories into distinct approaches, whether they are clearly divergent is questionable. Social norm theory could be viewed simply as an iteration of the early modelling studies. It represents an evolution in the theoretical grounding, terminology and study design of the social modelling research.

the presence of others can alter performance on non-social tasks. Zajonc (1965) later theorised that this effect was the result of increased drive within an individual when doing tasks in the presence of others. He further suggested that the alteration in drive would act to improve performance on simple tasks and inhibit it during more demanding ones. A review of the social facilitation literature suggested that the speed at which a simple task can be completed can improve minimally in the presence of others (Bond & Titus, 1983). Publications following Zajonc's have suggested a variety of ways in which social facilitation may change performance: it may influence levels of self-awareness, self-monitoring and attention/distraction. Social facilitation research has explored how the presence of others can alter cognitive (Klauer, Herfordt, & Voss, 2008) and sporting performance (Carron, Burke, & Prapavessis, 2004) and behaviours such as shopping (Sommer, Wynes, & Brinkley, 1992). Although social facilitation research has accounted for only low levels of variance in some behaviours (Bond & Titus, 1983), the effect has been shown clearly on eating behaviours (J. M. de Castro, 1990).

3.2.1 Social facilitation and eating behaviours

Social facilitation research utilises a distinct research paradigm that differs from that used in modelling/social norms research. The latter is characterised by a largely artificial eating situation: food types are constrained, people eat with strangers and their behaviour is monitored. In the real world, the typical eating situation is vastly different and, as Scheinebenne et al.'s (2007) model of food cognition has established, real world situations can change the preferences for, and the drivers of, food choice. Mieselman (1992) has criticised studies of social influence for being too artificial and has pointed to the need to balance this kind of experimentation with naturalistic observations. It is this approach that social facilitation research of eating behaviour attempts to utilise.

Social facilitation research on eating behaviours primarily utilises diet diary techniques. The diet diary requires participants to record eating behaviours, including what was eaten, the environment where it was eaten and how long was spent eating (and any other factors relevant to individual studies, such as mood) over a fixed number of days. This method is designed to allow for more natural measurement of food intake while also obtaining a picture of general dietary behaviours and influences on it²².

de Castro has utilised the diet diary technique, arguing that this method of data collection allows experimenters to make unobtrusive and accurate observations of 'free-living' people (J. M. de Castro, 2000). However no form of dietary measure is without criticism. Diet diaries, food frequency questionnaires and different forms of food recall all have advantages and disadvantages (see, Bingham et al., 1988; Bonifacj, Gerber, Scali, & Daures, 1997; R. K. Johnson, 2002). Almost all methods suffer from underreporting of food intake; people tend to forget items such as condiments when detailing the foods they have eaten and may respond in socially desirable ways, underestimating 'bad' foods and overestimating 'good' foods. A more fundamental flaw with the diet diary method is that it may also alter people's behaviour as they are more closely monitoring their food intake (J. M. de Castro, 2000). Threats to the reliability and validity of food diaries have been tackled with varying degrees of success. For example, the common tendency to underreport intake has been addressed by requiring participants to get their intakes substantiated by people who were present during the eating occasion. More recently, participants have also been required to take photos of the food they have consumed (see, J. M. de Castro, 2000). Although the diet-diary technique remains imperfect, its application has increased research into the effect of social influence on eating in naturalistic settings.

²² Once the data are collected, it can be used to look at specific food intakes or specific meals.

In one of the early social facilitation studies, de Castro and de Castro (1989) used the dietary information in the diaries to calculate the amount of dietary energy²³ consumed on various occasions throughout a seven-day period. This information was then separated into meals using the amount of dietary energy consumed and length of a reported eating occasion. They found that the number of other people present at an eating occasion significantly predicted the amount eaten at meals. In fact, including the number of people present doubled the total amount of variance of the amount eaten explained in their model. Later, de Castro (1990) reported that eating in the presence of other people was associated with the amount eaten and the time they spent eating. Using diet diaries and correlational analyses in a separate sample, de Castro and Brewer (1992) suggested that a positive linear relationship existed between amount consumed during a meal and the number of people present. They reported that the presence of just a single other person could increase the amount eaten by 28% and that meals were over 75% larger when eating with others compared to eating alone.

3.2.2 *The time-extension hypothesis*

How social facilitation works in a task as 'simple' as eating is still a matter of debate. de Castro's (1990; 1994) initial suggestion was that the presence of others increases the time spent eating and therefore also the amount consumed – a model he named the time-extension hypothesis. Social facilitation research in other fields has shown that, for simple tasks, the rate at which they are performed increases in a social setting. de Castro (1990) argued that the rate of eating may drive the effects of social facilitation in his early findings although he subsequently concluded that meal duration was more important.

²³As measured in units of kilocalories (kcal) or kilojoules (KJ). The colloquial use of the term 'calories' refers to kcal (1 kcal = 4.184 KJ).

Feunekes, de Graaf and van Staveren (1995) presented a more detailed version of the time-extension hypothesis in an effort to understand what other factors could increase duration and/or intake. In line with de Castro's hypothesis, they suggested that the duration of a meal mediates social facilitation. Using path analysis they attempted to develop a more explanatory model of social facilitation. Although direct relationships between the number of people present and the amount eaten were largely non-significant, they found a mediating effect of the amount of time spent eating; the presence of others directly increased the duration of a meal which then increased intake. Their model also indicated that the presence of others could improve atmosphere which, in turn, increased the meal duration and hence the meal size (see Figure 5).

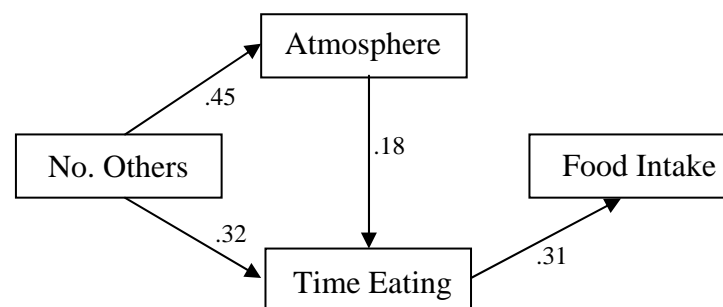


Figure 5: Feunekes et al.'s (1995) tested model of social facilitation.
 NB. Numbers next to arrows represent path/beta values

Feunekes et al. (1995) proposal is more explanatory than de Castro's original time-extension hypothesis. It is only after considering and dismissing a variety of other variables (e.g., hunger and availability), through statistical analyses, that Feunekes et al.'s model of social facilitation was created. Other researchers have provided further support for the idea that meal size is affected by meal duration. Weber, King and

Meiselman (2004) cited a study by Pliner, Bell, Kinchla and Hirsch (2003) showing that extending the duration of a meal increased intake regardless of the number of people present (in this case 1, 2 or 4 people). This research not only corroborated the time-extension hypothesis but also showed that it can be witnessed and manipulated in a laboratory setting.

While investigating the effects of social facilitation in the elderly, Mathey, Zandstra, de Graaf and van Staveren (2000) found that the time available to eat a meal could be extended *without* increasing intake; an observation contrary to the time-extension notion. They manipulated social setting by putting subjects in either a 'cozy' setting (food eaten in a group, talking allowed, atmosphere designed to be desirable) or a non-cozy one (food eaten in groups but individuals isolated and no talking permitted). As well as altering the social setting, the researchers used preloads²⁴ to assess the role of physiological reactions to consumption. They found that the preload was more influential than social setting on levels of consumption. Participants ate less after a carbohydrate-rich preload, but no difference in overall intake, in each setting, was found. Thus, with the addition of this carbohydrate-rich preload in the group setting, the meal was longer but not larger. Given the design of the study, it is difficult to determine which factors could have been instrumental in creating this exception to time-extension-like theories. For example, it could be the elderly sample, the laboratory environment, the preload or a combination of these factors that stopped the increase in consumption despite prolonging mealtime.

The "French Paradox" also highlights potential problems with the time-extension hypothesis. This paradox is based on the observation that French people demonstrate

²⁴ A preload is food or drink that is given to the participant before the experiment, proper, in order to decrease hunger. Often, preloads are given in the form of a flavoured milkshake.

lower body weight and risk of heart disease than the people from the US even though they have a diet that is purportedly high in fat. Rozin, Kabnick, Pete, Fischler and Shields (2003) have suggested that smaller portion sizes explain these differences. They observed that portion sizes in McDonald's in France were smaller than in the US and yet French people spent longer eating. In a study of differences between dietary patterns for North American, French and Dutch people, few differences were observed in the amount eaten, time spent eating and the rate of eating between the French and the North American participants (J. M. de Castro, Bellisle, Feunekes, Dalix, & de Graaf, 1997). Interestingly, the Dutch participants ate smaller, more frequent meals but ate more slowly and spent longer eating them. These results highlight the potential relevance of culture as a mediator or moderator of social facilitation and eating. The idea that some cultures may eat more slowly *and* consume less food is consistent with Mathey et al.'s (2000) findings that time can be extended without increasing the amount eaten.

Bellisle and Dalix (2001) examined how levels of distraction while eating influenced the amount consumed. Three forms of distraction were compared in their study: an audio tape prompting people to think about food, a television playing, and provision of a group environment for eating. The food served did not vary. The results indicated that participants described the food as "better tasting" when consumed with others. The amount eaten did not change significantly from baseline under any of the conditions. There are two possible explanations for why social facilitation was not demonstrated in this research. The study was conducted in France and may therefore be confounded by different eating styles. Furthermore, in all conditions, people reported eating for time periods that were at least 30 minutes. This is considerably longer than the average 12 minutes spent eating a meal previously reported in North American studies (Pliner, Bell, Hirsch, & Kinchla, 2006). Given that duration has repeatedly been shown to affect social

facilitation, ceiling effects attached to the overly long meal duration may have swamped social facilitation effects. Without knowing a typical eating duration in France, it is difficult to determine this.

3.2.3 *Beyond duration*

Although there has been some debate about the effect of duration on eating, there are many papers that confirm de Castro's time-extension hypothesis. These papers, however, offer little insight into the underlying mechanisms behind the time-extension hypothesis. Stroeble and de Castro (2004) suggested that the presence of others may increase arousal, which in turn increases intake. This hypothesis concurs with Zajonc's drive theory (1965). Stroeble and de Castro incorporated diet diaries with data from heart rate monitors in their study. Unlike the previous research using diet diaries, this study also incorporated eating occasions at restaurants. The researchers found that arousal (measured through heart rate) did not significantly change in different social company and settings. Participants did report different levels of emotions and different intakes according to the eating environment. Again, the more people present, the longer and the larger the size of the meal. The authors extended this finding by showing that, when with others, people had "happier" meals. Furthermore, when people rated themselves as more excited, they ate more food and higher amounts of fat. Finally, the diaries showed that eating a meal in a restaurant increased intake. Stroeble and de Castro used their results to offer further support for the social facilitation theory of eating but added that the location and atmosphere of the eating occasion may also alter intake. This is consistent with Feunekes et al.'s (1995) model of the time-extension hypothesis, which incorporates atmosphere as an important driver of time-extension.

Lumeng and Hillmen (2007) also used arousal theory as an explanation for the effects of social facilitation when eating. They covertly recorded children eating in a laboratory environment designed to resemble a natural eating occasion. The authors found that as groups became larger, the time spent eating did not increase but that the children's rate of eating increased, which then acted to increase their overall intake. They also reported that, as the number of members in the group increased, the number of social interactions decreased. These results did not completely dispel social facilitation theory, as those children who ate for longer did eat more food; it was simply that the presence of others did not increase the duration of the eating occasion. It is possible that children have a different approach to eating and do so with greater levels of rivalry (especially in the presence of tasty snack foods). Feelings of competition would explain why, as the number of others increased, the rate of eating also increased.

Redd and de Castro (1992) attempted to manipulate the social conditions in which people ate to gain further insight into how social facilitation might impact in the "real world". Over three separate five-day periods, participants were asked to eat all their meals alone, with others, or 'normally'. They recorded their food intakes, the length of their eating occasions and the company present in diet diaries over each of these periods. There were few differences observed between the "normal eating" and "eating exclusively with others" conditions. The authors noted that this was likely to be the result of the fact that 'normal eating' was often in the presence of others. The study confirmed previous social facilitation results; in the normal condition, when eating in groups, people ate more and ate for longer than when they were alone. When people were forced to eat alone, the composition of what they ate changed; participants reported eating fewer calories from fat than consumed when eating 'normally'. Results from Stroeble and de Castro's (2004) study may explain why participants ate less fatty

foods when eating alone compared to eating normally. Stroeble and de Castro observed that higher feelings of excitement were associated with high fat intake. In Redd and de Castro's study, the opposite effect may have been occurring; eating alone was unexciting and resulted in lower fat intake. This speculation is supported by Redd and de Castro's own data which indicated that when subjects ate alone they reported greater levels of depression.

Few studies have attempted to untangle whether it is the time spent eating or group size that is the major driver of social facilitation. Pliner, Bell, Hirsch and Kinchla (2006) conducted an experimental study that aimed to test the time-extension hypothesis by separating the effects of group size versus meal duration. Pliner et al. assigned groups of men or women to one of six experimental conditions according to different eating lengths (normal – 12 minutes; long – 36 minutes) and group sizes (alone, group of two or group of four). By attempting to disrupt natural group formation and meal durations, they aimed to assess which had a greater effect on intake. During and after the experiment participants were offered a plate of pizza and a bowl of cookies. Results from the study indicated that people ate more when given longer periods of time to eat (36 minutes) but not when in larger groups²⁵. The authors suggest that these results support de Castro's (1990) suggestion that social facilitation effects are mediated by meal duration as there was little evidence of a direct effect of group size and intake. They also suggest that eating for longer may not be determined by the people present but by simply having prolonged access to food (while being promoted to eat by environmental cues).

²⁵ In one of the analyses, lone diners ate the most cookies which is contrary to other social facilitation findings and may be reminiscent of a disinhibition effect.

Pliner et al. (2006) also noted some evidence of 'matching' in their results – people in pairs ate amounts that were the most similar. Pliner et al. suggested that the size of the group of eaters may affect intake differently because the number of people present will alter the influence that each individual has in dictating the norm. In other words, in a free-eating environment, with only two people, matching normative behaviour is easy because the behaviour of others is clearly discernible. As more people are added to the group, it becomes more difficult to determine what others are eating, and therefore more difficult to define 'appropriate' intake.

Authors using varying methods have attempted to explore alternative factors that may underlie social facilitation. Regardless of these different approaches, meal duration has repeatedly been shown to be an important mediator of the effect. Therefore, it is likely that, as de Castro (1990) suggested in his original time-extension hypothesis, eating with others can act to prolong the time spent eating and consequently the amount of food consumed.

3.3 Relationships: the potential moderator of social influence

Eagly (1983) argued that roles dictate how to behave and are accompanied by a series of expectations. For example, being a professional in a research environment comes with different expectations to being a musician in a popular band. Early research focused primarily on the numbers of people present in attempting to understand social facilitation. It is likely that 'who' the co-eater is to the eater will also moderate or mediate the effect on consumption. If the role that is being satisfied in a social situation can change, then it would be expected that different roles may change how social influence occurs; relationships with certain people may promote overeating more than others. A variety of studies have shown that the social relationship shared with the

person who produces, or 'facilitates', social influence can alter how this influence is witnessed (e.g., Clendenen, Herman, & Polivy, 1994; J. M. de Castro, 1994). All relationships involve norms, and these norms may promote healthier eating in some cases and unhealthier eating in others. Thus, in order to understand the mechanisms that drive social influences on consumption it is important to determine whether the roles of people in the social situation impact differentially on eating behaviour.

3.3.1 Sources of influence

Verlegh and Candell (1999) proposed that there are both primary and secondary reference groups that influence food choices. The primary reference group includes people with whom emotional ties are shared. These are people who are close and have frequent contact with the target person. Research has shown that families influence both fat intake (Hertzler & Frary, 1996) and breakfast behaviours (Billon et al., 2002).

Zimmerman and Connor (1989) conducted a health promotion campaign and noted that fat consumption was influenced by family, friends and co-workers. They also suggest that family members are crucial for determining how successfully people maintain dietary behaviour change. According to Verlegh and Candell, secondary reference groups include friends, institutions and the mass media. Verlegh and Candell have shown that despite the closeness of the primary group, situational variables mean that the secondary reference group can have a strong influence on eating behaviour.

In a study using a mixture of qualitative and quantitative research, Feunekes, de Graaf, Meyboom and van Staveren (1998) surveyed 361 social networks (consisting of parents, child, and best friend of parent or child) and interviewed ten families. They concluded that family rules tend to influence overall food intake and that conversations about food occur between family members more frequently than amongst friends, which supports

the idea of the pervasiveness of the primary reference group. Although it appears that friends have little influence of food choice, Feunekes et al. found that the consumption of snack foods was associated with the food intake of best friends. Thus, when snacking, friends may be considered an important reference group and possess the ability to change consumption or at least define the norm for snack food intake. Furthermore, it could suggest that certain foods are associated more closely with certain types of interpersonal relationships.

McIntosh, Fletcher, Kubena and Landmann (1995) investigated the type of people who influence food choices in the elderly. A free-response format allowed McIntosh et al. to identify the social sources considered important in the decision to change an eating behaviour (e.g., reduce red meat intake, in this case). The participants indicated that both primary reference group members and secondary groups (including the mass media) influenced their decisions. A majority of the elderly subjects reported being influenced most strongly by the mass media²⁶.

Although the exact nature of the influence that the mass media has on eating behaviours is debatable, it is often cited as an important source of influence. For example, the NSW Report on Obesity (2003) concluded that advertising may be partly responsible for the promotion of unhealthy behaviours. Many researchers have reported that the advertising of unhealthy foods dominates viewing times (Batada, Seitz, Wootan, & Story, 2008; Chapman, Nicholas, & Supramaniam, 2006; Galcheva, Iotova, & Stratev, 2008) and the negative effects that these advertisements can have on children (Kelly, King, Bauman, Smith, & Flood, 2007; Marshall, O'Donohoe, & Kline, 2007; Morley et al., 2008).

²⁶ This study highlights one of the difficulties with determining 'who' is an important social influence. It is a challenging task for people to identify who influences their behaviour. The people closest to them (the primary reference group) are likely to affect behaviour the most, but may also do so in a way which is less visible than input from external influences (such as the mass media). This may mean that people are less likely to spontaneously cite family and partners as influencing their behaviour.

The mechanism by which this occurs may be implicitly linked to social normative theories in which the mass media creates a consumption norm that influences food choices for the worse. McIntosh et al.'s (1995) study with the elderly ranks the mass media as one of the most powerful forms of social influence. Exactly where the media fits in a social network and when it is used as a reference for food intake, is less clear. Furthermore, given the wide-reaching nature of the mass media, it is difficult to quantify any impact it may have on eating behaviour.

3.3.2 Research on relationships and social influence

de Castro (1994) observed that different socially defined relationships can affect social facilitation. On the basis of diet-diary data from a large sample (over 500 people), he reported that all meals eaten with others, regardless of their relationship to the participant, tended to be longer and larger. He also found that when the 'other' was a spouse or family member, the amount was still larger but the rate of consumption was faster, whereas when the 'other' was a friend or colleague, larger meals were eaten more slowly. de Castro argues that the results support his time-extension hypothesis and, in addition, social disinhibition associated with shared eating with familiar people results in increases to the amount consumed. This is a result which is consistent with the results of Dube et al. (2007), who argued that certain types of social interaction can increase intake. More generally, the differences observed in intake in de Castro's study could reflect the different purposes that accompany each eating occasion.

Clendenen, Herman and Polivy (1994) used an environmental situation designed to imitate a casual film night to further examine social influence. The design involved the manipulation of group size (alone, pairs or fours), relationship of members in the group (self-nominated friends or strangers), and the food offered (cold meats or cookies).

Although they found that participants who ate the most did spend longer eating, they did not find a linear relationship between the number of people present and amount of food consumed; individuals in groups of four did not eat significantly more than individuals in pairs. Participants in groups of friends ate more than those in a group of strangers, and groups of friends consumed significantly more cookies when eating together.

The familiarity hypothesis, based on the theory of impression management, posits that the familiarity between people moderates the drive to present positively and therefore the extent to which meal time behaviour is influenced. In other words, when people eat with familiar others there is less desire to impress or project a certain image (Salvy, Jarrin, Paluch, Irfan, & Pliner, 2007). Support for this hypothesis can be found in a number of studies. Tice, Butler, Muraven and Stillwell (1995) showed that their participants had different styles of self-presentation with friends than with strangers and that as familiarity increased, behaviour changed. Similarly, Leary et al. (1994) found less need to impress in same-sex groups of familiar people.

Hetherington, Anderson, Norton and Newson (2006) explored how both familiarity and distraction could influence the effect of social facilitation. In a laboratory study, they manipulated the level of distraction and the familiarity of the participants. As in Bellisle and Dalix's (2001) study (described earlier in Section 3.2.2, page 68), there were several conditions manipulating the level of distraction, including the presence of others and/or a television. The researchers measured the actual time spent eating, defined as discernible eating behaviour rather than the time spent at the meal (as was recorded by Clendenen et al., 1994). This was something that could not be determined in diet diary studies where the time spent eating is based purely on the time that participants began and ceased eating. In Hetherington et al.'s study, when people ate alone, they ate the

least, regardless of the presence of the television. Eating with others increased energy intake 18% above baseline and extended the time spent eating. The researchers noted that up to 40% of the time spent at a meal with others was actually spent talking while the remaining time was spent consuming food or drink items. Eating with strangers also resulted in a high level of distraction from the food but did not significantly increase intake, suggesting that social interaction does not increase intake simply by taking people's minds off what and how much they are eating. Finally, participants ate 50% more cake when friends were present. The authors suggest "highly palatable, high energy snacks" may be more popular within certain social interactions (i.e., groups of friends compared to strangers).

Salvy et al. (2007) also experimentally explored the effects of familiarity on self-presentation of eating behaviours. Participants sat in a room with a stranger, a friend or a partner and were given ten minutes to talk and eat biscuits, both sweet and savoury. Like Leary et al. (1994), Salvy et al. also manipulated the sex composition of the group (mixed versus same sex). They found that both female and male participants ate more food when they were with familiar people. This confirms that the people with whom one eats with is an important influence on behaviour.

Multiple studies suggest that interpersonal relationships may determine the nature of an eating occasion and extent of the influence that one person has on another. In order to determine the influence that different people may have on eating behaviour, it is crucial to assess who is present.

3.4 Social Influence and fast food

Despite the common assertion that fast food consumption is obesogenic and that the increased normative pressure to eat meals prepared away from home is one of the drivers of the obesity epidemic, research identifying the antecedents and consequences of fast food consumption is sparse. Published research has typically focussed on defining the fast food consumer as well as exploring the factors important in food choice.

Traditional big brand fast food products are energy dense and, for this reason alone, it is important to understand their consumption. It is highly likely that individual, environmental and social variables will all act to promote or inhibit intake. The social influence literature indicates several possible ways that social factors may affect fast food intake. Many consumers report that their fast food consumption is driven by taste, cost and convenience (Bryant & Dundes, 2008; Driskell et al., 2006; M. J. A. Schroder & McEachern, 2005). Although social factors are not frequently cited by consumers as influencing their fast food eating behaviours, it is possible that these factors do affect fast food consumption. Vartanian, Herman and Wansink (2008) monitored social influences at an eating occasion and then asked participants to explain their food intake. They found that taste and hunger were used by participants to describe their intake despite clear evidence of social influences. Therefore, although fast food consumers do not acknowledge social influences they may exist at a fast food eating occasion.

3.4.1 *Environmental Pressure*

The model of normative overeating suggests that there may be environmental antecedents to overconsumption. In a fast food eating environment, these cues may be more explicit to consumers than in a home eating environment. 'Upsizing' and 'meal deals' are common elements to many fast food franchises. They are designed to sell more food for less money (Cameron-Smith, Bilsborough & Crowe, 2002). Beyond these

more overt influences, fast food eating environments may have similar influences as general eating environments. Atmospheric measures such as a pleasant ambience (Feunekes et al., 1995), the location (at restaurants versus at home: Stroebele & de Castro, 2004) and tasty food (J. M. de Castro et al., 2000) have been shown independently to increase intake at eating occasions for a variety of foods. How these aspects of the environment (or micro-environmental influences) interact as well as whether they can increase the intake of fast foods is unknown in the current literature.

3.4.2 Normative influence and social facilitation

Although the presence of others is directly related to improved atmosphere, there are many other ways in which social variables may influence intake. Matching norms, whereby people's intakes are matched to those around them, and social facilitation, whereby the intake amounts increase with the number of other people present at the eating occasion, have been consistently shown to increase intake of meals and snacks. It is unclear whether these two mechanisms actually represent the same or a different social influence but, together, they highlight how intake can be influenced by social variables. The extent to which this finding is replicated in fast food eating environments is yet to be addressed.

It is possible that social facilitation effects on consumption in fast food restaurants will differ from those observed in other eating environments. The very nature of *fast* food – a meal that is convenient and quick – highlights possible differences from general eating behaviours. The speedy service and consumption of fast food may make it immune from the effects of time-extension which are hypothesised to underlie social facilitation effects. Yet, Bell and Pliner (2003) reported that when food was eaten in groups of people at a fast food location, the time spent eating was significantly longer than the

duration of meals for those eating alone. Admittedly, the effect was smaller than that reported in a restaurant and a worksite cafeteria, but it was significant, nonetheless. Bell and Pliner's study was observational and did not include details of the foods consumed and it was therefore not possible to determine whether the increased meal duration led to increased intake. Considering the clearly portioned 'value meals' that are normally provided at fast food restaurants, it is possible that while the duration of a meal increased, the amount eaten did not. Yet, Stroeble and de Castro (1992) reported that social facilitation effects could alter the amount of consumed and the time spent eating at meals in restaurants. Nevertheless, the restrictive timing and speedy nature of fast foods is likely to lessen variability in the amount eaten and time spent eating. Research is needed to clarify the role of social facilitation in fast food consumption.

In contrast to the limitations that a fast food environment may have on the ability to observe the effects of social facilitation, the clearly portioned items may mean that fast food eating norms are more clearly determined. Having meals labelled as small, medium and large may make it easier for people to adhere to matching norms (ordering similar amounts to those people around them). Aside from potentially having established environmental norms, there is no evidence of how and indeed whether eating norms operate during a fast food eating occasion.

3.4.3 The 'who' of social influence

There have been studies that suggest that the interpersonal relationship shared with the people present at an eating occasion may alter the effect of the presence of others on food intake (Clendenen et al., 1994). Furthermore, there has been suggestion that certain eating behaviours may be more closely associated with certain types of people (e.g., snacking behaviours and friends: Feunekes et al., 1998). Compared to 'regular'

eating, fast food behaviours may be subject to different sources of influence. Fast food may represent a distinct type of meal with certain types of people influencing behaviour more than others. Whether and how different people alter fast food intake may provide useful insight into any social influences present during fast food consumption.

3.4.4 Fast food behaviours

Many of the questions pertaining to how social influence may alter fast food consumption exist because of paucity in research that attempts to explore social factors and fast food intake, but, more fundamentally, because of a lack of available research on fast food behaviours. Without pre-existing knowledge of these behaviours, it is difficult to ascertain what influences are important for determining the amount of fast food consumed. Menu availability suggests that traditional fast food items are more popular than healthier alternatives. In contrast, McDonald's have cited sales from their "Healthy Choice" menu as a reason for sales growth (Gumbel, 2004). There is some evidence from consumer surveys that the purchase of 'healthy' fast food items is increasing (DiPietro, Roseman, & Ashley, 2004). Without any data on actual ordering choices, it is difficult to know whether healthier options simply expand McDonalds' potential market (i.e., consumers who would not usually frequent McDonald's are attracted there for the healthy options) or whether these items represent a large proportion of their sales (i.e., existing consumers have changed their food choices).

There is limited data that describes the way in which consumers eat big brand fast food items. For example, it is unclear whether consumers purchase 'value meals' to eat as meals or snacks. As an occasional meal replacement, fast food may not dramatically sway energy equilibrium (see Chapter Two). On the other hand, if fast food intake is additional to three regular daily meals, energy excess is likely to result. Other

information about the way that big brand fast foods are eaten in Australia is needed, including the motivations and context of consumption. Given the potential for social factors to increase general food intake, understanding the social dynamic associated with fast food intake could reveal important insights about overconsumption and weight gain.

3.5 Aims of subsequent studies

The social influence literature reviewed showed that social factors can alter eating behaviour. Studies on eating behaviours have shown significant effects of social norms and social facilitation. None of these studies have explored how social factors may influence fast food consumption.

The aim of subsequent studies was therefore to explore how social influence operates at a fast food eating occasion. Limited existing research on social influence and fast food consumption behaviours precluded the formulation of specific hypotheses. Therefore, several research questions were used to guide the development of the following studies presented.

These research questions were:

1. Do micro-environmental pressures in a fast food restaurant influence the amount eaten?
2. Can social facilitation and/or the time-extension hypothesis increase the amount of fast food eaten?
3. What social normative influences affect fast food consumption behaviour?
4. If social influence factors are influential in fast food consumption, are these moderated by different interpersonal relationships?

4 Chapter Four: Development of the Fast Food Survey and Preliminary Examination of Social Influences on Fast Food Consumption

The literature on fast food consumption (reviewed in Chapter One) and social influence (reviewed in Chapter Three) suggests that there are many factors potentially associated with increased fast food intake. It is important to clarify the relationship between fast food consumption and the occurrence of overweight or obesity that has previously been reported. The possibility that individual characteristics, including sex, age, socio-economic status (SES) and body mass index (BMI), may associate with frequency of fast food consumption has been suggested in a number of previous studies (Bowman & Vinyard, 2004; French et al., 2000; Mohr et al., 2007; H. Schroder et al., 2007). Whether these same demographics relate to quantity consumed in one meal is less clear. For example, teenagers may be regular consumers of fast food (Unger et al., 2004), but may consume relatively little on each visit to the restaurant.

There have been several reports indicating that fast food consumption is motivated by convenience (FOODweek, 2008; M. J. A. Schroder & McEachern, 2005). Although the motivators for food choice (e.g., fast foods versus other foods) are important, understanding what styles of fast foods people choose, whether they consume these as meals or snacks whether, and how they balance their energy intake throughout the remainder of a 'fast food consumption day', will help to explain how fast food could be overconsumed and result in weight gain; this was suggested in the nutritional analysis reported in Chapter Two.

Despite the fact that social influence, in many forms (i.e., environmental pressure, social facilitation, social norms), has been shown to increase intake at a variety of eating occasions with a range of different foods, this research has not currently been extended to fast food eating behaviours. To date, research has focussed only on the consumption of multiple styles of snack foods including crackers (Rosenthal & McSweeney, 1979), cookies (Pliner & Mann, 2004), lollies (de Luca & Spigelman, 1979), savoury snacks (Clendenen et al., 1994), cake (Hetherington et al., 2006), or general dietary intake (J. M. de Castro, 1990, 1994).

With minimal information available on fast food behaviours, a survey was developed in order to collect data on: (a) what fast food items are being consumed, and (b) the social and environmental circumstances surrounding this consumption. The goals of this survey were twofold: to explore how actual fast food choices could increase the amount eaten and to assess whether demographic characteristics and social factors are related to fast food intake at a single eating occasion. This chapter will discuss the development and testing of the Fast Food Survey and initial analyses exploring the types of fast foods being eaten, and how social context, social influences and individual characteristics may alter energy intake at a fast food eating occasion.

4.1 Development of the Fast Food Survey (FFS)

The Fast Food Survey (FFS) was developed to assess fast food habits and enable exploration of variables that may increase fast food consumption. It was intended to measure consumption and potential predictors in a quick, but reliable manner that would maintain the enthusiasm of the participants and provide potentially useful individual feedback about consumption behaviour. With the current literature offering

little direction regarding fast food consumption, the FFS was designed to capture many aspects of behaviour and context in order to assess the impact of potential micro-environmental pressures, and social and demographic variables on consumption.

The FFS captured patterns of fast food intake from big brand fast food franchises in Australia: McDonald's, Hungry Jack's, KFC, Domino's Pizza and Red Rooster. The reason for limiting the exploration of consumption to these companies was to minimise ambiguity in the operationalisation of fast food (see Table 1, page 11). Although Subway has a dominant part of the fast food market in Australia, it was excluded from the definition of big brand fast foods used in this study. The reason for this was because Subway does not provide traditional fast foods (burgers, fried chicken, pizza etc.)²⁷. The focus on traditional fast foods in the FFS was chosen as increased intake of these styles of items is more likely to be associated with negative health outcomes.

In the FFS, participants were asked to recall their most recent fast food eating occasion including when, what and with whom they ate. To aid in the recall of the items consumed, the Fast Food Choices Program (FFCP) was developed (see, www.fastfoodstudy.com.au). Through a computer interface, the FFCP provided a menu of potential food choices available at each restaurant and asked the participant to identify their selections, including the amount of each item consumed. An algorithm was developed and utilised that allowed feedback to respondents regarding the nutrients they had consumed²⁸. Following their menu selections, participants were presented with a series of survey questions attempting to assess the environmental, social and

²⁷ Although there are items on the Subway menu that are more energy dense (e.g., chicken fillet or meatball subs), the items they sell are all sandwiches and differ dramatically from traditional fast food items.

²⁸ Participants were only made aware of the nutritional feedback component of the survey after they had completed all the questions. This was used so participants would not be primed to be concerned about the nutritional consequences of their consumption.

demographic factors that might correlate with fast food consumption. Finally, participants were offered the chance to enter a draw for a double movie pass. The final version of the FFS was programmed entirely in Macromedia (now Adobe) Flash. Each component of the survey will be discussed in detail below.

4.1.1 The Fast Food Choices Program (FFCP)

The first task to be completed within the FFS was the FFCP. This asked participants to recall the items they had eaten when they last visited one of the named fast food restaurants. The FFCP was developed to assist participants' recall. The FFCP included interactive, illustrated menus that participants navigated to select the items they consumed. When the items were selected, the corresponding nutritional information was stored within the program to allow nutritional feedback upon completion of the survey. Given the commercial nature of the foods listed, the program included detailed Trademark information. Finally, the program contained an animated, step-by-step tutorial that showed participants how to identify and select the items they consumed.

The FFCP was created in a number of stages. These involved the illustration and programming of over 400 products from the five major chains. Illustrations were all done using Adobe Photoshop and Macromedia Flash²⁹. Navigation in the FFCP was designed to reflect menu layouts within the restaurants; items were grouped as burgers, sides, drinks, desserts and so on³⁰. It was anticipated this would allow for intuitive, simple navigation.

²⁹ Care was taken to ensure that the items were drawn to accurately resemble the foods they were based on. For example, the Big Mac was drawn with three buns, two beef patties, lettuce and cheese. This level of accuracy was done to ensure that those participants who were not frequent fast food consumers could recognise the items they had eaten without relying on familiarity with product names (e.g., "Whopper").

³⁰A series of promotional food items, not listed on the company websites, were available in some restaurants. These items were excluded from the primary FFCP because they are available only for a limited time.

The company websites were used to source a list of the items available from each chain, and the accompanying nutritional information for these items. To verify that the online menu was accurate, follow-up visits were made to one restaurant of each of the chains³¹. The final section of the program had a free-text entry area allowing participants to detail any 'non-standard' food consumed (e.g., special promotional offers).

After participants had made their menu selections, the program directed them to a checklist screen. This allowed participants to check that they had accurately entered the items they ate. Here participants could also adjust the quantities of items they ate and/or remove items from their order. To account for any alterations to the orders that were not detailed in the program, the checklist was followed by the free-text entry area that asked participants if there were any alterations to the size or composition of the items they had selected or to detail any food waste. This also included the questions allowing entry of any items consumed that were not listed in the survey.

The final component delivered by the program was the nutritional feedback system. Upon completion of the survey, participants were given the option to view the nutritional information of the items they had consumed. If they selected this option, they were directed to a nutritional panel including all of the information for the items they had selected. The initial nutrition information panel was followed by more detailed nutrition feedback. The feedback relating to energy and nutrient consumption was developed in association with a registered dietician using information from the Australian Guide to Healthy Eating (Kellett et al., 1998). Information included common sources of each macronutrient and sodium; it suggested some health implications for

³¹At the time that the survey was being developed, Red Rooster released a new 'healthy' line of foods that was not listed on the website. Contact was made with Red Rooster and the nutritional information accompanying the new items was emailed by the company for incorporation into the program.

excessive intake of each and gave the recommended ranges of daily intake. The dietician gave advice regarding health outcomes of excessive consumption as well as suggesting some alternative, more interpretable guidelines for the intake of protein, based on body weight. This information, as it appeared in the FFCP can be seen in Appendix 2.

4.1.2 Measuring Correlates of Consumption

Questions about the behaviours surrounding the fast food eating occasion, potential social influences, perceptions of portion size³² and individual demographics were measured in the section following the FFCP and prior to nutritional feedback. A full list of the questions and the accompanying information sheet can be viewed in Appendix 3.

In total, there were 38 questions accompanying the survey. These were designed with a mixture of dropdown menus, radio buttons, spinners and free-text entry areas and incorporated into the initial section of the survey. To avoid missing data, each page included verification that all necessary questions had been answered. If items were overlooked, a message informing participants that they had missed a question appeared. Screen shots of the final survey can be viewed in Appendix 4.

Two sets of questions attempted to gauge the role of social influence on fast food consumption. Four questions were designed to measure normative influences. All were rated on 7-point, anchored Likert-style scales. These questions asked participants to give ratings of the awareness of others while eating, the amount others ate, how aware others were of what the participant consumed and concern for what the other people in the eating environment thought. In all these items, lower scores indicated less

³² Discussion of these items is beyond the scope of this dissertation and has been written for publication in a separate forum. It can be viewed in Appendix 7.

normative influence. Questions on awareness were rated from 1 (not at all aware) to 7 (very aware). The two items about concern were ranked from 1 (a little) to 7 (a lot).

To assess effects of social facilitation, four items were included in the survey. These included a question on the amount of time spent eating, ratings of atmosphere (two items) and the number of people present at the eating occasion. Items measuring atmosphere within the fast food restaurant included questions about how “social” and how “pleasant” participants thought the atmosphere was. The atmosphere of the eating environment was rated on a 7-point, Likert-style scale where 1 represented “not at all social/pleasant” and 7 represented “extremely social/pleasant”. Responses indicating the number of people present were divided according to a variety of interpersonal relationships. For example, participants could indicate they were with four people and that the group consisted of two friends, one child and their partner. This enables relationship to be examined as a moderator or mediator of the effect of number present. Nine different categories of relationship were utilised. These were: partner, children, parent, sibling, other relative, colleague, friend, members of a structured social group and an ‘other’ group (with a free-text entry area).

The next series of questions were included to investigate the context or micro-environmental aspects of fast food consumption both on the specific occasion recalled, and in general. The eight questions describing the context of the specific eating occasion were answered through a multiple choice format³³. Questions relating to the specific eating occasion included: the format of the purchase (take-away, drive-thru, dine-in); location the food was eaten (restaurant, car, home, other); the day of purchase; the meal

³³ The response format was piloted to ensure that the options provided were appropriate. This was the extent of initial piloting as no scales were being developed. All variables measured were observed variables that described discrete behaviours, perceptions or participant characteristics.

occasion (breakfast, lunch, dinner, in-between-meals-snack); the part of day during which the items were eaten (0500-1159 morning, 1200-1359 midday, 14-1659 afternoon, 1700-1829 evening, 1630-11.59 night, 12-4.59 late night); whether the items were bought in a meal deal or separately; and the reason for fast food consumption and any activities that preceded the eating event (two open-ended questions). A single item assessed how much respondents enjoyed the food items they consumed on the occasion reported from 1 (not at all) to 7 (extremely). The three items pertaining to general fast food behaviours included frequency of patronage, tendency to order the same items and the appeal of upsizing.

Three items addressed how the fast food items consumed impacted on daily eating patterns. This included ratings of the size of the eating occasion relative to a “normal” one. That is, if the fast food was eaten as lunch, participants were asked if this was a smaller, typically or larger-sized lunch than what they would usually eat. A second question asked the extent to which the total amount of food eaten during the day was different to usual. A free-response item asked participants to detail any changes to their eating pattern for the day of consumption (prior to and following fast food intake). The former two questions were rated on a 7-point, Likert-style scale from 1 (much less/smaller) to 4 (typical) to 7 (much more/bigger).

Finally, there were thirteen demographic questions. Amongst these were estimations of height and weight to allow the calculation of Body Mass Index. Participants were asked to indicate their confidence with the heights and weights they reported using a 4-point scale (from 1 – not at all confident, to 4 – very confident). Other demographic information included: age (in years); sex; annual household income (20,000 and less, 20,001-40,000, 40,001-60,000, more than 60,000); postcode (to allow calculation of

socioeconomic disadvantage); country of birth (Australia, UK or Ireland, Other); level of education (Below Secondary, Secondary, Trade/Apprenticeship, Certificate/Diploma, Bachelor degree or higher); current type of employment (Fulltime employed, Part-time/Casual employed, Unemployed, Home duties/Retired, Student, Other); size of immediate family; marital status (Married or living with partner, Separated/Divorced, Widowed, Never Married); whether the participant was a pensioner; and whether the participant was of Australian-Aboriginal heritage.

4.2 Surveying at the Royal Adelaide Show

The FFS was initially administered to a convenience sample to allow preliminary exploration of the links between social and environmental variables and consumption behaviour while also piloting the interface under monitored conditions. Ethics approval for this study was received from the University of Adelaide and the ethics committee at CSIRO, Human Nutrition.

4.2.1 Procedure

The FFS was set up at a survey station (or kiosk) where participants could sit and complete the questionnaire on one of four laptops³⁴. This station was located in a *CSIRO* display in the Jubilee Pavilion at the annual Royal Adelaide Show. The Royal Adelaide Show (RAS) is an agricultural fair and one of the largest annual community events in South Australia. The RAS has many non-agricultural activities including show-rides, displays and stalls selling merchandise and food. It runs for nine days from the

³⁴ Although the survey was designed using Internet-specific software, the facilities provided at the Royal Adelaide Show did not include an Internet connection. Therefore the original programming had to be modified slightly. A server laptop was set up that linked to the survey and stored the data. The only changes that needed to be made to the survey related to the 'back end' (the database) and therefore did not change the survey interface. The survey still operated through a web-browser and therefore appeared no different to the Internet version of the survey. The main difference was that a research project officer was located within the kiosk to provide any assistance and receive feedback about the FFS and its method of administration.

beginning of September each year and is reported to attract 35% of the South Australian population (Royal Agricultural & Horticultural Society of SA, 2006).

Over the first seven days of the RAS, people walking past the display were asked if they had “recently consumed fast food” and whether they were interested in doing an “interactive fast food survey”. They were offered the chance to be entered into a daily draw for a diet book and a separate draw for a free double-pass to a movie. Interested people were directed to a booth and then logged into the survey by either the research project officer in attendance or by an administrative assistant. Participants had the opportunity to ask the project officer for assistance if they ran into difficulties or were confused by any part of the survey. Administrative assistants were instructed to provide assistance only with the procedural aspects of the survey. Assistants and participants were all told that the survey was designed to “unravel everyday fast food consumption behaviours”.

Recruitment was aimed at those people who had consumed any item from one of the five chains within the 12 months preceding data collection. Given previous data confirming the pervasiveness of fast food consumption, it was expected that this would encompass a large proportion of the population. As well as having consumed fast food within this timeframe, participants had to be confident that they could remember the specific details of this consumption (i.e., time, place, other people present). Potential participants also had to have consumed an item from one of the fast food restaurants within Australia as the nutritional information was based on Australian statistics. People under the age of 16 were excluded from the study. This age limit was imposed for ethical reasons and to restrict the investigation to those people old enough to be assumed to be independent in their food choices.

4.2.2 Assessment of outliers

After recruitment, data were compiled. In seven days of recruiting at the RAS, the four computer stations obtained 126 responses. These data were then screened for outliers and coded before analysis. Dependent variables were screened for outliers using z-scores and stem and leaf plots. Five cases were removed following this screening³⁵. Mahalanobis distances indicated no cases with extreme Chi-Square values ($p < .01$). After this screening, two cases were removed because they were incomplete. For ease of interpretation, three cases were removed because they related to consumption of a drink only³⁶.

4.2.3 Adjustments to orders

A number of participants used the free-text entry areas following the FFCP to indicate that the order they had detailed needed adjusting. In total, 24 order adjustments were indicated by the respondents. Of these, 12 orders needed the standard portion size of the items adjusted due to food waste. In most cases, the reported estimates of variations were exact, for example, *"I had half a Big Mac"*. Where it was indicated that an item was shared, the portion was divided by the number of people present. When the adjustments were more ambiguous, for example, *"I had a bite of hotcakes"*, the item in question was purchased, the approximate size and weight of the change assessed, and the value calculated from that. Seven adjustments indicated menu items that the participant could not find. Only one of these items was not actually listed in the FFCP (a Crunchie sundae).

³⁵ Stem and leaf plots indicated one extreme case for energy consumed; this person consumed over 9200KJ. However, the standardised z-score for this case did not indicate that this case was over 3.29 standard deviations away from the mean. As the distribution was within normal limits and z-scores did not identify this case as an outlier, it was retained in the sample. People who reported spending longer than 40 minutes were identified as outliers using z-score criteria; stem and leaf plots confirmed this. There were five people who reported eating for 41 or more minutes that were removed from the sample.

³⁶ Recruitment was targeted at people who purchased any items. Only a small number of people only had a drink and this may skew the resulting calculation of energy intake from fast food items, therefore, these people were excluded from the analysis.

Contact was made with the fast food company to discover the nutritional content of this item. The final five order adjustments pertained to menu item customisation. In all instances these were removal of a vegetable item (pickle or tomato) from a burger. No energy and fat adjustments were made for these, as these items are very small and have little impact on overall energy. The adjusted energy amounts were used in all subsequent analyses.

4.2.4 *Recoding*

Several items were recoded before the analyses. There was substantial variation in the frequency of fast food patronage. Answers ranged from once every few months to almost daily. Six categories were created to reduce skew and improve interpretability of the data these included: “once every few months but less than once a month”, “monthly”, “more than once a month but less than fortnightly”, “fortnightly”, “once a week” and “twice a week or more”.

Given the skew present in the data for the number of people present, all those who reported eating in groups with five or more people were combined into a category labelled “large group”³⁷. This meant that group size had five levels: “lone diner”, “pair”, “group of three”, “group of four” and “large group” (i.e., five or more).

The postcode variable was used to calculate the relative socioeconomic disadvantage of the area where the participant lived. To do this, data about the Index of Relative Socioeconomic Disadvantage (IRSD) was taken from the ABS website (Australian Bureau of Statistics, 2008a). This index gives an indication of socioeconomic disadvantage according to postal zones throughout Australia. Scores range from 200 to 1200 with

³⁷ The distribution of the group size variable was skewed. Upon closer examination of the data, it was clear that this skew was likely the result of a few respondents who had eaten in large groups of people (20).

lower scores indicating more socioeconomic disadvantage. Scores are calculated using Census information about the number of high and low income houses in a postal area and other variables such as access to resources (Australian Bureau of Statistics, 2008b).

4.3 Results

4.3.1 Usability

Comments from participants addressed to the research staff indicated that they found the FFS and the FFCP engaging and easy to complete. Most participants completed the survey without any assistance. Questions that related to the procedural aspects of the survey often were accounted for by instructions already on the screen. It was suspected that these questions resulted from participants' desire to skip ahead without getting 'bogged down' in the instructions. Because the study was designed to be completed without guidance, these queries were resolved by directing participants toward the instructions on the screen. There were generally no other questions following this direction. One person indicated that he was unable to read the questions due to learning difficulties but still wished to complete the survey. His answers were recorded by an assistant who read the questions and possible response options as they appeared on the screen.

4.3.2 Final sample

There were 116 people in the sample after the outliers had been removed. Respondents ranged in age from 16 to 61 years of age, with a mean age of 30 ($SD = 12.16$).

Participants reported having between 0 and 8 immediate family members. Frequencies for the demographic factors are described in Table 2.

Table 2: Description of the demographic characteristics of the sample ($n=116$).

Variable¹	%	Variable	%
<i>Sex (male)</i>	38.8	<i>Of Aboriginal origin</i>	4.3
<i>Highest level of education completed</i>		<i>Employment status</i>	
Bachelor	34.5	Fulltime	38.8
Trade/certificate	23.3	Student	28.4
Secondary School	36.2	Part-time/casual	20.7
Below Secondary School	6.0	Home duties/retired	4.3
<i>Household income</i>		Unemployed	3.4
20,000 and below	14.7	<i>Marital status</i>	
20,001 to 40,000	20.7	Married/living with partner	45.7
40,001 to 60,000	21.6	Never married	50.9
60,000 and above	43.1	Other [†]	3.4
<i>Receive pension</i>	11.2	<i>State of residence</i>	
<i>Country of birth</i>		South Australia	95.7
Australia	82.8	Victoria	2.6
UK	5.2	Queensland	1.7
Asia	6.0		
Other	6.0		

¹Some of the categories for some of the variables were combined because of low cell frequencies ; [†]Separated/divorced/widowed

There was a disproportion number of females represented in the sample. There was also a higher number of people in the high income range and people possessing a Bachelor's Degree than would be expected in the general population according to the South Australian Census data (Australian Bureau of Statistics, 2007). The mean for the IRSD was 1005.09 ($SD = 60.06$). There were people from both the lowest and highest deciles of disadvantage (Australian Bureau of Statistics, 2008c). The survey attracted a high number of Australian-born respondents, and there was more than twice the number of people reporting to be of Australian-Aboriginal heritage than would be expected in the South Australian population (Australian Bureau of Statistics, 2007).

Frequency of fast food patronage is reported in Table 3. Most people reported consuming items from one of the fast food chains between once a fortnight and once a week.

Table 3: Frequency of fast food consumption in pilot sample ($n=116$)[†].

Variable	%
<i>Frequency of patronage</i>	
More than once every 6 months	15.5
Once a month	13.8
Once a fortnight	25.0
Once a week	22.4
Twice a week	15.5
More than twice a week	7.8

[†]only people who had consumed fast food were asked to participate.

4.3.3 *The relationship between demographic factors and fast food consumption*

Given the existing theme in previous research of assessing demographic characteristics and fast food consumption, the relationship between several demographics and fast food intake as well as frequency of consumption was initially analysed.

Males' fast food choices indicated that they ate significantly more kilojoules ($M = 4057$, $SD = 1872$) than females ($M = 3253$, $SD = 1714$), $t(114) = 2.34$, $p < .05$. People who reported working fulltime ate more ($M = 4003$, $SD = 2040$) than those with any other occupational status ($M = 3286$, $SD = 1605$), $t(114) = -2.11$, $p < .05$. There was no difference in the frequency of visits to any of the fast food chains corresponding with employment status.

Bivariate relationships between energy intake or frequency of consumption and demographic factors were calculated. There was a weak, positive relationship between age and energy intake, $r(116) = .20$, $p < .05$. The relationships between energy intake and

level of education, and energy intake and household income were not significant ($p > .05$). There was a weak, negative relationship between energy intake and socioeconomic disadvantage, $r(114) = -.21, p < .05$. Frequency of patronage was not related to demographics, including age, income, level of education or social disadvantage. It was, however, positively associated with energy intake at the eating occasion, $r(116) = .24, p < .05$.

To further explore the relationship between demographic characteristics and intake, a multiple regression was performed. Sex, age, the measure of socioeconomic disadvantage (IRSD), household income, highest level of education completed, being married (versus not), being fulltime employed (versus not) and frequency of consumption were included in the model. Results can be seen in Table 4.

Table 4: Total variance explained (Adjusted R^2), beta values and significance levels for a model predicting the amount of energy consumed at a fast food eating occasion using demographic factors ($n=116$).

<u>Predictors</u>	Adjusted $R^2 = .120$	
	<i>Beta</i>	<i>Alpha</i>
<i>Sex</i>	-.14	.14
<i>Age</i>	.16	.11
<i>IRSD</i>	-.24	.02
<i>Household income</i>	.06	.61
<i>Level of education</i>	.08	.42
<i>Married</i>	-.04	.76
<i>Fulltime employed</i>	.12	.25
<i>Frequency of consumption</i>	.17	.06

The final model was significant, $F(8,105) = 2.93, p < .01$ and accounted for 12% of the total variance for the amount of energy consumed at a single fast food eating occasion. The only significant predictor of the amount eaten was the level of socioeconomic disadvantage of the respondents' suburb. This was negatively related to the amount

consumed, indicating greater consumption was associated with higher socioeconomic disadvantage or vice versa. Self-reported frequency of consumption was positively related to energy, but this only trended toward significance.

The same combination of demographic characteristics was included to predict frequency of consumption. This model failed to reach significance.

BMI and fast food intake. Thirty-three males and 49 females were confident in both the heights and weights they provided³⁸. Body Mass Index³⁹ (BMI) was calculated for the participants confident in their height and weights. This group reported a mean BMI of 25.87 ($SD = 5.22$) with values ranging from 17.63 to 43.83. BMI was not significantly related to the energy intake on the fast food eating occasion. There was a weak, positive relationship between BMI and frequency of patronage, $r(82) = .25, p < .05$.

4.3.4 Fast food behaviours

As there is limited, published research on fast food behaviours, the frequencies of fast food behaviours and motivators and context of consumption were explored. Aspects such as meal deals and food choices were analysed to assess whether micro-environmental pressures influence the amount of fast food eaten (thereby addressing the first research question posed in Section 3.5).

Description of general fast food behaviours. Frequency of different purchasing behaviours can be seen in Table 5.

³⁸ People with confidence in their height and weight measures were of a slightly different demographic description to those lacking in confidence. They had higher income, $t(114) = -2.57, p < .05$, and a greater level of education, $t(114) = -2.89, p < .01$, than those not confident in the heights and weights provided. There were no differences (at the $p < .05$ level) for energy intake, age or social disadvantage between the groups.

³⁹ Weight [kgs] divided by height[m] squared.

Table 5: Frequency of meal types, location and time of consumption for the RAS sample (n=116).

Variable	%	Variable	%
<i>Form of purchase</i>		<i>Time of day</i>	
Take away	43.1	Morning (0500-1159)	10.3
Drive-thru	27.6	Midday (1200-1359)	25.0
Dine in	29.3	Afternoon (1400-1659)	16.4
<i>Location eaten</i>		Evening (1700-2029)	35.3
Home	29.3	Night (2030-2359)	9.5
Restaurant	31.0	Late night (0000-0459)	3.4
Car	16.4	<i>Day of week</i>	
Other	23.3	Monday	5.2
<i>Ordered items as a meal deal</i>	58.6	Tuesday	8.6
<i>Meal Occasion</i>		Wednesday	13.8
Breakfast	6.0	Thursday	15.5
Lunch	36.2	Friday	13.8
Dinner	49.1	Saturday	25.9
In-between-meal snack	8.6	Sunday	17.2

There were few clear patterns of behaviours surrounding fast food consumption. Most respondents purchased their items in a take away or drive-thru format; less than a third of the sample consumed their items in the restaurant. Most people reported consuming their fast food items for dinner or lunch. At the time of the survey, only McDonald's offered a breakfast menu and it is therefore unsurprising that there was only a small group of breakfast eaters. Frequencies of different meal occasions corresponded to frequencies of the part of day when the items were eaten. Finally, just over 40% of the participants reported eating fast food on the weekend.

Motivators and context of fast food consumption. Questions about the reasons for fast food consumption and the activities before eating the fast food items needed to be coded to allow analysis of the frequency of different responses. The open-ended responses for the question "Why did you eat fast food on this occasion?" were coded into categories

according to recurring themes. As most responses were only a few words long, the themes were fairly apparent. In cases where there were two reasons given, for example, “*wanted it, it was easy*”, the first of these options was chosen as this was assumed to be a primary reason⁴⁰.

A number of respondents indicated simply that they ate because they were hungry (labelled ‘*Basic Needs*’). One initial theme that arose from this open-response item that related to *fast* food consumption, was an attraction to traditional fast foods. Sub-themes of this include wanting fast food as a result of the type of food. Sometimes these cravings were specifically stated, “*I had a craving*”, in other instances they were less directly stated, “*was drunk and wanted it*”. Therefore, responses themed around cravings and ‘needs’ were combined into a category labelled ‘*Attraction to the Food*’.

The second theme which arose from the open-ended responses pertained to another typical characteristic of fast foods: convenience. Many people stated simply “*it was easy*” as a reason for eating fast food. Less obvious examples of reasons encompassed by the ‘*General Convenience*’ motivator included not having to cook. There seemed to be a distinct set of items that represented a reason typifying a different type of convenience. These items included: convenient location, access to toilets, banking facilities and the convenient pricing of the food. These all relate to the fast food environment which the restaurant creates and were therefore labelled ‘*Incidental Convenience*’.

The final reason cited in the open-response items focused on social demands; participants indicated that they ate it because other people wanted it or bought it for

⁴⁰ The only time this was not the case was when the first reason was “*I was hungry*”. This reply was generally uninformative as to the reasons for eating fast food instead of any other food. Where this answer was the only response listed by a participant it was coded as such.

them, or they had to eat it to be part of a social occasion. As such, these responses were categorised as being motivated by *'Other People'*.

For the second open-response item – “activities preceding fast food consumption” – the same process was used for coding. Again, descriptions of the activities before the fast food consumption were generally only a few words long; *“I was shopping”*, *“at the pub”* and so on. Over half of the sample indicated that they were out-and-about before consuming the fast food items. In 35 of these responses, participants wrote that they were actually on the way somewhere else⁴¹ accordingly items including description of this activity were coded as *'Between Activities'*.

Nineteen people in the sample wrote that they were out participating in some kind of social activity, including spending time at the pub, walking around the fair (RAS) and so on. Eighteen participants indicated that they were shopping before their fast food consumption. These instances were generally stated simply as *“shopping”*. Considering the number of people who responded this way, *'Shopping'* was defined as a distinct category. Eleven people wrote that they were participating in a moderate level of physical activity (such as an organised sport). Although this activity was nominated by less than ten-percent of the sample, it was distinct and, for the purposes of coding, called *'Moderate Physical Activity'*. For other instances that included socialising, the label *'Social Activities'* was used⁴².

⁴¹ Twenty-one of those people who indicated that they were travelling wrote that they were going to or from specific locations. Work was the most common destination specified (10 people). Eleven participants indicated that they were driving with no specified destination.

⁴² Although the presence of other people was not explicitly stated in many of these, for example, *“at the pub”*, they were still assumed to be social activities. The data on the number of other people present when eating the fast food indicated that none of the people engaging in social activities before eating dined alone.

Aside from those out-and-about, 20 people indicated that they were doing activities typically completed at home. These included homework or study, sleeping, watching television, reading and “*thinking*”. All of these activities required low physical activity levels. Accordingly, the category ‘*Not Much*’ was used to describe these activities.

The final group of participants indicated that they were doing activities outside of their homes. Twenty-three people wrote that they had been at work or at university. These responses were coded into a distinct group – ‘*Work*’. Four people had missing data for the activities preceding their fast food consumption.

Following the identification of these themes, motivators for fast food consumption items were coded into the following reasons: *Basic Needs, Attraction to the Food, General Convenience, Incidental Convenience* and *Other People*. The activities preceding consumption were categorised as: *Between Activities, Social Activities, Moderate Physical Activity, Shopping, Work* (or university) and *Not Much*. The frequencies of responses in each of the coded categories for both open-response items can be seen in Table 6 (over the page).

To validate the scoring of these themes, the raw responses were given to a second researcher. She was informed of the categories and the basic process for coding and asked to code all the responses. Agreement between the two coding sets was 100%.

Analysis of the free-response data according to these category assignments indicated that energy consumption from the fast food eating occasion reported did not vary according to stated motivation to consume or activities preceding consumption ($p > .05$).

Table 6: Coded categories and associated frequencies for both open-response items.

Activities Preceding Consumption (n=111)		
	<i>%</i>	<i>Examples of typical descriptions</i>
Between Activities	25.9	<i>“Driving into the city”; “Heading home from work”</i>
Social Activities	17.2	<i>“Spending time with friends”; “At a carnival”</i>
Shopping	15.5	<i>“Shopping”; “Buying groceries”</i>
‘Not Much’	14.7	<i>“Watching television”; “Sleeping”</i>
Working	12.9	<i>“At work”</i>
Moderate Physical Activity	9.5	<i>“Playing netball”; “House cleaning”</i>
Reasons for Consumption (n=116)		
	<i>%</i>	<i>Example of typical descriptions</i>
General Convenience	32.8	<i>“It was easy”; “Didn’t have to cook”</i>
Basic need	24.1	<i>“I was hungry”; “It was mealtime”</i>
Incidental convenience	17.2	<i>“It was there”; “It was late, no other options”</i>
Attraction to food	12.9	<i>“Craving fatty food”; “Had been drinking”</i>
Other people	12.9	<i>“Someone bought it for me”: “Everyone was doing it”</i>

4.3.5 *Fast foods eaten and the potential for overconsumption*

Chapter Two showed that order and brand choice could potentially change the amount of dietary energy consumed. The following section describes analyses designed to assess whether these nutritional differences would be reflected in the actual ordering behaviours reported.

Differences in energy and fat intake between chains. The average energy consumed from the fast food items was 3564KJ ($SD = 1812$). Given the indication in the nutritional profiling (Chapter Two) that some fast food companies’ options were more energy dense than others, energy consumed was assessed between each fast food brand. The highest proportions of people in the samples reported consuming items from Hungry Jack’s followed by closely by McDonald’s. The amount of energy consumed by the brand of fast food eaten can be viewed in Table 7.

Table 7: Energy (KJ) and fat content of fast food consumed by pilot participants†.

Variable	KJ			% KJ from fat	
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<i>Whole sample</i>	116	3564	1812	39.36	8.99
<i>McDonald's</i>	38	2933 ^{ad}	1328	36.25 ^{bc}	9.84
<i>Hungry Jack's</i>	40	4338 ^c	1796	43.29 ^a	8.99
<i>KFC</i>	23	3885 ^{cd}	2028	39.34 ^{ac}	5.66
<i>Domino's Pizza</i>	12	2184 ^{ab}	1614	34.71 ^c	5.66
<i>Red Rooster</i>	3	4320	869	45.15	8.87

†Shared suffixes indicate differences that are not significant at the .05 level

Analysis of variance (ANOVA) comparing energy intake between the different brands⁴³ revealed significant differences existed, $F(3,109) = 7.53, p < .001$. Post-hoc comparisons using Bonferroni's adjustments revealed that those who ate at Hungry Jack's ate significantly more energy than those at McDonald's or Domino's Pizza. Those who ate at KFC also ate significantly more than those eating Domino's Pizza.

To further assess energy density of the items consumed, the percentage of energy from fat was calculated; every gram of total fat consumed from the fast food items was converted into 37KJ of energy (Codex Alimentarius Commission, 2006). The total kilojoules consumed from fat were then divided by the overall energy intake. The extent to which energy from fast foods was dominated by fat varied significantly between fast foods (excluding Red Rooster), $F(3,109) = 5.78, p = .001$. Dunnett's T3⁴⁴ post-hoc comparisons were used to explore where this difference lay. People consumed a higher percentage of fat in items consumed from Hungry Jack's compared to those from Domino's Pizza or McDonald's. Means and standard deviations for the percentage of fat from the fast food items consumed can also be seen in Table 7 (above).

⁴³ Given the small number of people who had eaten Red Rooster, these participants were excluded from the comparison.

⁴⁴ Levene's test revealed a violation of the assumption of variance.

Making healthy choices. The nutrition analysis in Chapter Two revealed that some of the major fast food chains offered healthy alternatives that could dramatically reduce energy intake from fast food items. To explore whether these options were being selected by consumers, order information was analysed for items eaten from McDonald's and Hungry Jack's⁴⁵. Items that were advertised as "*less than 10 grams of fat per serve*" were coded as healthy choice options; this criterion was used by McDonald's and Hungry Jack's to advertise healthy alternatives at the time of the survey. Of the 13 primary burger and baguette options available on the menu at Hungry Jack's, one was low-fat (7.7%). McDonald's offered 16 burger or baguette options and five of these contained less than ten grams of fat (31.3%). Order descriptions indicated that six orders in total included a low-fat burger/baguette item at McDonald's (20.0% of all orders containing a burger or baguette). One of the baguettes was accompanied by fries. Only one of the orders at Hungry Jack's included the low-fat baguette from Hungry Jack's (2.6% of all orders with a burger or baguette). The participants who had ordered low-fat items were of varying demographic characteristics; there were four females and three males, ranging in age from 19 to 61, residing in areas ranging from the highest deciles of disadvantage to the lowest. There were no differences in any of the demographic characteristic of this sample compared to those who ordered 'traditional' fast food items.

Daily imbalance. To assess whether participants ate fast food items as main meal replacements, reported meal occasions were assessed. Most of the fast food eating occasions were classified as meals. There was no difference in the amount of energy

⁴⁵ Order descriptions were coded according to whether they contained a burger or baguette, chips, a chicken item (nuggets or chicken portions) and/or a beverage to give an indication of what style of items were popular at each chain. As KFC and Domino's Pizza did not offer any healthy alternatives at the time of the survey and there were only limited orders from Red Rooster, orders from these chains were excluded from the analysis.

consumed at meal occasions ($M = 3652, SD = 1837$; breakfast, lunch or dinner) as compared to snacking occasions ($M = 2636, SD = 1244$), $t(114) = 1.71, p > .05$.

In order to explore whether the items eaten were replacements for other items, and whether there were any compensatory eating behaviours in the day when the fast food intake occurred, the open-ended question about alterations to dietary patterns were analysed. Over half of the respondents ($n = 67$) chose to leave this item about alterations to dietary patterns blank. Corresponding to the lack of detail in eating change, the modal response for the amount of food eaten during the day was “typical” (a rating of 4).

Relative to the specific eating occasion, the modal response was also “typical”. Over half of those who responded to the question about changes in intake throughout the day indicated that they had skipped or missed a meal on the day of their fast food consumption (20.7% of the whole sample). The total energy consumed by people who reported skipping a meal ($n = 24, M = 3371, SD = 1804$) did not differ significantly to the amount eaten by those who did not ($n = 92, M = 3615, SD = 1820$), $t(114) = .59, p > .05$.

Other respondents to this question indicated that they had eaten more food than usual ($n = 6$), that the meal occasion occurred in a different time of day than usual ($n = 6$), and that on the day of consumption, they ate more convenience foods than they usually would (including the fast food consumption they detailed; $n = 9$).

4.3.6 The influence of micro-environmental pressures on fast food consumption

Measures including appeal of upsizing, tendency to order the same items, purchasing a meal deal and enjoyment of food were analysed to explore any potential micro-environmental influences on fast food consumption.

Many participants described the concept of upsizing as unappealing with the modal response being 1 (*“very unappealing”*). The mean score for this item was also below the midpoint ($M = 2.78, SD = 1.97$). In contrast, the modal response for the tendency to order the same items was 7 (*“very true of me”*). The mean was above the midpoint ($M = 4.51, SD = 2.03$). There was no relationship between the tendency to order the same items and frequency of patronage, $r(116) = .03, p > .05$ or the amount eaten on the reported occasion $r(116) = .12, p > .05$. However, a moderate positive relationship existed between the appeal of upsizing and frequency of patronage, $r(116) = .26, p < .05$ as well as the amount eaten, $r(116) = .32, p < .001$. The relationship between the enjoyment of items eaten and the total energy consumed was not significant for either the amount eaten, $r(116) = .11, p > .05$ or frequency of consumption, $r(116) = .13, p > .05$.

Over half of the participants ordered their items as part of a meal deal. Having ordered a meal deal increased the amount of kilojoules from 2657 ($SD = 1580$) to 4205 ($SD = 1697$). This difference was significant, $t(114) = -4.98, p < .001$. Crosstabs were used to compare the number of people eating meal deals across the different brands of fast food (excluding Red Rooster). The number of people having meal deals was 52.6%, 75.0%, 56.5% and 25.0% for McDonald’s, Hungry Jack’s, KFC and Domino’s Pizza respectively. Chi-Square revealed a significant difference between the groups, $\chi^2(3,110) = 10.60, p < .05$. A higher percentage of people than expected ordered meal deals when eating Hungry Jack’s; less people than expected reported ordering a meal deal when having Domino’s Pizza.

The size of the meal deals⁴⁶ was also examined. Across all chains, a majority (61.8%) of the 68 people having a meal deal had a regular or medium-sized meal. This was followed by large meals (22.1%) and small meals (16.2%) respectively. There was a moderate relationship between the size of the meal purchased and the appeal of upsizing, $r(68) = .27, p < .05$. Fifty-three-point-four percent of people who purchased a large meal rated the appeal of upsizing below the median.

4.3.7 Social influences and fast food consumption

The means for the measures of social influence, the ratings of atmosphere and the time spent eating can be seen in Table 8.

Table 8: Mean response to items measuring social influence on eating.

Question	<i>M</i>	<i>SD</i>
<i>How aware were you of the people around you when you were eating?^{†2}</i>	4.81	2.01
<i>How much fast food do you think those around you ate?^{†1}</i>	4.40	1.59
<i>How aware of the amount you ate do you think those people around you were?^{†2}</i>	3.35	1.90
<i>How concerned were you about what those people around you thought of you?^{†1}</i>	2.18	1.71
<i>Approximately how long did you spend eating?[‡] (in minutes)</i>	14.18	8.34
<i>Please rate how sociable the atmosphere was when you ate this fast food^{‡3}</i>	3.84	1.84
<i>Please rate how pleasant the atmosphere was when you ate this fast food^{‡4}</i>	4.53	1.57

[‡] $n=116$; [†] $n=91$ – means only for those who ate with others

Rating scale response format: ¹1= a little, 7= a lot; ²1= not at all aware; 7= very aware; ³1= not at sociable; 7= very sociable; ⁴1= not at pleasant; 7= very pleasant

Most people reported eating with one other person (27.6%). Dining alone was the next most frequent response (21.6%) followed by groups of three (19.8%), four (17.2%) and

⁴⁶ Meal deal size was defined according to the size of the fries or drink with priority given to fries when the two varied.

large groups (13.8%). The relationship between group size and the amount of energy consumed was not significant, $r(116) = -.18, p > .05$. Some previous authors have not supported a linear relationship between the number of people present and the amount eaten and suggested that a simple dichotomy of alone versus with others is more discriminating (Pliner, Bell, Hirsch & Kinchla, 2006). Analyses comparing those who ate in company to those who ate alone was still non-significant, $t(114) = .97, p > .05$. Those who ate with others did spend longer eating ($M = 11.00, SD = 6.51$) than those who ate alone ($M = 15.05, SD = 8.61$), $t(114) = -2.19, p = .03$. Table 9 shows the correlations between the social facilitation variables.

Table 9: Correlations between energy consumed and ratings of the eating environment for whole sample ($n=116$).

Variable	1 KJ	2 Size	3 Time	4 AtmosS
1. Energy (KJ)	1.00			
2. Group size (Size)	-0.11	1.00		
3. Time spent eating (Time)	0.14	0.10	1.00	
4. Atmosphere Sociability (AtmosS)	0.04	0.54*	0.16	1.00
5. Atmosphere Pleasantness	0.13	0.24*	0.14	0.67*

*significant at $p < .01$ level

The atmospheric measures were significantly and positively related. Group size was also positively related to improved ratings of atmosphere. These were the only significant relationships between the social facilitation variables. Although there was a difference in the time spent eating between participants who ate with others versus those who ate alone, there was no evidence of a linear relationship between these variables. The relationship between time eating and group size is plotted in Figure 6.

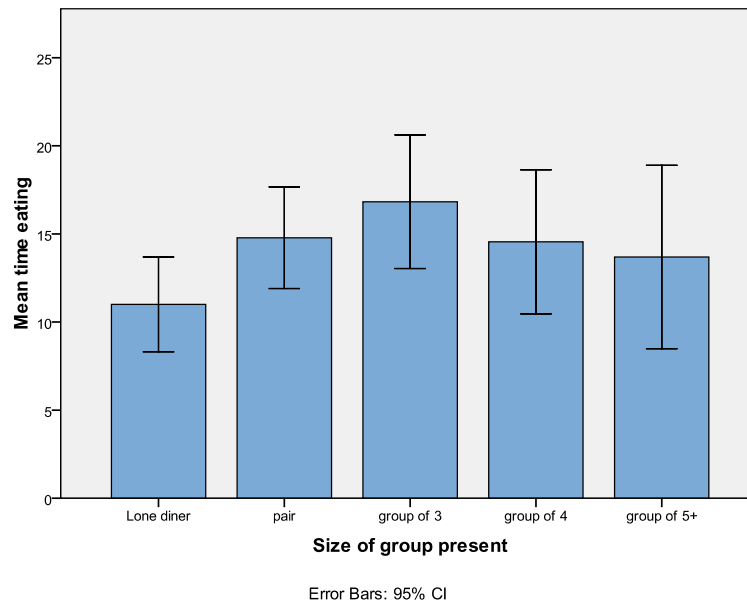


Figure 6: Mean time spent eating for different group sizes at the reported fast food eating occasion ($n=116$).

It is clear that although there appeared to be a positive, linear relationship between the people present and time eating as group size increased from a lone diner to a group of three diners, this relationship reversed as the group size increased from three members to larger groups.

Assessment of the perceptions of the norms that surrounded the eating occasion was restricted to respondents who ate with at least one other⁴⁷. The only normative influence that related to the amount consumed was the perception of how much food those people around were eating, $r(91) = .26, p < .05$. Normative perceptions were associated with each other; ratings of how much people thought others ate related moderately and positively to general awareness of those around, $r(91) = .33, p < .01$, and moderately with the level of concern for what those around thought of them, $r(91) = .45, p < .01$. Concern for what others thought of the participant was also weakly

⁴⁷ Chi-square comparisons and t-tests indicated that there were no statistical differences between those who ate with others for any of the demographic characteristics.

and positively related to how much the participants thought those around them ate, $r(91) = .23, p < .05$.

The nine categories of interpersonal relationship described earlier were reduced to more simple groups. Parents, siblings, other relatives and children were combined into a category of *Family*. *Partner* was left as a distinct category. Friends, members of a social group and colleagues were combined in a *Friends* category. All those participants who had listed an 'other' category were put into the most appropriate of these groups. Of those eating with others, most ate in the presence of a member/s of their family ($n = 65$); this was followed by people eating with their partner ($n = 34$), and friends ($n = 32$)⁴⁸.

A simple multiple regression model was constructed to assess the effects of the social factors on those who ate with others. All the normative items and the social facilitation items (group size, time eating and pleasantness of atmosphere⁴⁹) were included. Limited demographics were also controlled for (sex, age and socioeconomic disadvantage). The only social factor significantly influencing the amount eaten was the perception of how much the others present were eating. This was positively associated with actual intake.

Given the potential influence that the type of person present may influence eating behaviours, a second model was constructed. This model included the same social factors but the group size variable was replaced with the number of family members present, the number of friends present and whether there was a partner present.

Including more detailed information about the people present improved the amount

⁴⁸ These numbers do not sum to the total sample (91) as many participants ate in the presence of multiple people who had different relationships with the participant, for example, one parent, one friend.

⁴⁹ Sociableness of atmosphere was not included as it was moderately related to both the ratings of the pleasantness of the atmosphere and group size.

variance that the model accounted for by roughly 5%. It also revealed that who was present could have effects on the amount eaten; the number of family present had a significant, negative relationship with the total amount eaten. Although the presence of a partner had a positive effect, it was not significant. The perception of how much the others present ate remained a significant predictor of the energy intake from fast food items at the single eating occasion. Descriptions of both models and beta values can be seen in Table 10.

Table 10: Models for social variables predicting energy intake at a fast food eating occasion. Total variance (Adjusted R^2), betas and alphas are presented for each predictor ($n=91$).

<i>Predictors</i>	Model 1		Model 2	
	Adjusted $R^2 = .119$		Adjusted $R^2 = .167$	
	<i>Beta</i>	<i>Alpha</i>	<i>Beta</i>	<i>Alpha</i>
<i>Time spent eating</i>	-.00	.98	-.02	.85
<i>Atmosphere pleasantness</i>	-.08	.46	-.13	.25
<i>General awareness of others</i>	-.02	.84	-.07	.57
<i>Amount others present ate</i>	.29	.01	.32	.01
<i>Perception of how much others thought you ate</i>	-.05	.69	-.08	.57
<i>Concern of judgement</i>	-.03	.81	-.02	.87
<i>Sex</i>	-.19	.09	-.22	.06
<i>Age</i>	.17	.12	.21	.06
<i>IRSD</i>	-.22	.04	-.21	.07
<i>Group Size</i>	-.15	.13	-	-
<i>Number friends present</i>	-	-	.02	.88
<i>Number family present</i>	-	-	-.29	.04
<i>Partner present</i>	-	-	.13	.27

4.4 Discussion

The purpose of this study was to undertake a preliminary exploration of fast food eating behaviours with the goal of gaining a better understanding of the variety of factors that could increase the amount of fast food eaten on a single occasion and how these might best be operationalised. A further aim was to test the acceptability and usability of the

FFS and the ease with which it could be completed when online. To do this, an Internet survey was developed and administered at a local agricultural fair to a small convenience sample of people who had consumed fast food.

4.4.1 The Fast Food Survey: Strengths and limitations

It was clear that the survey represented an acceptable instrument to measure varying aspects of fast food consumption. Data collection via the FFS was efficient; participants appeared to have little difficulty engaging with the program and many were interested in the nutritional feedback that was provided (50% of respondents viewed the nutritional information). Demographic variables and measures of social influence in the FFS could be used to successfully predict energy intake at a single eating occasion. Although a small percentage of the total variance was accounted for in each of the regression models, the fact that these factors could significantly predict intake indicates that further investigation is warranted.

The survey attempted to account for a large variety of correlates for fast food consumption. Although most measures worked successfully, results from others were less informative. Specifically, the items about variation in general dietary intake on the day of fast food consumption were left largely unanswered which meant that responses to this item could only be used in a descriptive sense. This meant that the impact of fast food intake on daily eating patterns could not be established. Nevertheless, skipping meals was commonly reported as a change to 'usual' eating patterns. To truly understand daily energy balancing, food intake will need to be measured by more sophisticated dietary measures such as food frequency questionnaires or diet diaries, or through ethnographic assessments which have higher participant burden.

Although much previous research has explored frequency of fast food patronage, it is important to identify the drivers of energy intake at any one meal at the micro-level as an initial step to understanding fast food behaviours. Exploring the amount of fast food eaten simultaneously with the reported frequency of fast food consumption is a novel aspect of the FFS. Analysing both measures revealed that the influences that predict energy intake at a single fast food visit differ from those that predict differences in frequency of attendance at a fast food restaurant.

The survey was completed by a small, convenience sample which was not representative of the wider population. This limits extrapolation of these results to the general population. Furthermore, there was some evidence that the fast food consumption reported by these participants may have been influenced by the context of the survey. Many reported consuming Hungry Jack's (the only of the fast food chain operating at the RAS) and several indicated that consumption occurred while at the fair when answering the open-ended questions. This means that the consumption in this sample may not be representative of typical fast food eating occasions. Therefore, although these results revealed some interesting findings, they need to be interpreted cautiously until corroborated by larger, more representative samples.

4.4.2 Demographic characteristics and fast food consumption

Previous authors have noted relationships between individual demographics and the regularity of fast food consumption (Mohr et al., 2007; H. Schroder et al., 2007). The current survey failed to support these findings – none of the demographic factors measured significantly predicted frequency of fast food patronage. The sample in the current study was small when compared to that of previous studies (the survey reported by Mohr et al. included almost 20,000). This may have limited the predictive power of

the model for frequency of fast food consumption. Preliminary correlation comparisons suggested a relationship between with higher BMI and higher frequency of patronage (or vice versa) which supports previous studies that have shown that fast food consumption may be associated with BMI (Duffey, Gordon-Larsen, Jacobs, Williams & Popkin, 2007).

The demographic factors accounted for more of the total variance of the energy consumed at a single eating occasion than for frequency of fast food patronage. There was an effect of gender on the amount eaten on the single occasion assessed. Males consumed more than females on the single eating occasion, a finding consistent with their higher daily requirements (Kellett, Smith & Schmerlaib, 1998). Although sex, age and occupational status were initially significant, when considered in combination with other demographic variables, these variables failed to contribute significantly to the prediction of energy intake. The only significant demographic predictor of energy intake at a fast food eating occasion was the level of socioeconomic disadvantage of the participants' resident – living in more disadvantaged areas associated with higher fast food consumption at a single eating occasion and vice versa. There is no existing literature on how demographic factors influence the amount eaten at a single fast food eating occasion. Perhaps, people from more disadvantaged areas have a higher appreciation of the financial benefits of eating greater amounts of food at fast food restaurants. As Cameron-Smith, Bilsborough and Crowe (2002) noted, for only a small increase in price, energy intake can be increased substantially.

Finally, although only trending toward significance, a positive relationship between the frequency of fast food consumption and energy intake at a single eating occasion was found. Understanding any potential relationship between frequency of fast food

consumption and the amount consumed is crucial; if people who visit fast food restaurants more frequently also order and consume more food, it is likely that this association will result in overconsumption from fast food items.

4.4.3 *Behaviours, motivators and context surrounding fast food consumption*

Most people in the current sample reported eating fast food once a week or once a fortnight; rates comparable to those reported in larger surveys (FOODweek, 2008). Multiple studies have reported that convenience and cost drive fast food consumption (Scheibehenne, Miesler & Todd, 2007; M.J.A Schroder & McEachern, 2005). The current findings suggest that convenience can be both general and incidental. The results also suggested that the food itself may be a strong motivator for a sub-set of consumers. Interestingly, cost was spontaneously cited as a reason for consumption by only three of the respondents.

The context of fast food consumption reported by participants in the FFS supported previous indications from surveys with undergraduate students that fast food purchases are mostly impulsive (M. J. A. Schroder & McEachern, 2005). It seemed that few respondents planned to eat fast food and those who did usually indicated that it was part of their routine (i.e. "*Friday is junk food night*"). Approximately 16% of people ate their fast food items while in the car and close to 30% purchased the food while in the car. Both these frequencies indicate the way in which people have satisfied their need for convenience with fast foods. There is no great mystery to fast food consumption, it is easy and satisfies its label; it is fast. In a world with increasing time scarcity, where food and sharing meals may be less integral to the culture, it is not surprising that a style of eating which is not focused on the entirety of the experience, but can be 'slipped-in' between other commitments and activities may be becoming increasingly popular.

4.4.4 *Fast food: Potential for overconsumption*

There were significant differences in the amount of energy consumed between the fast food chains. The fact that the meals at Hungry Jack's come in larger portions (discussed in Chapter Two) was, most likely, one of the reasons for the higher energy consumption at this chain compared to meals from McDonald's and Domino's Pizza (which sell less energy dense meals and smaller portions). The items consumed from Hungry Jack's had higher levels of fat and were more commonly purchased as meal deals compared to other chains which may also account for the higher energy consumed at Hungry Jack's compared to some other chains.

Orders containing 'healthy choice' items were not commonplace. In McDonald's, there were more low-fat options available and more people ordered these types of items than at Hungry Jack's. This again suggests that the purchasing environment has a crucial impact on behaviour which is consistent with the proposal, in the model of normative overeating, that environmental pressures can promote overconsumption (Herman, Rother & Polivy, 2003). Such a small number of people ordered these styles of items that further analyses on the orders containing healthy choices were restricted.

Micro-environmental pressures, such as meal deals and menu options, were associated with intake. The way that meals are promoted and constructed is likely to be an important factor promoting increased intake.

Although the purchase of meal deals was commonplace, overall, respondents found the concept of upsizing unappealing⁵⁰. Half of the people who reported eating a large meal

⁵⁰ Only meal deals can be upsized.

(according to their order descriptions) also rated the appeal of upsizing below the median. This suggests some incongruity between attitudes and behaviour, as the default-sized meal deal at most fast food restaurants is medium or regular. Therefore, people who ate large meals did, in effect, upsize them during the ordering process. An aspect of social desirability may have been influential in responses to this question, especially in the context of the negative publicity that upsizing has received (especially through the film *Supersize Me*⁵¹).

4.4.5 *Social influences and fast food consumption*

Fast food consumption was associated with social factors. A group of respondents directly identified other people as the reason for their fast food consumption in the open-ended response format. Citing other people as the reason for consumption was usually accompanied with suggestions of a feeling of external locus of control. For example, “*everyone else was doing it*” or “*someone else bought it so I had to eat it*”. The group of people directly identifying others as the reason for their consumption was a small, in line with the findings of Vartanian et al. (2008) which suggested that often participants do not cite social factors as influencing their behaviour. Nevertheless, the fast food consumption reported often appeared to be social in nature (other people were present in many occasions). Redd and de Castro (2006) reported that in free-living environments people naturally tended to eat with others. Consistent with this observation, in the FFS, a majority of respondents reported eating while others were present. Furthermore, the presence of others was associated with more sociable and pleasant eating environments for respondents when asked to rate the atmosphere at the meal.

⁵¹ The movie is actually about super-sizing which is upsizing to fries and a drink one size larger than large.

Overall, social factors successfully contributed to the model predicting intake at a single fast food eating occasion. How these factors relate to different social influence theories will be discussed in the following sections.

Normative influence. One of the strongest social predictors of energy intake at an eating occasion was the perception of the amount the others around ate. This norm was designed to assess the level of matching – reducing or increasing intake to match the other people’s intake at an eating occasion (Roth, Herman, Polivy & Pliner, 2001). Previous findings supporting the existence of matching norms have shown that when eating in the presence of people who eat more food, people will modify their own behaviour to match it. The actual amount that the co-eaters consumed at the eating occasion recalled in the FFS cannot be determined from these data. It may be that people in the sample who ate more food justified their increased consumption by adjusting the *perceived* norm of the environment. Although, it is difficult to measure the perception of norms in an environment through a survey, it is not impossible. For example, the Theory of Planned Behaviour includes assessment of social norms through survey methods (Ajzen, 1985).

Social facilitation. There was no relationship between the number of people present and the amount eaten, an observation contrary to that reported by de Castro and Brewer (1992). There was also no relationship between the number of people present and the time spent eating, which is also contrary to social facilitation findings (J. M. de Castro, 1990, 1994; J. M. de Castro & Brewer, 1992). The relationship between the number of people present and time spent eating appeared to be positive only up to the presence of three other people. It may be that as groups get larger, the effect of other people became more diffuse and reduced the effect of time-extension that has been observed in

previous studies. Only a small proportion of respondents ate in large groups in this preliminary study and, accordingly, data from a larger sample is required to understand the relationship between the time eating and the number of people present that was observed in this study. As there was a difference in the time spent eating between those eating in a group versus those eating alone, these data are at least partially consistent with the time-extension hypothesis.

If, as was suggested by Feunekes, de Graaf and van Staveren's (1995) model, increased energy intake is indirectly influenced by the people present through the time spent eating, evidence of a relationship between the amount eaten and number of people present may have been missed in analyses measuring only direct effects. It is also possible that the restricted variance in time taken to eat a 'fast' meal ensured minimal effects from social variables. Again, further research will be needed to clarify if this is indeed the case. More detailed examination of the pattern of these associations and how they impact on fast food consumption is warranted.

Interpersonal relationships and fast food consumption. As was suggested in the literature (J.M., de Castro, 1994; Feunekes, de Graaf, Meyboom & van Staveren, 1998; Verlegh & Candel, 1999), it appears that interpersonal relationships may be an important moderator of the effects that others can have on the amount eaten. Analysing group size alone revealed little direct effect on the amount eaten for those eating with others. When interpersonal relationships were added to this model, it not only improved the total variance explained for energy intake, but also revealed that some people increased intake (i.e., partners) while others decreased it (i.e., family members). Although the effect of partners was not a significant one, the effect of family was. Thus, even when accounting for several other social factors and some demographics, the number of family

members present was related to decreased intake at the fast food eating occasion. Previous research has shown that family has a prominent influence on eating behaviours (e.g., Zimmerman & Connor, 1989). Yet, social modelling studies have tended to focus on the effects of strangers versus friends on the amount eaten (e.g., Rosenthal & McSweeney, 1979; Roth et al., 2001). Eating with more family members may make a fast food eating occasion more practically orientated or less of a special event. This may in turn, decrease the motivation to overindulge (de Castro, 1994). This finding will need confirmation and further exploration in larger samples before it can be better understood.

4.4.6 Conclusions from the initial FFS

The FFS is an acceptable and feasible approach for survey collection of fast food intake from people across a range of ages, educational levels, socioeconomic status, and cultural backgrounds. The current study showed that the 'climate' of the fast food environment (as defined by variables such as the way these items are packaged together and the size of these items) is a potential source of variation in the amount of fast food consumed. Therefore, the fast food environment has unique environmental pressures that may promote consumption. That is not to infer that influences on general eating behaviour are not also applicable to fast food consumption, as the current results also provided some support for the potential influence of social factors, such as the presence of other people and the perceived environmental norms, on the amount of energy consumed from the single fast food eating occasion. A greater understanding of any relationships between intake, and social facilitation variables (including the number of people present, and the time spent eating) can only be developed through additional data collection. Corroborating these findings in a new, larger sample will also allow more detailed analysis of intake which may help to reveal some of the indirect effects on

consumption. As such, the aim of the next study was to administer the FFS to a larger sample with the goal of modelling multiple factors that may be important for increased intake in a fast food environment.

5 Chapter Five: Social influences on amount of fast food consumed in one visit – Testing a structural model

Initial testing of the Fast Food Survey (FFS) at the Royal Adelaide Show (RAS; a local fair) indicated that a variety of the social factors proposed to influence fast food eating behaviour warranted closer examination. For example, there was not strong support for the model of social facilitation and the time-extension hypothesis, as neither the number of people present nor the time spent eating were related to the amount of fast food consumed at a single eating occasion. It was unclear whether this was due to the limited sample size or a result of the nature of fast foods. The aim of the subsequent study was to: 1) explore the observed relationships using more sophisticated statistical analyses, 2) assess whether an existing model of social influence could be replicated when measuring fast food intake behaviours, and 3) to extend this model to provide a more detailed description of any social facilitation effects on fast food consumption. This study will therefore address the second research question posed in Section 3.5: “Can social facilitation and/or the time-extension hypothesis increase the amount of fast food eaten?”

5.1 Testing existing social influence models in fast food

Feunekes, de Graaf and van Staveren’s (1995) model is the only published attempt to demonstrate how social facilitation may operate during an eating occasion. It shows that the presence of others increases the time spent eating, which in turn increases the amount eaten or meal size (See Figure 5, Section 3.2.2 page 61). This model represents a sound basis for exploring the effects of social facilitation on fast food consumption as it provides a model for preliminary testing and can be developed to include a variety of other factors that may add predictive power to the model.

In order to test de Castro's (1990; 1992) original proposal that eating with others increases time spent eating and consequently meal size, Feunekes et al. (1995) administered diet diaries to a small sample of Dutch volunteers ($n = 50$)⁵². These diaries collected information on: the items eaten (amount and type of food), the number of people present, the time at the beginning and end of the meal, activities while eating, sociableness of the eating atmosphere, how pleasant the food was, how difficult it was to get additional food and how much the participant intended to eat. The researchers then assessed which of the above factors were related to intake at a variety of eating occasions (breakfast, lunch, dinner and snacks). Their preliminary analyses revealed a positive relationship between meal duration and energy intake at all meal occasions (except lunch). Their analyses also showed a positive relationship between the number of other people present and hunger, ratings of atmosphere and the pleasantness of food. There was little evidence of a direct effect of the number of people present on the amount eaten⁵³.

Following path analysis, the authors concluded that time spent eating mediated the effect that the presence of others had on intake. They further concluded that this mediation is partly explained by the effect of people on the pleasantness of the experience; ratings of atmosphere were improved with more people present. Nonetheless, the association between atmosphere and meal duration was only of 'borderline' significance. There was no direct effect of the presence of others on the amount eaten. The researchers also report that there were no mediating effects of

⁵² This was originally two samples that were combined for structural equation modelling in their final sample.

⁵³ In their first study, only the consumption of breakfast was significantly associated with the number of people present. In the second study, only the amount eaten at snacking occasions was associated with the number of people present. When the samples were combined, there was only evidence of a significant relationship for breakfast meals. Feunekes et al. (1995) conclude that overall no direct effect between the number of people present and the amount of food consumed was witnessed.

hunger and the taste and availability of food between the number of people present and meal sizes.

Feunekes et al. (1995) claim “social facilitation of food intake is mediated by meal duration”. The bivariate relationship (also referred to as a ‘total effect’) between the number of people present and the amount eaten was weak, therefore, whether the relationship they present represents one of mediation is debatable (see, Baron & Kenny, 1986). It has been acknowledged that mediation can exist even when the relationship between the mediated variables is not significant (see, Judd & Kenny, 1981, p.207). Furthermore, it has been suggested that an indirect effect can be significant in the absence of a significant total effect (Preacher & Hayes, 2004). The model presented by Feunekes et al. showed an indirect effect of the number of others present on the amount eaten through meal duration which may also be referred to as a mediating effect. The time spent eating appears to have an important relationship with the number of people present. This association has been shown in studies using diet diary records (de Castro, 1990, 1991, 1994) and in observational settings (Bell & Pliner, 2003; Sommer & Steele, 1997). Furthermore, experimental studies have shown that prolonged access to food can increase intake regardless of the number of people present (Pliner, Bell, Hirsch & Kinchla 2006). Therefore, it is possible that the presence of others indirectly increases intake by increasing the time spent eating.

5.1.1 Extending Feunekes et al.’s model of social facilitation to fast food consumption

Social facilitation research suggests that eating in the presence of others can increase the amount of food eaten (Clendenen, Herman & Polivy, 1994; J.M. de Castro, 1990; J.M. de Castro & Brewer, 1992). Given the moderately strong evidence for consistent effects of social facilitation on food intake, and the acknowledged energy density of fast foods, it is important to explore the impact of social influences on consumption of fast food in

order to understand how this behaviour could impact health. de Castro has explored social facilitation across many different contexts but has not extended these studies to fast food consumption (J. M. de Castro, 1990, 1991, 1994; J. M. de Castro et al., 2000; J. M. de Castro et al., 1997; J. M. de Castro & Brewer, 1992). There is also good evidence that others can indirectly increase the amount of time spent eating (Bell & Pliner, 2003; Feunekes et al., 1995; Sommer & Steele, 1997). If social facilitation is dependent upon the mediating effect of time, as Feunekes et al. (1995) suggested, the 'fast' nature of fast food may limit the extent to which the presence of others influences the amount consumed.

One limitation of attempting to apply the model of social facilitation to fast food consumption is the nature of fast food purchases. Pliner et al. (2006) suggested that social facilitation may be explained by prolonged access to food in an environment that promotes food intake. The previous FFS study showed that most (70.7%) purchases were taken to be consumed away from the restaurant. Feunekes et al.'s (1995) study was conducted in a home environment where access to food is minimally constrained. However, some of their results suggested that increases in meal size in the presence of others may not occur spontaneously during the eating occasion but may be anticipated before eating. For example, they noted a small effect of the presence of others on the volume of food a participant *intended* to eat before the eating occasion. When participants ate with others the amount they intended to eat prior to the meal increased. In an eating environment such as a restaurant, the amount is determined at the time of ordering. Thus, social facilitation of consumption volume and meal energy density in the restaurant setting are evidenced at the time of ordering (c.f., Stroeble & de Castro, 2004). The influence of social factors on consumption intention has also been observed in studies of purchasing behaviour (Sommer, Wynes & Brinkley, 1992). The above observations suggest that it may be possible to observe social facilitation effects in the

fast food consumption, regardless of whether food is consumed in the restaurant or elsewhere.

5.1.2 The goal of the current study

The goal of the current study was to explore the indirect or mediating effects of the other people present at an eating occasion by confirming and extending Feunekes et al.'s (1995) model of social facilitation in the context of fast food consumption.

In Feunekes et al.'s (1995) model, there was evidence that the number of people present at the eating occasion indirectly affected energy intake through meal duration and eating atmosphere. A common way for determining the magnitude of indirect effects is by multiplying the standardised path coefficients that are associated with an indirect effect (Keith, 2006; MacKinnon, Krull, & Lockwood, 2000). Using this method, the strengths of the indirect paths in the model reported by Feunekes et al. are 0.04 (.45*.18*.51) through atmosphere and 0.16 (.32*.51) through meal duration⁵⁴. The first aim of the current study was to assess the utility of Feunekes et al.'s model in the context of fast food consumption. Specifically, this aim was to describe whether the indirect effects of the number of people present through meal duration and atmosphere presented in Feunekes et al.'s model would also be present in a model based on a single fast food eating occasion.

The second aim of this modelling was to refine the model of social facilitation for fast food consumption. There was some evidence in the initial FFS study that people with different interpersonal relationships to the respondent had varying effects on the amount eaten. Specifically, the number of family members present negatively predicted energy intake from fast food items while the number of friends present and the presence

⁵⁴ Feunekes et al. do not actually report these values in their paper.

of a partner showed minimal total effects. Therefore, the second aim of this modelling was initially addressed by exploring whether interpersonal relationships shared with the people present alters any of the effects observed.

Feunekes et al. (1995) considered the effect of fullness ratings and discovered that they did not significantly contribute to their original model. There are likely to be many other environmental, contextual and behavioural measures that alter the relationships between the amount eaten, the time spent eating and the eating atmosphere. Consequently, the third aim of modelling was to expand the model further by the inclusion of other factors associated with these variables.

The final analysis aimed to explore how social factors and norms may act to increase fast food intake at a single eating occasion. In the previous study, a significant relationship was found between the participant's perception of how much those around him or her had eaten and the amount actually eaten by the participant (see Section 4.3.7, page 105). It was hypothesised that these norms may add extra explanatory power to the model for those people who ate in the presence of others.

This research will therefore extend previous research by both testing the model of social facilitation for an increasingly common eating behaviour that has not been previously explored (i.e., fast food consumption), and by extending this model to provide a thorough description of the effects of many variables at a single fast food eating occasion.

5.1.3 Using survey methods to explore social influence

Previous social facilitation studies of eating behaviour have almost exclusively used diet diaries (e.g., J. M. de Castro, 1990, 1994; J. M. de Castro & Brewer, 1992; Feunekes et al.,

1995; Stroebele & de Castro, 2004) with only two using alternative approaches including experimental and observational methods (Clendenen et al., 1994; Sommer et al., 1992). Diet diaries collect detailed dietary information about daily intakes. They are limited by the high participant burden they impose and are often expensive to administer because they involve participant training and may involve financial reimbursement for the participants' time. This is why diet diary studies often involve small samples (although there are exceptions, de Castro, 1994, had over 500 participants). Survey methods can obtain data from a wide cross-section of the population but require participant recall of intake, which can limit the accuracy and level of detail that can be obtained.

Because the purpose of the current study was to examine the influence of the presence of others on energy intake at a fast food eating occasion, a meal recall approach was used in which respondents described, in detail, the circumstances of their most recent fast food meal. Initial work at an agricultural fair, described in the Chapter Four, verified the utility of this approach.

Asking people to recall the time they spent eating at the last occasion they ate fast food using survey methods may have proved difficult for consumers, thereby questioning the reliability of recall. In previous research, time spent eating has been recorded by an observer or by the participant during the meal. In a survey, estimates of time spent are dependent on accuracy of recall. Attempts were made to assist recall by providing priming cues designed to assist the respondent to recreate the experience, but it is difficult to judge the effectiveness of this approach. To check consistency in estimates of time spent eating, the times reported by the fair sample (from the initial FFS study) were compared to those of the Internet sample. The mean in the first sample was 14.18 minutes ($SD = 7.98$) while in the Internet sample it was 14.34 minutes ($SD = 8.39$). As

can be seen in Figure 7, the distributions were close to identical⁵⁵. This indicates good consistency in the recall of time⁵⁶.

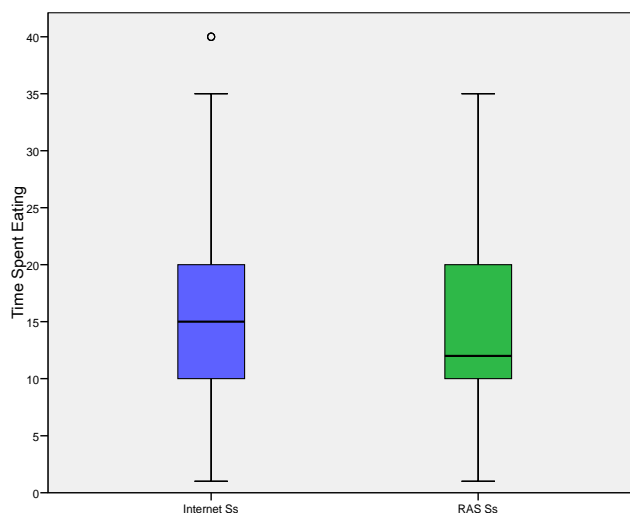


Figure 7: Box plots for time spent eating from the Internet sample (InternetSs; in blue) and the fair sample (RAS Ss; in green).

5.2 Procedure

5.2.1 A brief introduction to Internet methods

Market researchers began using Internet surveys over ten years ago (Comley, 1996). Internet methods can be both cheaper and more efficient (Granello & Wheaton, 2004; Schmidt, 1997) than traditional forms of surveying, improving response rates by 10 to 15% compared to mail out surveys⁵⁷ (Cook et al., 2000). Aside from better response rates, the speed of response may be faster for Internet surveys, saving a researcher up to a week waiting for posted surveys to be returned (Deutskens, de Ruyter, Wetzels, & Oosterveld, 2004). Moreover, there is some evidence that some participants prefer this form of surveying (B. Smith, Smith, Gray, Ryan, & Team, 2007; Zhang, 1999), perhaps

⁵⁵ The outliers indicated in the Internet sample distribution were not outliers in the initial screening and were left in the sample as they did not exceed the original 40-minute benchmark from the fair sample.

⁵⁶ It does not indicate with-in subject reliability in the recall of time. In order to do this, a longitudinal approach would be required.

⁵⁷ The higher response rates for Internet surveys may be artificially inflated because undeliverable emails are generally removed from the initial response pool, whereas undeliverable letters are much harder to trace (Cook, Heath, & Thompson, 2000).

because they can be completed and submitted more conveniently than phone or postal surveys (Gruber, Szmigin, Reppel, & Voss, 2008).

One of the concerns with Internet surveying is bias arising from sub-population variability in access to the World-Wide-Web. Although this issue is also true for phone surveying (not everyone has access to a phone), it has been noted as of particular concern in many discussions of Internet methods (Duffy, Smith, Terhanian, & Bremer, 2005; Mathy, Kerr, & Haydin, 2008; Sheehan & Hoy, 1999). Accessibility is becoming less of a concern as the number of Internet connections continues to expand. Sixty-six percent of Australian households reported some form of Internet connection in the recent Australian Census (Australian Bureau of Statistics, 2007). It is difficult to measure how many people have access to the Internet outside of their homes as work, libraries, cafes and even some petrol stations are now becoming access points. Schillewaert and Meulemeester (2005) reported that participants without an Internet connection at home completed the online version of their survey at work. Furthermore, there have been several papers indicating that Internet sampling can reach representative populations (Best, Krueger, Hubbard, & Smith, 2001; Gosling, Vazire, Srivastava, & John, 2004; Mathy, Schillace, Coleman, & Berquist, 2002).

5.2.2 Pilot testing of the Fast Food Survey (FFS) delivered on the Internet

Pilot testing of any Internet survey is a critical first step before roll-out on the World-Wide-Web (Bucher, 2002). The FFS program was piloted to assess its download length and accessibility via the Internet. A form was sent with the link to the program, and participants were asked to complete the form and return it to the researcher. The link to program, along with the required password (unique to the pilot version), was sent to a convenience sample of acquaintances. The pilot version was available for ten days. An example of one complete response and a summary of the feedback received can be seen

in Appendix 5. In total, eight people completed the pilot version of the program. All feedback they provided was incorporated into the revised version of the program; typographical mistakes were corrected and navigability was improved. Information regarding expected download and completion times was added to the instructions. This included the creation of two progress bars⁵⁸. These functions were designed to keep potential participants aware of the length of the survey.

5.2.3 *Recruitment methods and outcomes*

To aid participant recall, a simple domain name was registered (www.fastfoodstudy.com.au)⁵⁹. Recruitment occurred over a 90-day⁶⁰ period. The web address was promoted and marketed widely in the community and people were asked to log in and complete the survey. Promotional stories and interviews in the local media encouraged hits to the Fast Food Study homepage. Snowball sampling was also used, with an email sent to acquaintances of the research team asking them to complete the survey and to forward the email on to their friends. Finally, a targeted mail-out supplemented the recruitment in an attempt to attract a higher proportion of male respondents. Three-hundred male participants registered for the Northwest Adelaide Health Survey (See, Grant et al., 2008 for detailed description of this sample) were sent a letter promoting the website and asking them to take part in the survey (see Appendix 6). Recruitment drives to promote the homepage proved successful, with peaks in first-

⁵⁸ The first showed the progress of the download as a percentage of the complete download. The second progress bar was inserted into the survey questions and indicated how many more pages of the survey questions remained.

⁵⁹ In order to ensure access by people who misremembered the site address, an attempt was made to ensure that the site was identifiable via a search engine. Utilisation of a simple and explanatory web address also ensured that people who were interested in the topic and surfing the web, would also find the website. Care was taken to make the html code of the homepage as 'clean' as possible. This meant that the code was written to contain only the elements necessary for the page to display correctly. Tags were written into the programming that allowed meta search engines such as Google to search for relevant contents of the page. The site was then registered with the major search engines (Google, Yahoo and MSN).

⁶⁰ Recruitment was between November 2006 and March 2007 but ceased over the holiday season; from end of December to end of January.

time visitors following each attempt. Figure 8 shows first-time visitors⁶¹ to the www.fastfoodstudy.com.au homepage. The peaks following publicity are labelled with the associated recruitment attempts⁶².

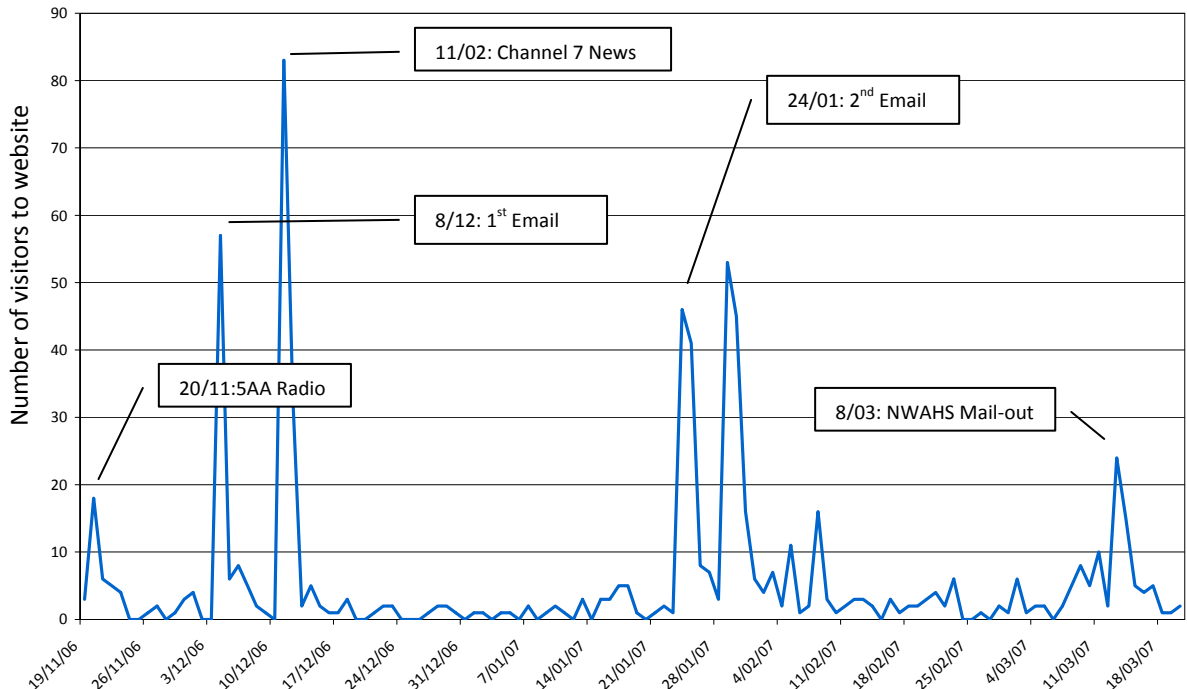


Figure 8: First-time visitors to www.fastfoodstudy.com.au with recruitment dates and associated recruitment methods labelled.

5.3 Approach to analysis

5.3.1 Descriptive data

Prior to modelling, descriptive data were analysed to address two goals. The first was to provide a point of comparison in the fast food eating behaviours reported in the current, larger sample compared to the RAS sample (herein referred to as the fair sample). The second goal of descriptive analyses was to assess the total effects (bivariate relationships) of the social facilitation variables presented by Feunekes et al (1995).

⁶¹ First-time visitor information is collected from the IP address of the person accessing the survey. A person visiting the website from three different computers will register three first-time visitor hits.

⁶² For ethical reasons, the counter of the homepage was not attached to the survey pages, therefore it is impossible to determine how many of these hits resulted in completion of the survey. Therefore, this data is simply a guide for interest in the site.

5.3.2 *Methods for modelling*

As was done by Feunekes et al. (1995), modelling in the current study was performed using path analysis. Path analysis allows testing of causal models while also assessing direct and indirect effects to be measured. Its ability to estimate indirect effects differentiates it from other linear equation techniques (Pedhazur & Schmelkin, 1991). Preliminary modelling was developed using the recursive⁶³ model presented in Feunekes et al.'s paper. Given the recursive nature of the model and the absence of latent variables⁶⁴, path analysis was performed using sequential regressions (also referred to as an "ordinary least squares regression approach"). This method allows the path coefficients and indirect effects to be calculated, but, as is the case with most modelling techniques, does not determine causation (Keith, 2006).

All indirect effects of the people present at the eating occasion were calculated by multiplying standardised path coefficients (Keith, 2006). To determine the significance of these indirect effects, Sobel's (1982) equations were used. These equations are based on asymptotic distribution theory and test whether the magnitude of the indirect effect is significantly different from zero. To assist in these calculations, an online calculator was used (Preacher & Leonardelli, 2001).

In accordance with the recommendations of Tabachnick and Fidell (1989), data were screened to ensure linearity, normality, homoscedasticity and avoid multicollinearity

⁶³ Recursive means that there is no feedback loop between variables and all of the arrows in the model point in only one direction.

⁶⁴ Latent variables are not directly observable and are calculated through indicator variables that are observable or directly measured. Therefore, latent variables use indicators of an underlying concept and typically require confirmatory factor analysis to confirm that these measures 'tap into' the same construct (Kline, 2005). Byrne (2001) identified self-concept as a common example of a latent variable.

and singularity⁶⁵ before the models were developed. Following this screening, the measures '*energy consumed*' and '*time spent eating*' were transformed⁶⁶.

5.3.3 *Limiting the reverse relationship between time spent eating and the amount eaten*

Measuring the time spent at an eating occasion has been common in previous studies but may be confused with the effect of amount eaten on time taken (big meals take longer to eat). The focus of this study is whether extra time spent in the establishment than is needed to consume a meal leads to an increase in the amount eaten. Therefore, in an effort to clarify interpretation, the amount of time required to eat fast food items was subtracted from the participant's estimate of the time spent eating.

Assessing the amount of time needed to eat a fast food meal. Forty-one people in a food court were observed in order to determine how long they took to consume a variety of takeaway meals (including baked potato, pre-prepared salads, meat pies and traditional fast food)⁶⁷. Each of the diners observed was eating without distractions including other people and/or reading materials, computers and so on. Time (in minutes) was recorded from the time of the first bite until the last bite (and did not include time to complete a drink). The average time spent eating was 7.61 minutes with the modal time being

⁶⁵ Normality, homoscedasticity and linearity were assessed through examination of the scatterplot and the normal probability plot for each regression (including the previously transformed variables). Inspection of each of these graphs did not reveal any obvious abnormalities. To avoid multicollinearity and singularity, preliminary bivariate correlations were performed on all the variables to be included in the model. None were very highly related to each other ($r > .80$). For each regression, tolerances and the variance inflation factors (VIF) were calculated to assess the level multicollinearity for every predictor. No tolerances were close to zero; all had values above .5. After this screening, all measures were judged suitable for inclusion in a regression analyses.

⁶⁶ To assess normality in the dependent variables, skewness and kurtosis values were divided by their standard errors to determine how many z-scores the distribution was away from normal. For atmosphere, the distribution was within three standard deviations from normal for skewness. For kilojoules consumed, the skew was over five standard deviations from normality while it was nine away for the extra time spent eating. Histograms were used to explore the direction of the skew. Both showed a positive skew. To adjust this skew, these variables were transformed using square root transformations as is suggested by Tabachnick and Fidell (1989, p.85).

⁶⁷ Observational methods were used rather than data from lone diners in the initial FFS. As data from the FFS did not include description of activities *during* consumption, it was unclear how many lone diners may have been doing activities such as reading which may have prolonged the time they spent eating when eating alone.

8 minutes. Data for 15 people who ate either McDonald's or Hungry Jack's were separated from the data for other non-big brand fast food meals. The mean time was 7.73 minutes for the fast food consumers and the modal time spent eating was 8 minutes.

Thirteen of the 15 people observed eating big brand fast foods in the food court were consuming meals that consisted of a burger, fries and a drink. Data from the initial FFS supported the idea that orders contained fairly consistent components. Food and drink items selected in the FFS were coded according to item description (i.e., if a person had six chicken nuggets, this was coded as one item; if a person had a cheeseburger and a Big Mac, this constituted two items). Of the 116 respondents, 93.1% had orders containing three items or less (including the drink)⁶⁸.

Given consistency in the types of fast food meals eaten and the consistency of 8 minutes needed to eat these types of meals, this value was considered enough time to consume a fast food meal (and more than enough time to eat a fast food snack). Subsequently, 8 minutes was subtracted from the time spent eating reported by participants. All recalculated *time spent eating* scores that were below zero were converted to zero. Although this limited the variability of time in the sample (21.9% of people were coded as eating for zero extra minutes), this was done to ease interpretation of the variable. The new variable therefore represented *extra* time spent eating at the fast food eating occasion.

⁶⁸ In most cases, those who consumed more items ate from KFC where meals tended to have more, smaller components. The only exception were two people (one who ate at McDonalds and one who ate Hungry Jack's) who consumed a soft serve cone in addition to a burger, fries and drink.

5.4 Data adjustments and recoding

5.4.1 Assessment of outliers

Following all recruitment drives, there were 434 responses to the survey. Eleven cases were removed from the dataset because they had incomplete nutrition information⁶⁹. For ease of interpretation, three cases were removed because they had only consumed a drink. A further two cases were removed because the participant had bought their items (for the one meal occasion) from more than one of the fast food chains.

After the initial screening, data were screened for univariate outliers on the dependent variables *energy consumed* and *time spent eating*. Z-score criteria and stem-and-leaf plots indicated seven outliers for the amount of energy consumed⁷⁰. The data were also screened for multivariate outliers. Six cases with extreme Mahalanobis scores ($p < .01$) were identified as multivariate outliers and removed (Tabachnick & Fidell, 1989).

5.4.2 Adjustments to reported fast food orders and variable recoding

Participants indicated that the order they had entered into the Fast Food Choices Program (FFCP) needed adjusting in 74 instances. These were done in the same way as presented in Section 4.2.3. Of the 74 adjustments, 20 orders needed the standard portion size of the items adjusted and 54 of the total adjustments related to the actual

⁶⁹ Although the survey included programming that prevented incomplete survey answers, some people failed to select fast food items and completed the survey.

⁷⁰ There was some discrepancy between outliers identified via the different procedures. The stem-and-leaf plots indicated twelve outliers; people who consumed over 8300KJ from their last fast food eating occasion. Z-score criteria revealed only three outliers (9500KJ or greater). Examination of the meal contents for those returning energy totals between 8300KJ and 9500KJ suggested that the upper figure was a large, but likely meal description. The largest order below 9500KJ was an order of 9474KJ, which was comprised of two burgers, a large fries, a small drink and a medium drink. Consequently, 9500KJ was used as the cut-off for determination of outliers. Four outliers were detected by both stem-and-leaf plots and z-scores for *time spent eating*. These were all people who had eaten for over 40 minutes and were deleted.

items selected for the order⁷¹. Two cases had order alterations that could not be calculated and were consequently deleted.

Data were re-coded for the variables, *frequency of consumption*, *group size* and the *Index of Relative Socioeconomic Disadvantage (IRSD)* according to the method described in Section 4.2.4. Many of the variables in the survey were categorical (e.g., *brand of fast food*, *employment status*, *reasons for consumption*) and were recoded for inclusion in regression models via utilisation of “dummy coding”⁷² (Tabachnick & Fidell, 1989). Variables treated in this fashion were *reasons for fast food consumption*, *activities preceding fast food consumption*, and *brand of fast food*. To avoid singularity⁷³, one reference group was excluded from the analysis in each case (Tabachnick & Fidell, 1989). There are no established statistical recommendations for choosing a reference group to be excluded from coding. Choosing which response category to exclude from the model is important. The significance of the dummy-coded variables in the model is determined relative to the reference category during the regression. The most common response (therefore the modal response) for brand of fast food eaten (*McDonald's*), and the most common activity before consumption (*between activities*) were chosen as the referent. A significant effect arising with these variables therefore indicated a significant difference from the mode. The referent for the variable *reasons for consumption* was the response *basic needs*. This response indicated that the person simply ate the food

⁷¹ Thirty-nine people reported that items needed to be added to the order. In 61% of these cases, the menu item was available to select in the FFCP but not found by the participant (usually a condiment). The nutritional information for items that were missing from the FFCP was obtained via phone calls and email to the relevant companies. The other 15 adjustments to orders pertained to ‘customisation’ of the composition of standard menu items, for example, “*Had cheeseburger with no meat*”. Minor changes to the burger involving such ingredients as onions and pickles were not adjusted for in the calculation of energy content. When extra sauce was ordered, adjustments were made to the order.

⁷² Dummy coding involves creating dichotomous (i.e., ‘yes versus no’ variables) from categorical labels.

⁷³ Singularity means that the prediction of one variable can be predicted perfectly by another. This occurs in dummy coding because if there three categories of a variable and these are coded into three groups, information on membership of two groups can predict membership of the third. If a response is not in category one or two, then it would belong to category three.

because they were hungry (a driver common to any eating) with significant differences from this seen as potentially informative for fast food consumption.

To limit the number of variables included in modelling, other categorical measures were recoded into dichotomous variables representing the presence or absence of the most frequent response category. *Employment status* was coded into *fulltime employment* (fulltime employed versus not fulltime employed), *marital status* was coded into *married* (versus not married), *eating occasion* was coded into *dinner* (or other), *location where the food was eaten* was coded into *at home* (or not at home) and *day of week* when the food was consumed was coded into *eaten on the weekend* (versus during a weekday).

In the models including the interpersonal relationships with the people present while eating, the data on the others present had to be recoded. Two variables were created that assessed the number of friends and family members present by collapsing some social relationship categories. This was done in a way identical to that reported in Section 4.3.7 in the previous Chapter⁷⁴. A third variable was also created that indicated the presence of a partner at the eating occasion. A person could have eaten with people representing multiple interpersonal relationships. For example, they may have eaten with a partner, two friends and a family member.

5.4.3 Coding free-response items

The categories used to code the open-response items developed from the initial FFS study were applied to the Internet sample. These categories proved suitable for the new dataset; distributions of responses were similar across both samples. Chi-Square tests

⁷⁴ The descriptive information for friends and family present indicated that there were some outliers in both of these measures. The number of friends present ranged from 0 to 20 while for family the range was from 0 to 13. As was done for the group size variable, these items were recoded to reduce the distribution of these in the models. Thus both variables were recoded from 0 to 5 or more friends or family present.

revealed that the frequency of responses was not significantly different in either question (see Figure 9 and Figure 10).

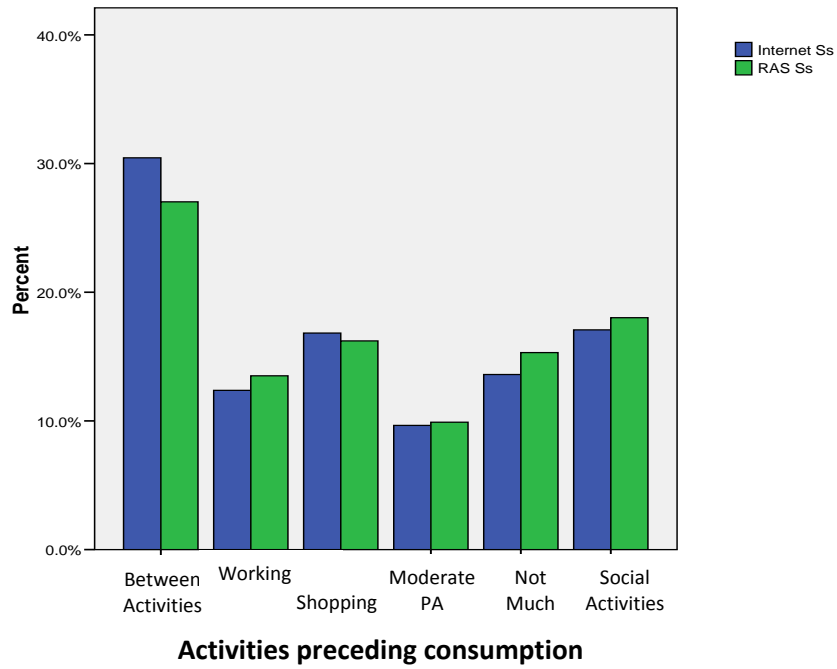


Figure 9: Activities preceding consumption according to the response categories from the Internet (blue) and fair (green) samples.

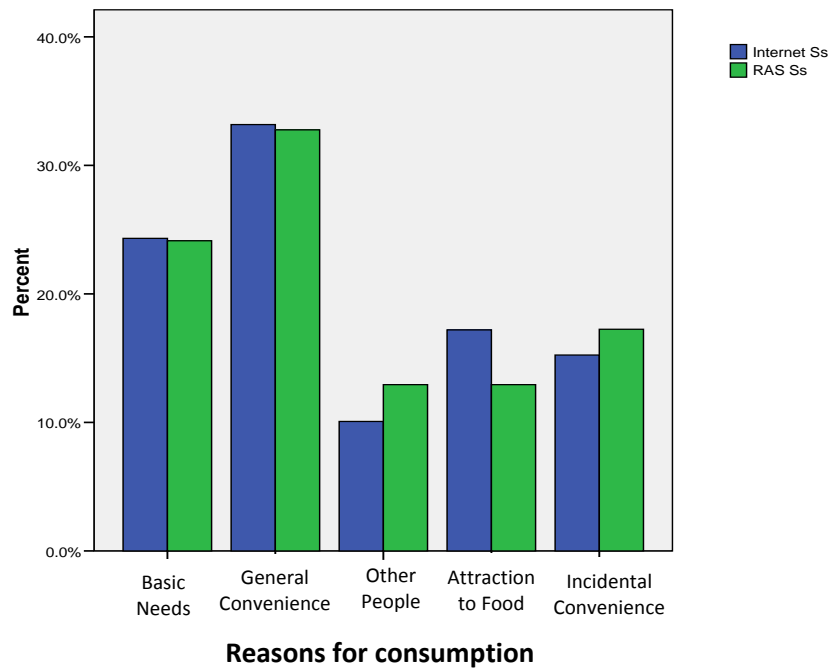


Figure 10: Reasons for fast food consumption from the Internet sample (blue) and the fair sample (green).

5.5 Results from descriptive data

5.5.1 Demographic characteristics of the final sample

Frequencies for demographic details of the sample can be seen in Table 11.

Table 11: Description of the demographic characteristics of the Internet sample ($n=407$).

Variable	%	Variable	%
<i>Sex (male)</i>	33.2	<i>Marital status</i>	
<i>Highest level education completed</i>		Married/living with partner	49.9
Bachelor	56.5	Never married	44.5
Trade/certificate	23.4	Other†	5.7
Secondary School	19.2	<i>State of residence</i>	
Below Secondary School	1.0	South Australia	67.3
<i>Household income</i>		New South Wales	8.4
20,000 and below	8.1	Victoria	7.6
20,001 to 40,000	10.1	Western Australia	7.9
40,001 to 60,000	26.5	Queensland	5.9
60,000 and above	55.3	Tasmania	1.0
<i>Country born</i>		Undefined	2.0
Australia	80.8	<i>Frequency of patronage</i>	
UK	5.2	Once/ year	4.4
Asia	4.2	More than once/half year	16.5
Other	9.8	Once/month	21.4
<i>Employment status</i>		Once/fortnight	22.9
Fulltime	57.5	Once/week	19.7
Student	20.9	Twice/ week	9.1
Part-time/casual	13.8	More than twice/week	6.1
Home duties/retired	4.7	<i>Receive pension</i>	5.7
Unemployed	1.7	<i>Of Aboriginal heritage</i>	2.9
Other	1.5		

†separated/widowed

Despite attempts to recruit male participants, the survey attracted a higher proportion of female respondents, consistent with the previous FFS study. The average age of the Internet sample was 31.45 ($SD = 11.82$) with a range from 16 to 74 years of age. The number in the participants' immediate families ranged from 0 to 8 members. The mean

IRSD value for the sample was 1010.70 ($SD = 65.98$). There were respondents from all deciles of socioeconomic disadvantage. The modal response indicated that most respondents resided in areas with the second lowest level of socioeconomic disadvantage (Australian Bureau of Statistics, 2008c).

5.5.2 Reported fast food behaviours

The frequency data supported trends seen in the data collected from the fair sample (see Table 12). The only exception to this was that there were substantially fewer people who ate meal deals in the Internet sample compared to the fair sample (approximately 25 and 50% respectively)⁷⁵.

Table 12: Frequency of fast food behaviours reported by the Internet sample ($n=407$).

Variable	%	Variable	%
<i>Fast food brand</i>		<i>Day of purchase</i>	
McDonald's	40.8	Monday	7.4
Hungry Jack's	23.1	Tuesday	8.4
KFC	21.1	Wednesday	10.6
Domino's Pizza	8.1	Thursday	14.0
Red Rooster	6.9	Friday	18.2
<i>Location eaten</i>		Saturday	25.1
Home	37.8	Sunday	16.5
In the restaurant	31.0	<i>Meal occasion</i>	
In the car	16.5	Breakfast	5.7
Other	14.7	Lunch	38.6
<i>Form of purchase</i>		Dinner	44.2
Take away/drive-thru	69.5	In-between-meals snack	11.5
Dine in	30.5	<i>Ordered a meal deal</i>	24.6

The percentage of people eating from each of the fast food companies was consistent with their reported market share (BIS Shrapnel, 2003).

⁷⁵ When reviewing the descriptions of the fast food items ordered, some appeared to be meals and yet participants indicated that they were not purchased as part of a meal deal. Some participants indicated they had eaten a burger with medium fries and a medium drink and also answered that they had not eaten a meal deal. It is virtually impossible to order these items without having them in a meal deal.

The group size of people present during the fast food consumption was most commonly one other person (i.e., two people in a group; 38.8% of the sample). In descending order, the most frequent categories of the other people present during the eating occasion was alone (26.3%), two other people (12.8%), in a group of four or more others (11.3%) and with three others (10.8%). Again, as in the initial FFS study, when eating with others, people most commonly ate with their partner (45.7%).

Eighty-five-percent of the sample was confident in their self-reported heights and weights⁷⁶. BMI ranged from 16.9 to 48.2 with an average of 25.5. There was a weak relationship between BMI and the amount of energy consumed from fast food items, $r(346)=.24, p<.001$.

5.5.3 Relationships between social variables

Correlations were computed between the amount of energy consumed from fast food items, the extra time spent eating (herein referred to as “time spent eating”), ratings of atmosphere, enjoyment of the items eaten and group size. The results can be seen in Table 13 (on the following page).

The number of people present was significantly associated with increased time spent eating. There was a small, negative association between the number of others present and enjoyment of food items. Time spent eating was correlated with improved ratings of the eating atmosphere, but not to the enjoyment of the items consumed. Sociableness of the atmosphere was more strongly related to group size than the pleasantness of the atmosphere.

⁷⁶ Those confident in their self-reported heights and weights were slightly different to those who were not. There were more people in the “20,000 to 40,001” income bracket confident in their height and weight than expected, $\chi^2(3, 404) = 14.25, p<.01$. Otherwise, there were no statistical differences between those confident in their heights and weights and those who were not for age, sex, employment status, marital status (all $p>.05$).

Table 13: Correlation values (Pearson's r) for the social facilitation measures ($n=407$).

	1 KJs	2 Size	3 Time	4 AtmosS	5 AtmosP
1. Energy consumed (KJs)	1.00				
2. Group size (Size)	-0.04	1.00			
3. Time spent eating (Time)	0.17***	0.23***	1.00		
4. Sociableness of atmosphere (AtmosS)	-0.01	0.48***	0.21***	1.00	
5. Pleasantness of atmosphere (AtmosP)	0.05	0.13**	0.14**	0.50***	1.00
6. Enjoyment of items	0.12*	-0.10*	0.04	0.18***	0.46***

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

5.5.4 Conclusions from descriptive analyses

Results from the full Internet sample largely replicated results obtained at the fair despite significant demographic differences in the samples. The frequencies of behaviour reported were very similar between samples. Furthermore, the reasons for and activities preceding consumption, time spent eating and amount eaten were very similar in both samples which provides good validation of the FFS.

The FFS sample recruited from the Internet had a high percentage of women, people in the highest education and income brackets and a high proportion of fulltime employed. Therefore, this sample was no more representative than the initial FFS. The sex bias in both samples is likely to result from the health-related nature of the survey⁷⁷. The Internet nature of the survey may have attracted a biased sample (Schillewaert & Meulemeester, 2005). Alternatively, fast food consumers may also represent a unique group of the population as it has been reported that demographic characteristics are associated with frequency of consumption (Schroder et al. 2007; Mohr et al., 2007).

⁷⁷ Of all the women studying a non-school qualification in Australia, 13.9% are in the field of health. In contrast, only 3.5% of all the men studying at this level are studying health (Australian Bureau of Statistics, 2007).

The bivariate relationships analysed largely supported the total effects reported by Feunekes et al. (1995). People present related to the time spent eating, ratings of atmosphere and enjoyment of food items. Furthermore, the direct relationship between the number of people present and the amount eaten failed to reach significance (as was the case in the initial FFS study). One relationship that did not replicate Feunekes et al.'s was that the enjoyment of the food items related negatively rather than positively to the number of other people present. The negative relationship between enjoyment of the food and the number of people present contradicts research which has suggested that, when eating with others, people perceive food as tasting better (Bellisle & Dalix, 2001; Stroebele & de Castro, 2004). The contradictory relationship may result from the nature of fast food; it is very predictable and liking of the food may be relatively stable.

Finally, these correlations support those in the initial FFS study which showed that both ratings of the sociableness and pleasantness of atmosphere are associated with group size. In the current results, both measures also related to the time spent eating. Sociableness of the atmosphere was more highly correlated with group size and the time spent eating than the pleasantness of atmosphere⁷⁸. Given the fact that pleasantness of atmosphere is less conceptually similar to the number of people present than sociableness of atmosphere, and that both measures related to variables in similar ways, it represents a more appropriate measure of atmosphere. Therefore, pleasantness of atmosphere rather than sociableness (used in Feunekes et al.'s, 1995 original model) will be used in future analyses.

⁷⁸ In the original model of social facilitation (Feunekes, de Graaf & van Staveren, 1995), the measure of atmosphere asked participants to rate the sociableness of their atmosphere. This can be criticised as it may be viewed as a proxy measure for the number of people present. The fact that the number of people present was related to ratings of atmosphere could, therefore, be seen as an expected result. In order to overcome this issue, two measures of atmosphere were included in the FFS. The first was identical to the measure seen in Feunekes et al.'s model; the second asked participants simply to rate how pleasant the atmosphere was.

In conclusion, the relationships assessed here supported those reported at the initial stages of modelling undertaken by Feunekes et al. (1995) for general eating behaviours. Given the similarities between the current results and those reported by Feunekes et al., it is possible that an indirect effect of the number of other people present through the time spent eating exists. Bivariate relationships offer no indication of indirect effects and therefore modelling was performed to further explore whether and how social facilitation operates in the context of fast food consumption.

5.6 Modelling increased energy intake from fast food items

As was evident in the initial FFS study, there was a significant difference in energy intake for participant sex in the larger FFS, with males ($M = 4264, SD = 1830$) eating significantly more than females ($M = 3307, SD = 1598$), $t(405) = 5.41, p < .001$. All models were subsequently created separately for each sex.

5.6.1 Confirming the model of social facilitation in fast food intake

To address the initial aims of the current study, initial confirmatory models were run using the variables that Feunekes et al. (1995) found to have a significant influence on food intake while also controlling for demographic factors. Bivariate relationships (also referred to as 'total effects') were calculated for each of the predictors for females and males separately. The correlation coefficients for the total effects are displayed in Table 14 (over the page). Although total effects were small for the relationship between group size and the amount eaten, they were in reverse directions for males and females. Atmosphere was positively related to both the time spent eating and group size in females but not in males.

Table 14: Correlation values (Pearson's r) for the social facilitation measures. Values for females ($n=272$) are presented above the diagonal, values for males ($n=135$) are below the diagonal.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	KJs	Size	Time	AtmosP	Age	Married	Income	Ed	FTE	IRSD
1. Energy consumed (KJs)	-	-.09	.22***	.03	-.21***	-.04	-.02	-.05	.10	.04
2. Group size (Size)	.05	-	.27***	.16*	.02	.06	-.04	-.06	-.15*	.09
3. Time spent eating (Time)	.26**	.22**	-	.19**	.09	.03	.02	.10	.10	.05
4. Pleasantness of atmosphere (AtmosP)	.00	.09	.05	-	-.03	-.11	-.10	-.11	.01	-.14*
5. Age	-.22**	-.13	.14	.14	-	.34***	.12	.22***	.05	-.06
6. Married	-.05	.04	.07	-.02	.49**	-	.29**	.01	.15*	.03
7. Income	-.09	.04	-.03	.02	.21*	.45***	-	.16**	.35	.14*
8. Level of education (Ed)	.02	.10	.13	-.12	-.16	-.08	.21*	-	.14*	.11
9. Fulltime employed (FTE)	-.09	.07	-.09	.03	.14	.39***	.43***	.15	-	.08
10 Socioeconomic disadvantage (IRSD)	-.04	.14	.06	-.11	-.19*	-.12	.05	.29**	-.06	-

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

The initial regression analysed *energy intake* using *time spent eating*, *group size*, *pleasantness of atmosphere* and the demographic variables as predictors. This regression was followed by regressions predicting the time spent eating and ratings of atmosphere. For every step of the model, six demographic variables (*age*, *being married*, *working fulltime*, *household income*, *IRSD* [socioeconomic disadvantage], and *level of education*) were entered to control for any potential differences these may create. All variables were entered into every regression simultaneously. The resulting beta values for both males and females can be seen in Table 15.

Table 15: Total variance explained (Adjusted R^2) and beta values for the dependent variables *energy intake* (Energy), *time spent eating* (Time) and *pleasantness of atmosphere* (Atmos) for both male and female respondents in the Internet sample.

	Step 1: Energy		Step 2: Time		Step 3: Atmos	
	Males [†]	Females [‡]	Males [†]	Females [‡]	Males [†]	Females [‡]
Adjusted R ²	.098	.103	.073	.104	.017 ^{ns}	.050
Predictors						
<i>Time spent eating</i>	.32*	.28**	-	-	-	-
<i>Atmosphere</i>	-.05	-.01	.04	.17**	-	-
<i>Group size</i>	-.03	-.15*	.24**	.26**	.14	.18*
<i>Age</i>	-.34*	-.24**	.20	.07	.20	.01
<i>Married</i>	.11	.05	.09	-.02	-.19	-.10
<i>Household income</i>	-.03	-.05	-.09	-.02	.06	-.07
<i>Level of education</i>	-.02	-.05	.19*	.10	-.11	-.08
<i>Fulltime employed</i>	-.04	.08	-.15	.12	.06	.09
<i>Socioeconomic disadvantage (IRSD)</i>	-.10	.03	.02	.03	-.08	-.14*

[†]n=131; [‡]n=266; **p<.01, *p<.05; ^{ns} Model was not significant

Significant predictors were used to construct a figure of the relevant pathways between outcome measures for males (See Figure 11) and for females in the sample (see Figure 12).

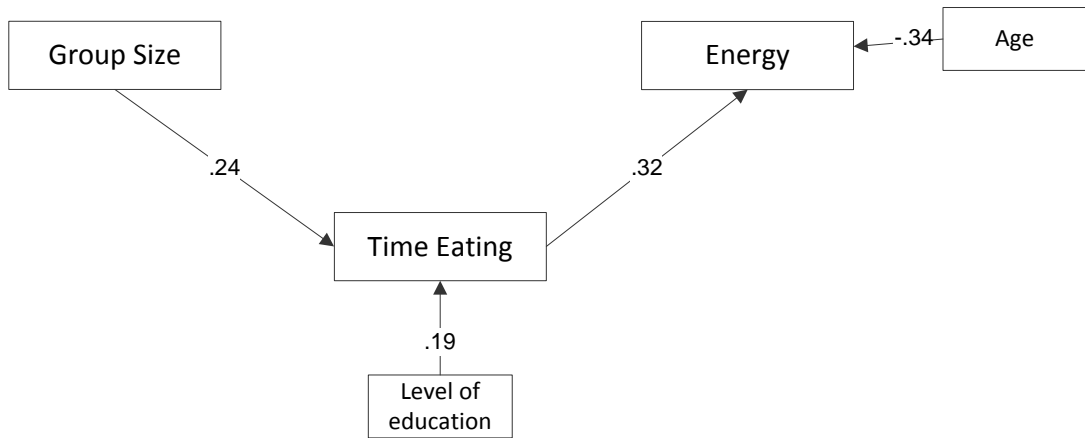


Figure 11: Significant paths from group size to energy intake from fast food items in males (n=131).

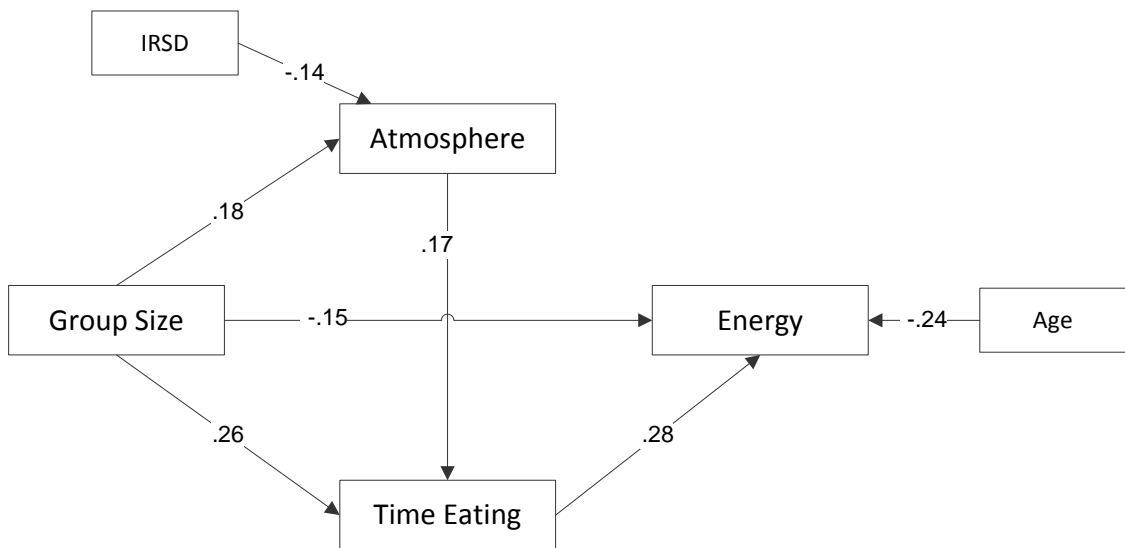


Figure 12: Significant paths from group size to energy intake from fast food items in females (n=266).

Males. In the prediction of energy intake in males, only two of the variables entered contributed significantly to the variance explained by the model. The strongest predictor was *age*, which had a negative relationship with *energy intake*. The other significant predictor was the *time spent eating*, which positively predicted *energy intake*. *Group size* was a significant predictor of *time spent eating*. The indirect effect of the number of others present was .08 (.24*.32) through time spent eating (Sobel statistic = 2.16, $p < .05$). The analysis for *atmosphere* failed to reach significance.

Females. In females, there was evidence of an indirect effect of *time spent eating* on *energy intake*. The value of this effect in females was comparable to that seen in males: .07 (.26*.28; Sobel statistic = 3.13, $p < .01$). *Group size* also had a direct relationship with *energy intake* in the females within the sample. The direction of the influence of others was weak but negative, contrary to the positive relationships proposed in the literature. *Atmosphere* was a significant influence in females; *group size* predicted ratings of atmosphere. The indirect effect of others through ratings of atmosphere and then the time spent eating was quite small: .009 (.18*.17*.28)⁷⁹.

5.6.2 Conclusions from preliminary modelling

The path analysis supported the mediating effect of meal duration suggested by Feunekes et al. (1995). The support for the effects of both time and atmosphere as influences on total energy was clearer in the model for women as compared to men. Atmosphere was not related to the number people present or to the time spent eating in men. Women and men may therefore be influenced differently by atmosphere.

⁷⁹ Sobel test cannot be calculated for indirect effects through multiple variables (i.e., meal duration and eating atmosphere). If all the paths are significant, the indirect effect can also be treated as significant (Kline, 2005).

Feunekes et al. (1995) reported that the association between ratings of atmosphere and time spent eating was of 'borderline significance'. If there was an effect for women, but not men, collapsing the samples may have obscured the result in their study.

The differences seen in the models for men and women are worth noting. Separating the model into men and women indicated that the total effect of the number of other people present on intake was positive in men and negative in women. Contrary to predictions arising from theories about social facilitation, increasing numbers had an inhibitory effect on intake in women which is contrary to the theory of social facilitation. Even after accounting for the positive effect that time-extension had on the amount eaten, larger group sizes negatively influenced intake. Conversely, in men there was weak evidence of the effect of social facilitation. Modelling revealed a positive (but non-significant) total effect of the number of other people on the amount eaten and a mediating effect of the time spent eating.

The fact that the total effect of the others present at the eating occasion on the amount eaten was negative in women while the indirect effect was positive warrants further discussion. When mediated by time spent eating, group size increased intake. In contrast, the number of people present negatively predicted the amount consumed. Furthermore, including time spent eating in the regression model strengthened the relationship between the number of others present and energy intake from the fast food items, thereby increasing the magnitude of this effect by .06 and making it significant⁸⁰.

⁸⁰ The model was run with only *time spent eating* and *group size* to assess whether it was *time spent eating* that created this effect in females and not any of the demographic variables. In this regression, both paths were significant. The path between time and energy was stronger and in the opposite direction to ($\beta=.26$, $p<.001$) to the effect of group size ($\beta=-.16$, $p=.01$).

The effect observed in the current model is consistent with MacKinnon, Krull and Lockwood's (2000) description of inconsistent mediation or suppression effects. The authors write, "... situations in which direct and indirect effects of fairly similar magnitudes and opposite signs result in a nonzero but nonsignificant overall relationship are certainly possible" (MacKinnon et al., p.175).

Therefore, it appears that positive indirect effects and negative direct effects can occur simultaneously and may act to reduce the total effect between two variables. This was clear when considering the total indirect and direct effects of the number of people present in the model for women. The sum of the indirect and direct paths equates to the total effect of the other people present on the amount eaten (indirect effects = .08 (.07+.009); direct effect = -.16, total effect = -.09). Therefore the suppressing effect of eating duration may act to increase the overall inhibitory effect that the presence of others had on the amount eaten. There is debate about the exact definition of suppressor effects⁸¹. Nevertheless, according to the definition given by MacKinnon et al. (2000), the observed relationships in the current model represent the inconsistent mediation of the number of people present on the energy consumed by the time spent eating. More generally, this means that there may be shared variance between time and the number of other people present, not relevant to time spent eating, which improved the predictive validity of the two measures. This finding also revealed important detail about the relationship between the presence of others and the amount eaten that could not be discovered through purely bivariate analyses.

⁸¹ Horst (1941) first described suppression effects. One of the criteria for meeting suppression was that the suppressor variable (*time spent eating*) is not directly related to the outcome (*energy intake*). In the above example it is. However, Conger (1974) gave a much more general description of a suppressor effect, defining it as one variable increasing the effect of another. For a description of multiple forms of suppression effects, see Smith, Ager and Williams (2006).

Feunekes et al. (1995) proposed that future research focus on who demonstrates social facilitation and who does not. Given the limited variability in a fast food environment, it was surprising that the indirect effect of the number of people present through the time spent eating could be significantly different from zero in the model for fast food. It was also noteworthy that social facilitation effects were clearer in male fast food consumers than female consumers who demonstrated effects of time-extension but an overall inhibitory effect of the presence of others.

5.6.3 The effect of 'who' is present in the model of social facilitation

The initial FFS study showed that the number of certain types of people present (i.e., family) negatively predicted intake in fast food eaters, whereas eating with friends and families had little effect. It was unclear how replacing the general group size measure with outcomes separating the number of people of different interpersonal relationships to the nodal person would affect the model. Path analyses were performed identically to the procedure described above. The only difference was that group size was replaced with the number of family present, the number of friends present and the presence or absence of a partner. This was done in order to gain a more detailed understanding of how the type of people present may directly or indirectly alter intake and to address the final research question posed in Section 3.5. Resulting data is presented in Table 16 (on the following page).

Again, significant paths were used to draw a figure of the model of social facilitation. The figures for men and women can be seen in Figure 13 and Figure 14 (on pages 150 and 151 respectively).

Table 16: Total variance explained (Adjusted R^2) and beta values for the dependent variables *energy intake* (Energy), *time spent eating* (Time) and *pleasantness of atmosphere* (Atmos) for both male and female respondents in the Internet sample in the model including separated interpersonal relationships.

	Step 1: Energy		Step 2: Time		Step 3: Atmos	
	Males [†]	Females [‡]	Males [†]	Females [‡]	Males [†]	Females [‡]
Adjusted R^2	.101	.100	.110	.108	.001 ^{ns}	.043
Predictors						
<i>Time spent eating</i>	.35***	.28***	-	-	-	-
<i>Atmosphere</i>	.03	-.02	.04	.17**	-	-
<i>No. Family present</i>	-.08	-.08	.23**	.20**	.12	.16*
<i>No friends present</i>	.05	-.15*	.07	.18**	.09	.09
<i>Partner present</i>	-.13	-.09	.28**	.19**	.05	.10
<i>Age</i>	-.32	-.25***	.16	.08	.20	.01
<i>Married</i>	.19	.06	-.04	-.06	-.19	-.13
<i>Household income</i>	-.03	-.05	-.09	-.01	.05	-.07
<i>Level of education</i>	-.03	-.03	.19*	.08	-.11	-.09
<i>Fulltime employed</i>	-.02	.09	-.19	.11	.06	.10
<i>Socioeconomic disadvantage (IRSD)</i>	-.08	.02	-.01	.04	-.08	-.13*

[†] $n=131$; [‡] $n=266$; *** $p<.01$, ** $p<.01$, * $p<.05$; ^{ns} Model was not significant

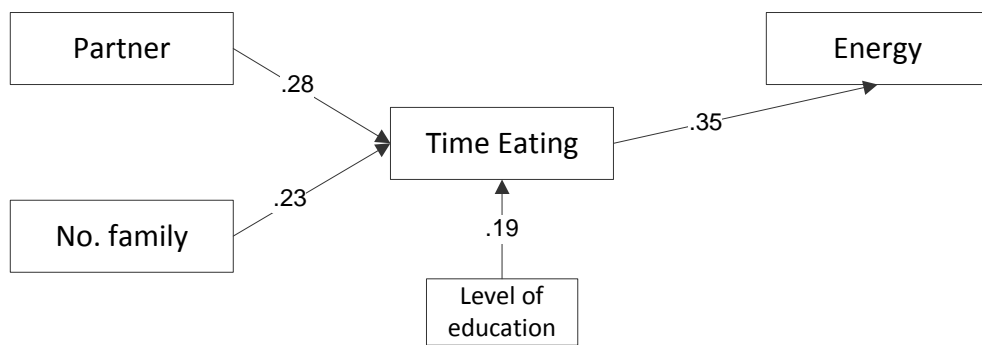


Figure 13: Significant paths from interpersonal relationships to energy intake from fast food items in males ($n=131$).

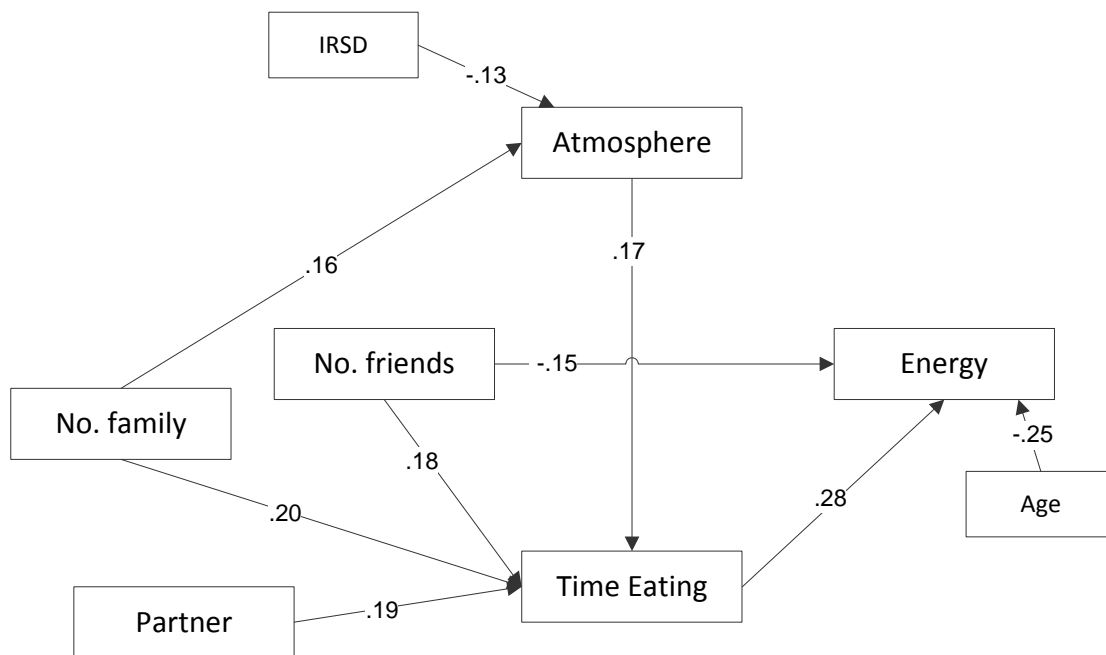


Figure 14: Significant paths from interpersonal relationships to energy intake from fast food items in females ($n=266$).

Males. As was seen in the previous model of social influence, the direct effects of the presence of other people were not significant. The number of friends present did not indirectly influence intake at a single fast food eating occasion in males. The indirect effect of having a partner present was $.10$ ($.28 \times .35$; Sobel statistic = 2.25 , $p < .05$) through time spent eating and $.08$ ($.23 \times .35$; Sobel statistic = 2.17 , $p < .05$) for the number of family members present. The total effect ($.00$) of the number of family present was cancelled out by indirect ($-.08$) and direct effects ($.08$). Overall, the total effect of the presence of a partner was slightly negative ($-.03$) with a positive indirect effect ($.10$) and a negative, direct effect ($-.13$, not significant).

Females. In the model for females, the people present from all types of relationships indirectly influenced the amount eaten through the time spent eating. Family had the greatest indirect effect on energy consumed. The effect of the number of family present

through time eating was .06 (.20*.28; Sobel statistic = 2.39, $p < .05$) and .008 (.16*.17*.28)⁸² through the path from eating atmosphere to time spent eating to the amount eaten. The effect of partners and the number of friends present was indirectly influenced by time spent eating, but not by the eating atmosphere. This effect was .05 for both partners (.19*.28; Sobel statistic = 2.36, $p < .05$) and the number of friends present (.18*.28; Sobel statistic = 2.61, $p < .01$). The direct and indirect effects of the presence of a partner (indirect effect = .05, direct effect = -.08) and the number of family member present (indirect effect = .07, direct effect = -.09) were very close and resulted in small total effects, -.03 for partner and -.02 for the number of family members present. The number of friends present was the only revised group size predictor that directly predicted energy intake. The combined direct and indirect effects created a negative total effect of the number of friends present (-.15+.05 = -.10).

5.6.4 *Personal relationships and social facilitation – conclusions*

Separating the number of people representing different social relationships did not change the total variance explained by the models. It did, however, provide information as to the types of people who may be driving the effects witnessed in the confirmatory model of social facilitation for fast food consumption.

In men, the more descriptive interpersonal predictors revealed that time-extension did not relate to intake for all social groups; the number of friends present had no effect on the time spent eating. Although it was not significant, it was interesting that the presence of a partner had a negative direct effect and a positive indirect effect on energy

⁸² Sobel test cannot be calculated for indirect effects through multiple variables (i.e., meal duration and eating atmosphere). However, if all the paths are significant, the indirect effect can also be treated as significant (Kline, 2005).

intake in males. The total effect of the presence of a partner was small but negative (-.03). Nevertheless, it queries whether social facilitation of fast food consumption occurs in men when eating fast food with their partners; having partners present may change men's eating behaviour when eating fast food. This relationship failed to reach significance in the current sample and will need to be explored further in a larger sample.

In women, the indirect effects of the number of family present seen in the model were similar to those presented by Feunekes et al. (1995). The number of family members present predicted improved eating atmosphere which then predicted the time spent eating. It is possible that many of the eating occasions analysed in the diet diaries occurred with family present. This data was not presented in Feunekes et al.'s paper.

Splitting the group size predictor into different interpersonal relationships for women also revealed that the number of friends present had the strongest direct effect on energy intake; it decreased consumption. The number of friends present also had a positive indirect effect on consumption by increasing time spent eating. Overall, the models including interpersonal relationships rather than a general group size predictor have extended the results of the confirmatory models by offering a more detailed description of the influence of relationship on consumption. In the existing literature, there is good evidence that interpersonal relationships may moderate the effects of social influence (e.g., de Castro, 1994; Clendenen, Herman & Polivy, 1994). The nature of a person's relationship to the people with whom she or he eats is likely to change the nature of the eating occasion and the amount consumed.

5.6.5 *Expanding the model of social facilitation for fast food intake*

The low total variance for the dependent variables explained in initial modelling means that there may be other predictors that could contribute to the model. Results of the initial FFS (Chapter Four) indicated that the brand of fast food consumed was associated with significant differences in energy consumption. Previous research has also suggested that palatability of food and location of consumption can alter atmosphere, and possibly indirectly affect atmosphere (J. M. de Castro et al., 2000; Stroebele & de Castro, 2004). Activities before consumption may influence the reasons for consumption and ultimately the level of intake. In the initial FFS study, there was some indication that frequency of consumption related to energy intake in the recalled fast food meal (this relationship only trended toward significance). Given the potential implication of this relationship for weight gain, it is important to assess whether this relationship is one that remains after controlling for a variety of other factors. Therefore, the goal of the following analyses was to determine if the addition of other environmental and behavioural variables altered the relationships between the other people present, the eating atmosphere, the time spent eating and the amount eaten. Subsequently, predictors measuring fast food brand, activities preceding consumption, reasons for consumption, enjoyment of food items, location, day eaten and the participants' frequency of consumption were added to the model.

The standardised betas that resulted from each step of the path analysis for males and females separately can be seen in Table 17 (on the following page). Again, models were drawn using paths from the significant predictors. The resulting models can be seen in Figure 16 and Figure 15 (see page 156).

Table 17: Total variance explained (Adjusted R^2) and beta values for the dependent variables *energy intake* (Energy), *time spent eating* (Time) and *pleasantness of atmosphere* (Atmos) for both male and female respondents in the Internet sample for the expanded model.

	Step 1: Energy		Step 2: Time		Step 3: Atmos	
	Males [†]	Females [‡]	Males [†]	Females [‡]	Males [†]	Females [‡]
Adjusted R^2	.241	.242	.151	.090	.249	.373
Predictors						
<i>Time spent eating</i>	.39***	.29**	-	-	-	-
<i>Atmosphere</i>	-.01	-.13	-.06	.16*	-	-
<i>No. family present</i>	-.09	-.01	.24*	.21**	.04	.15**
<i>No. friends present</i>	.09	-.03	.05	.15*	.11	.14*
<i>Presence of partner</i>	-.11	-.13*	.32**	.20**	.01	.05
<i>Age</i>	-.17	-.14*	.16	.06	.27*	.07
<i>Married</i>	.05	.06	.07	-.07	-.14	-.07
<i>Income</i>	.02	-.05	-.09	.01	.01	-.01
<i>Level of education</i>	-.07	-.03	.23*	.09	.01	-.01
<i>Fulltime employed</i>	-.03	.07	.27**	.11	.03	.02
<i>Socioeconomic disadvantage (IRSD)</i>	.04	.01	-.08	.03	-.06	-.11*
<i>Ate fast food at home</i>	.18	.23**	-.13	-.12	.28**	.29***
<i>Ate fast food on weekend</i>	-.15	.05	.07	-.06	.07	.04
<i>Frequency of consumption</i>	.14	.04	.08	.07	.11	.05
<i>Ate Hungry Jack's</i>	.23*	.22**	-.05	.07	.06	-.08
<i>Ate KFC</i>	.31**	.13	.15	.09	.05	-.10
<i>Ate Domino's Pizza</i>	-.18	-.20**	.16	.15*	.17	.05
<i>Ate Red Rooster</i>	.05	.02	.02	.06	.10	-.04
<i>Enjoyment of items</i>	-.04	.06	.18	.02	.37***	.46***
<i>Ate for general convenience</i>	.12	.18*	.09	.06	-.05	.07
<i>Ate because of others</i>	.00	.03	.26*	.07	.07	.05
<i>Ate because of attraction of food</i>	-.01	.16*	.06	.09	-.10	.13*
<i>Ate for incidental convenience</i>	.02	.10	.17	.09	-.08	.02
<i>Shopping before</i>	.01	.04	-.12	-.05	-.09	.01
<i>Not doing much before</i>	.10	.02	-.11	-.01	-.10	-.04
<i>Doing moderate activity before</i>	.06	.04	-.01	-.07	.02	-.03
<i>Working before</i>	-.02	.03	.11	-.01	.09	.01
<i>Socialising before</i>	.02	.10	-.06	-.01	.12	.01

[†]n=131; [‡]n=263; ***p<.001, **p<.01, *p<.05

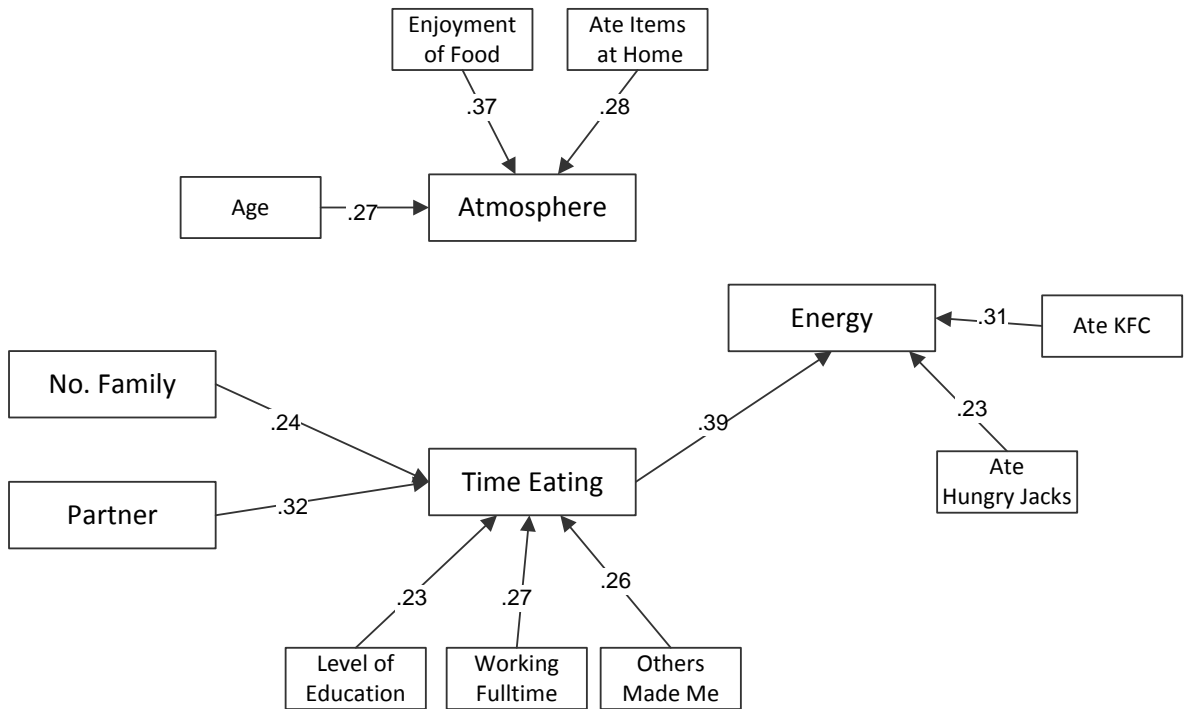


Figure 15: Significant paths for interpersonal relationships, time spent eating and energy intake from fast food items in males ($n=131$).

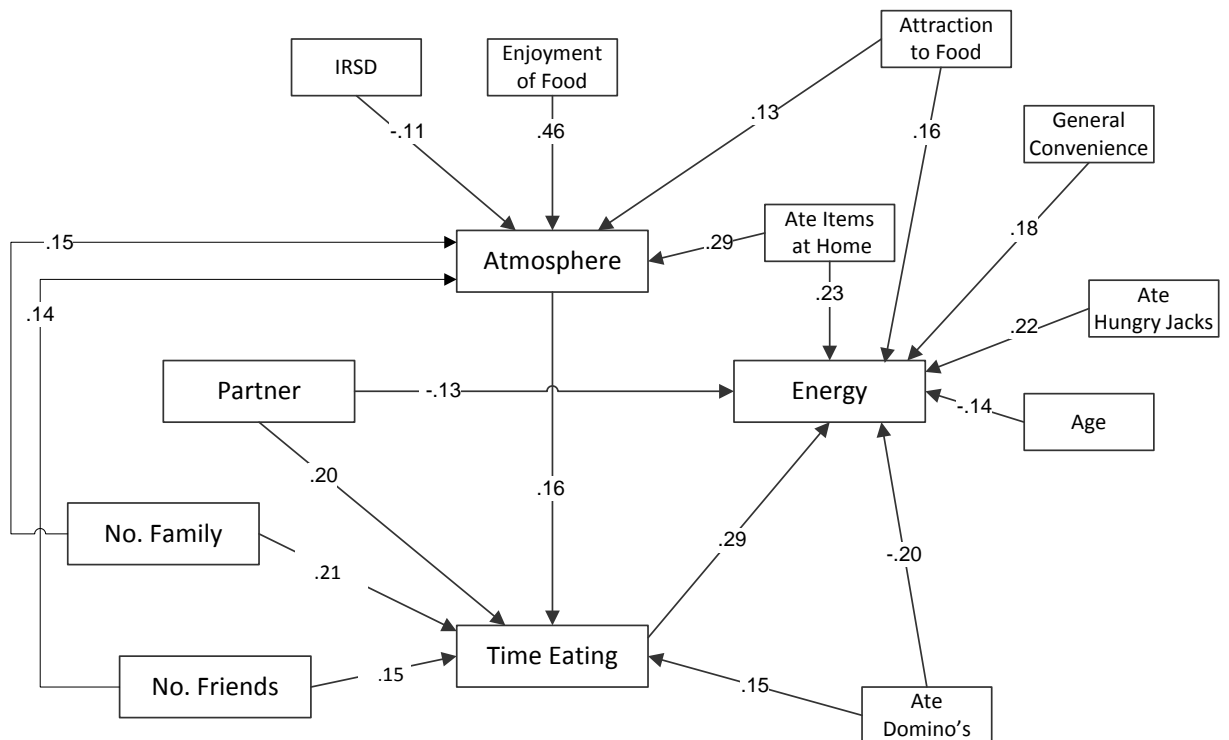


Figure 16: Significant paths for interpersonal relationships, time spent eating and energy intake from fast food items in females ($n=263$).

The model predicting *total energy consumed* was significantly improved by the additional predictors for men ($F(17,103) = 2.30, p < .01$) and women ($F(17,235) = 3.79, p < .001$). The prediction of pleasantness of the atmosphere was also improved in both men ($F(17,105) = 3.37, p < .001$), and women ($F(17,237) = 8.86, p < .001$). Time spent eating was not significantly improved by the inclusion of additional predictors in either men ($F(17,104) = 1.33, p > .05$), or women ($F(17, 236) = 0.71, p > .05$).

The differences in significant paths for males and females were again apparent in the more complex models. The results are presented for males and females separately.

Males. Both *Hungry Jack's* and *KFC* directly and positively predicted *energy intake* relative to the reference category (*McDonald's*). Two demographic variables (a higher level of education and not working fulltime) and eating in response to social pressure predicted *time spent eating*. Inclusion of the additional predictors helped the regression for *atmosphere* to reach significance. Enjoying the items eaten and eating at home predicted better ratings of *atmosphere* in males. As was witnessed in the other models, none of the predictors for the number of others present related to *atmosphere*. Both the number of family members present and eating with a partner continued to have an indirect relationship with the amount eaten through the time spent eating. The indirect effects were comparable to those witnessed in the previous modelling: .09 (.24*.39; Sobel statistic = 2.22, $p < .05$) for number of family present and .12 (.32*.39; Sobel statistic = 2.35, $p = .01$) for presence of a partner.

Females. The negative direct relationship between the number of friends present and the amount eaten witnessed in the previous model failed to reach significance with the

inclusion of the additional predictors. Interestingly, eating in the presence of a partner demonstrated a significant negative relationship directly with energy intake. The number of friends present and the number of family present both associated with improved ratings of atmosphere ratings although the presence of a partner did not.

The presence of people from each of the interpersonal relationships positively predicted the time spent eating as was seen in the previous model. The indirect effect of the presence of others through time was .06 for the presence of a partner (.20*.29; Sobel statistic = 2.37, $p < .05$) and the number of family present (.21*.29; Sobel statistic = 2.59, $p < .001$) and .04 for the number of friends members present (.15*.29; Sobel statistic = 2.01, $p < .05$).

There were several factors directly predicting energy intake in women. As seen in the model for men, brand of fast food eaten was a direct predictor of energy intake. Having items from Hungry Jack's resulted in increased energy, whereas eating Domino's Pizza resulted in a lower energy intake relative to eating McDonald's. Eating at home and eating for general convenience or because of attraction to the fast food also positively predicted energy intake from the fast food items. Eating at home and because of attraction to the food also positively related to better ratings of atmosphere.

As was witnessed in the model for men, greater enjoyment of the food items strongly predicted better ratings of the eating atmosphere. The negative relationship between socioeconomic disadvantage and atmosphere also remained significant after the inclusion of the additional predictors.

Domino's Pizza had a negative association with energy intake but a positive relationship with time spent eating. This suggests that when eating Domino's Pizza, females ate less, yet ate for longer. Sensitivity analyses were performed and revealed that exclusion of this group did not change the overall model and therefore, it was retained in the final model⁸³.

5.6.6 *Conclusions from modelling fast food intake in males and females*

It was interesting that, in the previous model, it was the number of friends present that had a significant effect on energy intake in females, but when other contextual variables were considered in the model, it was the presence of a partner that had the greatest direct influence on energy intake in females. This suggests that some of the contextual variables had shared variance with the number of friends present and may have reduced the magnitude of this effect. It is also noteworthy that the presence of a partner was the only group measure that did not significantly relate to ratings of atmosphere in females in either model. Partners represent a unique interpersonal relationship and a primary source of influence on eating and it is possible that, as compared to friends and family members, the presence of partners has a distinct influence on eating behaviour.

The addition of the extra predictors improved the predictive power of the model of social influence in fast food consumption, with the noted exception of the model fit when predicting time spent eating. This model was not improved by the inclusion of additional predictors suggesting that other variables, not captured in the study, may influence how long it takes to consume a fast food meal. Furthermore, time spent eating was not well

⁸³ The models were calculated with and without those females who had eaten Domino's Pizza. Beta values for direct influences of energy intake were altered minimally (by approximately .01) but the significant paths remained the same.

predicted by the variables in the model. This may be because of the nature of fast food consumption or the fact that only a limited number of variables designed to explain time spent eating specifically were included in the model. Finally, few factors may be able to increase the time spent eating fast food as the food is designed to be consumed quickly.

In the more detailed model of social influence presented here, additional predictors were included to better describe influences specific to fast food consumption. Although the extra predictors improved the model overall, they did not fundamentally change the indirect relationships witnessed in the earlier social facilitation models. That is, the presence of other people predicted the time spent eating, which then predicted the amount eaten. In women, the presence of other people also continued to have a negative indirect effect on the amount eaten. This suggests that the mediating or suppressing effect of meal duration is important within the model of social influence. It also suggests that, particularly in women, there is some aspect of eating in the presence of other people that has an inhibitory effect on fast food intake.

5.6.7 Altered intake in those people eating in the presence of others

Additional analyses were undertaken to further explore influences on female consumption in the presence of others⁸⁴. Four measures of perceived norms were included in the path analysis for energy eaten from fast food items in this group.

⁸⁴ Originally, the intention of the next analyses was to develop a model for those people who ate in the presence of others. Given the differences between sexes in the previous models, it did not make sense to combine the sample for these analyses. Furthermore, there were not enough males and females eating with others to permit splitting the model into males and females who ate socially (208 females and 92 males ate with others). Given the higher number of females who ate with others, the analysis was restricted to female fast food consumers who ate in the presence of at least one other person.

The preliminary analyses showed that model for *time spent eating* was not significant ($p>.05$) in this group. As this was the second step of the path analysis, further analysis did not occur. Therefore, in place of a test of the model for those women who ate in the presence of other people, a single multiple regression was performed that analysed the direct effect of the 32 predictors on energy intake. The beta values resulting from this analysis can be seen in Table 18.

Table 18: Predictors of energy intake (with associated Beta values) in female participants who reported eating with at least one other person ($n=204$).

Step 1: Energy intake			
Adjusted R ² =.197			
<u>Predictor</u>	<u>Beta</u>	<u>Predictor</u>	<u>Beta</u>
<i>Number of friends present</i>	-.06	<i>Ate Domino's Pizza</i>	-.19**
<i>Number of family present</i>	-.02	<i>Ate Red Rooster</i>	.08
<i>Ate with partner</i>	-.22*	<i>Ate for general convenience</i>	.19*
<i>Time eating</i>	.24**	<i>Ate because of others</i>	.03
<i>Atmosphere</i>	-.11	<i>Ate because of attraction of food</i>	.13
<i>Age</i>	-.18*	<i>Ate for incidental convenience</i>	.10
<i>Married</i>	.12	<i>Shopping before</i>	.07
<i>Income</i>	-.06	<i>Not doing much before</i>	.02
<i>Level of education</i>	.00	<i>Doing moderate activity before</i>	.05
<i>Fulltime employed</i>	.11	<i>Working before</i>	.02
<i>Relative social disadvantage</i>	-.01	<i>Socialising before</i>	.13
<i>Ate fast food at home</i>	.16	<i>Enjoyment of items</i>	.03
<i>Ate fast food on weekend</i>	.08	<i>Awareness of others</i>	.01
<i>Frequency of consumption</i>	.06	<i>Amount you thought others ate</i>	-.03
<i>Ate Hungry Jack's</i>	.25**	<i>Concern for others' perceptions</i>	-.06
<i>Ate KFC</i>	.16*	<i>Amount others thought you ate</i>	-.03

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

The total variance explained by the model was lower for the same predictors in the model of energy intake in women eating socially compared to all women in the sample (19.7% versus 24.2%, respectively). Furthermore, the extra subjective norm predictors

failed to add to variance explained by the initial model of fast food consumption for women eating in the presence of others ($F(4,172) = .36, p > .05$). Most of the predictors that had a significant effect on energy intake on the single eating occasion were identical to those seen in the model for all female eaters. Eating because of an attraction to the style of food and eating at home did not remain significant in the females who ate with others.

The strength of the association between the presence of a partner and the amount eaten was stronger when considering only those females who ate with other people. The effect was comparable, but in an opposite direction, to that of the strongest predictors (i.e., eating Hungry Jack's and the time spent eating).

5.6.8 Conclusions from the analysis of those who ate with others

The analysis of female fast food consumers who ate with others revealed that the predictors were basically unchanged but explained less of the total variance for the amount consumed at a single fast food eating occasion. The fact that approximately 75% of the female fast food consumers ate with others is likely to explain the similarity between the model for the complete sample and that for the group which ate in the presence of others.

Despite the inclusion of the subjective norm variables designed to measure potential influences in participants eating in the presence of other people, these predictors had little direct influence on the energy consumed.

5.7 Conclusions from the FFS administered through the Internet

5.7.1 *The model of social facilitation for fast food consumption*

Although the modelling presented in this chapter was based on the model of social facilitation presented by Feunekes et al. (1995), there was minimal evidence of social facilitation in the models created for fast food consumption. For men, the presence of a partner and the number of family members present at the eating occasion predicted the time spent eating which consequently predicted the amount eaten⁸⁵. Consistent with Feunekes et al.'s model, there was good evidence for the suggestion that meal duration mediates and/or suppresses the effect of the presence of others at a fast food eating occasion (discussed further below). Finally, there was also some indication that atmosphere could predict the time spent eating which then predicted the amount eaten in females.

In contrast to the model of social facilitation, the direct effect of others present negatively influenced the amount eaten in women. Therefore, this effect does not resemble "social facilitation" so much as "social inhibition". The theory that best accounts for this finding has been labelled "minimal eating norms" (Roth et al., 2001). This describes the tendency to eat less in the presence of an eating companion in order to make a more positive impression. This effect has been found primarily in female diners. It may be the case that, when women ate fast food, they reduced their intake relative to that consumed in other circumstances, in order to meet this norm.

⁸⁵ There was some evidence of a weak, negative direct effect of effect of partners on the amount eaten, questioning the utility of this model for males who ate with their partner but this was not significant at the $p=.05$ level.

If minimal eating norms were apparent in the fast food eating occasions analysed here, it is unclear whether this is something that is specific to the nature of the fast food eating occasions explored or is a general effect seen when women eat in the company of other people. The current study deviated from Feunekes et al.'s (1995) in several ways. It used a survey methodology with a large sample of Australian consumers and focussed specifically on fast food consumption. Nevertheless, de Castro (1994) reported that the effects of social facilitation on general eating behaviours were clearer in women dining with men compared to men dining with other men. Perhaps it is eating fast food that creates this inhibitory social influence. Further examination of minimal eating norms in fast food environments will be needed before this can be determined.

Even though most participants in the study purchased their item/s using a takeaway format, energy consumption was associated with an indirect effect of meal duration. This result is consistent with Feunekes et al.'s (1995) result which indicated that their model of social facilitation could be applicable at meal preparation stage, not just the consumption stage. The finding that eating the fast food items at home increased intake (in women only) is also consistent. When people eat at home there is less opportunity to obtain more fast food. This supports the idea that the amount to be eaten can be influenced at the ordering stage (Sommer et al., 1992) and suggests that intervention could be targeted at a stage earlier than purchasing.

5.7.2 The indirect effects of the presence of others on intake at a single fast food eating occasion: Meal duration and eating atmosphere

The model presented by Feunekes et al. (1995), showed that meal duration mediated the effect of the presence of others on the amount eaten, suggesting that the time-

extension hypothesis (de Castro, 1990; 1994) might explain the effects of social facilitation. In the modelling performed in the current study, the indirect effect of time on energy consumed remained in both males and females, despite using fast food meals to test the time-extension hypothesis and adding various predictors to the model. In females, this indirect effect existed even in the presence of a negative direct effect of the presence of others on the amount eaten. This indicates that the indirect effect of the time spent eating is an important variable and requires consideration in the exploration of social influence.

Despite attempts to validate the reliability of the meal duration measure used in this study, it is possible that when participants recalled the time they had spent eating, they were influenced by the time-extension hypothesis using implicit knowledge of this effect to calculate and recall how long they spent eating. In other words, it is not unreasonable to suspect that people who ate with others may have believed that they spent longer eating. Without testing this in an observational setting, it is difficult to conclude the magnitude of this effect in the context of fast food consumption. Nevertheless, the results from this study suggest that it does warrant further examination in a fast food environment.

The presence of other people associated with both the time spent at an eating occasion and the perceived pleasantness of an eating atmosphere in women in a fast food setting. The fact that the presence of other people can relate to improved eating environment (and vice versa) is not surprising. There is a social stigma associated with eating alone, especially when dining out (Stroebele & de Castro, 2004). Thus, eating with others has two outcomes: it allows one to eat for longer periods of time and also find the

experience more pleasant. In contrast to women, for men the eating atmosphere did not seem to have any association (direct or indirect) with the amount eaten or the people present.

5.7.3 How who is present influences intake when consuming fast food

Previous research has indicated that different interpersonal relationships may moderate social influence effects (see, Section 3.3, for full discussion of this research). The models constructed from the current analyses support the suggestion that not all people have equivalent influences on intake. In men, the number of friends present at the fast food eating occasion did not significantly influence intake (directly or indirectly). In contrast, eating with family and/or a partner had an indirect effect on the amount eaten (through time). How interpersonal relationships influenced intake in women was less clear because the relationships between who was present and the time spent eating changed slightly with the inclusion of additional predictors accounting for the context of the eating occasion. Nonetheless, it was apparent that different interpersonal relationships may alter eating occasions in different ways.

It is likely that a number of factors determine the way other diners influence intake. For example, it may be that the presence of certain types of people creates a completely different eating environment. Indeed, Clendenen et al. (1994) found that the presence of friends compared to strangers could facilitate different food choices. There is good evidence that familiarity determines different levels of intake (see, Tice, Butler, Muraven & Stillwell, 1995). It is also likely that the level of familiarity with the people present underlies the way that people with different interpersonal relationships influence eating.

Describing the different ways that 'who' is present at an eating occasion can influence intake is an important addition to the current understanding of social influence in eating behaviours. The modelling in the current study was limited to fast food consumption. It is likely that the moderating effect of interpersonal relationships is important to consider in the exploration of social influences on eating behaviours.

5.7.4 Micro-environmental influences on fast food consumption

Aside from social influences, there was also evidence of micro-environmental factors that related to intake of fast food items. The initial study using the sample at the fair indicated that the brand of fast food consumed was a major predictor of energy intake. Even after controlling for demographic and other environmental variables, the brand of fast food eaten had a direct influence on energy intake in both men and women. This, combined with results of the nutrition analysis of fast food meals, confirms the idea that not all big brand fast foods are likely to have an equivalent effect on intake and, in the long-term, health.

Although in the initial FFS, it appeared as though larger portions may explain greater intake at Hungry Jack's relative to McDonald's and Domino's Pizza, the KFC meal constructed in Chapter Two had a similar portion size relative to one from McDonald's. Therefore it was interesting that eating KFC could predict increased energy intake relative to McDonald's, in males the current FFS sample. Examination of the item descriptions of the orders suggests that a possible reason for this could be the style of meals available at KFC. Although the meals reported from McDonald's were the typical burger, fries and soft drink combinations, the meals at KFC had many more constituents. They frequently included two forms of fried chicken with multiple side orders and a

drink. This is in line with some meal deals that KFC advertise. For example, the “*Ultimate Burger Meal*” consists of a chicken burger, a piece of chicken, a “Potato & Gravy”, chips and a soft drink which can then be upsized (Yum! Restaurants International, 2007). Therefore, it is possible that although the portion sizes at KFC are reasonable, the purchasing environment promotes deals which encourage extra items and, consequently, additional energy intake.

5.7.5 *Sex differences, women and social influence during fast food consumption*

The most important finding for future research on social influences taken from the current results is the sex differences that were observed. Ultimately, although both men and women were influenced by the presence of others, the way in which this influence occurred was different. The clearest example of this was the positive total effect of others on the amount eaten in men and the negative total effect seen in women.

In the context of eating behaviours, different influences affecting women and men may result from varying interest and engagement with the issue of health. Participant recruitment outcomes here have suggested that women are more interested in health than men. This heightened interest may mean that diet and food choice are determined differently in women than men. Moreover, the high-fat nature of fast food may serve to exacerbate sex differences. Research suggests that most people implicitly associate fat with negative affect (Roefs & Jansen, 2002) and that women are generally more concerned with eating and their body weight (Pliner, Chaiken, & Flett, 1990). There is little doubt that many people know that fast food is generally high in fat; fast food companies market ‘healthy’ choices, suggesting, indirectly that other choices are not ‘healthy’. The perception that fast food is not healthy and a greater awareness of health

and dieting may make women more sensitive to their environment as they attempt to assess what is an 'appropriate' amount to eat.

The fact that the presence of others can negatively predict intake was found even after controlling for a myriad of other potentially important factors in women, suggests that women are reactive to the presence of others, possibly more so than men. It is possible the female intake is better predicted by minimal eating norms rather than social facilitation. It is theorised that following the former leads to an association between moderation of food intake and femininity (Mooney, Detore, & Malloy, 1994). If this norm is gender specific (being motivated by sex role expectations), it is potentially crucial when considering how social influences affect men and women differently and warrants further research.

5.7.6 Limitations of the current study

The current focus on cross-sectional survey data means that it is not possible to determine whether the amount of fast food eaten at a sitting impacted on the amount of food consumed throughout the remainder of the day. Consequently, it is not possible to link higher consumption to obesity risk because behaviours related to optimising energy balance may serve to mediate this risk.

Generalisability of the results is compromised by possible limitations of the sampling process, particularly the focus on Internet data collection and the lower representation of men. Recruiting male participants is a problem that health research faces repeatedly with no obvious solution. Despite having a reasonable number of respondents, when dividing the sample by sex, the lack of men in the sample reduced the ability of this

model to explore influences; it impeded the ability to test a model of increased fast food intake for people eating fast food in social groups. Regardless, the regression for women gave some direction for future research. It showed similar trends to the model developed using all women.

In this study, time was defined as time spent engaging in an eating behaviour rather than time actually eating. Although there may be some individual variation in the rate of eating that may alter time spent at an eating occasion, the definition of time used here has been common in other social influence research. Attempts were made to improve the way in which time was measured, however, the recall of time is still likely to lack the accuracy of time data that is recorded during the eating occasion by an observer.

Finally, this study was limited to big brand fast foods. Previous experimental studies have offered their participants only one or two types of food; it is important to recognise that the type of food eaten may influence the extent to which the presence and behaviour of others has an influence on consumption amounts. Nevertheless, differences between the styles of food items provided by the different fast food chains may have affected the relationships influenced. For example, the direct relationship between the amount of energy consumed and eating Domino's Pizza in women was negative whereas having pizza also related positively to the time spent eating. Pizza represents an easy and cheap⁸⁶ food to *share* among many people at a social gathering. Further inspection of the descriptive information supports this assertion. A comparison of the number of people eating alone, in a pair or in a group between the different fast food brands, showed that fewer people ate pizza alone (15.2% of people ordering Domino's Pizza),

⁸⁶ In Australia, Domino's Pizza offer large pizzas for as little as AUD4.90 each.

compared to other forms of fast food (21.4% to 31.4% of all people eating other fast foods ate alone). Social influence may be either mediated or moderated by cultural norms around the consumption of different types of food. de Castro, Bellisle, Feunekes, Dalix and de Graaf (1997) reported that the amount of food consumed over a specified time period varied between cultures. Australian women's preference for eating pizza with others may reflect a cultural norm whereby pizza, because of the meal size and the way it is served, is viewed as a meal to share.

5.7.7 Directions for future research

As is suggested in previous models of social influence, most of the social effects on eating were indirect, meaning they predicted outcomes through a mediating variable.

Performing path analysis allowed detection of a mediating and suppressing relationships that would have been lost in simple correlational analyses and represents an excellent method for assessing the often interrelated effects of social and environmental influences on eating behaviour. Multiple papers indicate that minimal total effects should not warrant the exclusion of variables from multiple regression analyses (Friedman & Wall, 2005; Shieh, 2006). This was very much the case in the current study where the combined indirect and direct effects of the presence of others cancelled each other out in women, creating a small total effect. Although modelling often requires larger sample sizes, future studies in social facilitation should consider using modelling as a statistical method to assess its effects.

Despite good evidence for the time-extension hypothesis, social facilitation may not be as demonstrable in fast food consumption as it is in general eating behaviours. It was clear that other factors and social influences may alter behaviour and the presence of

others may not result in increased intake, especially in female fast food eaters. More needs to be understood about the different ways in which social environments influence men and women. It appears that adherence to different social norms and impression management may underlie these discrepancies. Therefore, understanding how people do or do not conform to these norms will develop the understanding of social influence beyond the effects of social facilitation.

Time spent eating was a robust predictor of fast food intake despite the inclusion of different variables⁸⁷. It is therefore reasonable to conclude that one of the mechanisms behind social influence is the time spent at an eating occasion. Whether this effect can counteract other inhibitory social influences (i.e., the presence of others for women) is unclear. Nevertheless, if spending longer eating can increase the amount consumed. Therefore, it is possible that factors outside of social influences could act in a similar way to time-extension in the social facilitation paradigm, prolonging the time spent eating and the amount eaten. Sommer and Steele (1997) found that diners in social situations extended the time spent at an eating occasion. They also observed that people dining alone could extend their eating time through reading. They suggest that reading allows lone diners to reduce the discomfort created by dining alone. If, as is seen in the model of social facilitation in fast food consumption, the time spent eating relates to greater consumption, then people reading may also eat more. This may be a way that the time-extension hypothesis can affect lone diners thus questioning the association between social variables and meal duration. Further research is needed to test this possibility.

⁸⁷ The fact that this relationship was not found in the previous study may be a result of the limited sample.

Given the results of the current study, the aim of the next study was to explore the effects of social influence in a more naturalistic environment to further examine the gender differences that have been repeatedly discovered in the exploration of fast food consumption and related behaviours to date.

6 Chapter Six: Fast food consumption, minimal eating and impression management

There has been suggestion in previous chapters of this dissertation that gender roles may have an important influence on eating behaviours, relating to increases and/or decreases in the amount of fast food eaten, depending on both the sex of the person eating and that of others present. Feunekes, de Graaf and van Staveren (1995) did not account for sex differences in the development of their original model of social facilitation (possibility due to their small sample size).

Early research into social facilitation in eating did not report on the assessment of any potential gender differences despite using mixed-sex samples (de Castro and Brewer, 1992; de Castro, 1990). Subsequent research assessed these potential differences. Redd and de Castro (1992) found that men and women ate different amounts of food but did not see any differences between men and women in different social conditions (eating with others or alone). Clendenen, Herman and Polivy's (1994) study involved only female participants and demonstrated evidence of social facilitation; the co-eaters were also exclusively female. de Castro (1994) presents the only study exploring differences in the effects of social facilitation between women and men. He reported that the effects of social facilitation were clearer in women dining with men than men eating with other men. The results from modelling of social facilitation in fast food consumers (discussed in the previous chapter) suggested some effects that were the contrary to de Castro's results; women seemed to eat less in the presence of others. These results suggest the

activation of some form of “minimal eating norm” in women. The large body of research that has explored this phenomenon will be detailed in the following section.

6.1 Women and eating lightly: A review of the literature

The idea that eating small serves might convey a feminine image for women has been hypothesised in the literature for 20 years (Chaiken & Pliner, 1987; Mori, Pliner, & Chaiken, 1987). Chaiken and Pliner (1987) amongst initial groups of researchers to empirically test this suggestion. They gave students written descriptions of a person, manipulating the gender of the target person and the amount of food they “enjoyed eating”. The researchers then asked students to rate the target person according to a number of personal characteristics. They found that when a female target was described as eating less food, she was rated as being more feminine. Ratings of male targets did not change significantly with meal size.

Mori, Chaiken and Pliner (1987) explored this finding further by testing a possible mechanism that might explain this result. Mori et al. hypothesised that women who wanted to appear feminine in a social interaction would restrict their intake. In order to test this thesis, they placed participants with partners of varying desirability (all confederates)⁸⁸. Participants were told that the experiment was about how people become acquainted. A bowl of candy coated chocolates (i.e., M&Ms) was placed on the table while the participant and confederate talked and the dependent measure was the number consumed during the conversation. To control for social facilitation of consumption, the confederate ate the same amount in all conditions. Mori et al. found

⁸⁸ To manipulate desirability and ensure that the partner would be seen as attractive beyond their appearance, the partner’s personal profile was provided to participants before the experiment. This outlined personal interests and characteristics that were rated as attractive in opposite sex people during piloting.

that the presence of a 'desirable' opposite-sex partner resulted in fewer M&Ms consumed by both male and female participants. They suggested that the desire to appear feminine motivated minimal eating in women and theorised that men may have reduced their intake for reasons beyond gender role expectations.

In order to confirm their femininity hypothesis, the researchers conducted a second study where they threatened (or reinforced) female participants' femininity. They hypothesised that women whose femininity was threatened would have a greater desire to create a feminine impression and consequently eat less. Mori et al. (1987) gave the participants feedback indicating that they had been rated as low (or high) in femininity by their male partner. As hypothesised, female participants ate significantly less in the presence of a desirable male partner when their femininity had been threatened. The authors concluded that a minimal eating norm in women (i.e., constrained intake quantity) may result from concerns about appearing feminine.

Subsequent studies have confirmed the minimal eating norm. Using a method similar to Chaiken and Pliner (1987), Bock and Kanarek (1995) gave participants different meal descriptions and asked them to rate the qualities of the fictional male or female who consumed a particular diet. They manipulated the gender of the target person, and the amount and the type of foods they ate. People who ate larger amounts of food (both male and female) were described as more masculine. People described as eating smaller meals were rated as "neater" and "more concerned with their appearance". The authors reported no "gender-based double standard"; the female target was not judged differently from the male target according to the amount eaten. Nonetheless, in contradiction to this assertion, examination of ratings of 'good looks' from this study

indicated that females who ate less were rated as significantly more attractive despite the fact that the description of the target was identical across conditions. This suggests that there may have been differences in the perception of the target relative to the amount they ate and their gender. Pliner and Chaiken (1990) replicated this vignette study using an experimental manipulation. Their results indicated that ratings of femininity varied inversely with numbers of crackers consumed.

Two other experimental studies have demonstrated how dynamics between gender and group size within the social environment can influence the consumption behaviours of individuals. Klesges, Bartsch, Norwood, Kautzman and Haugrud (1984) observed people eating in various types of restaurants and recorded the group size of the people eating, the gender composition of the group, the weight status of members of the group and food eaten. They reported that women ate a similar amount to the men when in a small group in fast food restaurants, but in larger groups, females ate significantly less than males.

Using a method similar to those used in experimental research on social norms, Salvy, Jarrin, Paluch, Irfan and Pliner (2007) invited people to come to their laboratory for a study of social exchanges between friends, partners and strangers. While the participants interacted, snack foods were 'provided'. The researchers found that male participants with their friends ate more than all other groups. There was also a tendency for both male and female participants to decrease their intake in the presence of unfamiliar partners, suggesting eating minimally may not be a self-presentational concern exclusive to women. Matching of intake was only observed when a female partner was involved. The authors suggested that the higher level of matching observed

in dyads with a female participant occurred because women were more sensitive to their partner's behaviour or more concerned with self-presentation while, on the other hand, men wanted to appear "individual". This idea is supported by papers that have suggested that women are more responsive to pressure to conform (Eagly, 1983) and women rate someone who fails to conform to norms more negatively than men (Rudman, 1998).

Recently, research on social influence, gender and food consumption has shifted from exploring normative influences on consumption volume, to focus on food selection and gender. This work suggests that minimal eating norms may be evidenced in differences in the energy content of food consumed, regardless of whether these differences are determined by amount or energy density. Studies designed to identify food that could be described as 'feminine' have highlighted the 'light' nature of these foods; salads and diet beverages are commonly rated as feminine (Basow & Kobryniewicz, 1993; Mooney et al., 1994; Mooney & Lorenz, 1997). Market research data confirm these results showing significant differences in consumption of low energy foods between the sexes (Driskell, Meckna & Scales, 2006).

Gender stereotyping of food extends to ratings of female eaters; women who eat feminine foods are rated more favourably than women eating other types of food. Basow and Kobryniewicz (1993) found that female targets described as eating feminine meals were rated as more appealing than females described as eating a very masculine meal. This study confounded volume and energy density so it was not possible to separate the effects of these variables. Mooney and Lorenz (1997) kept volume constant while manipulating the femininity of the dietary profile and the gender of the person eating

the diet⁸⁹. Their results indicated that the consumption of “lighter” (also, typically more feminine) meals led to more favourable impressions of both male and female targets. Consistent with this, Mooney, de Tore and Malloy (1994) found that females described as eating low-fat food were judged more positively (i.e., more attractive, more intelligent, calmer and having smaller body size) than females eating high-fat food. The research on personal ratings, femininity and different types of food suggests that eating food that is energy light (frequently labelled “lite”) may also be associated with typically feminine qualities. Beyond this, it also suggests that women who adhere to gender role expectations are rewarded through positive interpersonal ratings. Thus, it may not be simply the volume eaten but also the type of food eaten, and its inferred energy density, that modifies social judgements.

It is clear from empirical research that there are certain aspects of eating that are gender-orientated. For example, eating minimally is often seen as feminine. It is less clear whether, and if so, how women then use this information to reduce their intake, and under which circumstances this is likely to occur. Results from limited experimental and observational studies provide some evidence this may occur, but it is less clear how, and if, men change their intake. Much research has focused solely on women eaters. Considerably less seems to be published about masculinity and how ratings of male attractiveness may be affected by the volume and types of food men eat. Nevertheless, empirical research emphasises the need to consider gender and gender interactions when exploring eating behaviours.

⁸⁹ In initial piloting, subjects were asked to create lists of typically masculine and feminine foods. The most frequently mentioned foods were used in the study. The feminine profile included items such as a wholegrain tuna sandwich, a toasted bagel with cream cheese and spaghetti. The masculine meal included a tuna sub, steak and ‘flapjack’.

6.1.1 Impression management and sex roles: Mechanisms behind minimal eating norms

The research on eating norms described above suggests that individuals may moderate what they eat as an act of impression management (Mori et al., 1987; Roth et al., 2001; Salvy et al., 2007). Specifically, the aim would appear to be to modify self-presentation, via manipulation of food consumed, in such a way as to enhance one's appearance to others. Baumeister (1982) suggested that effective self-presentation involves conforming to expectations and social norms. This is clearly the goal of those participating in the study undertaken by Mori et al. in which female participants attempted to enhance their image by eating less and conforming to feminine ideals. Other studies indicate that the need to control self-presentation changes depending on the gender composition of group members and familiarity within the group (Leary et al., 1994).

It is important to acknowledge that minimal eating norms may also exist for reasons beyond the need to enhance one's presentation to others. Schlenker (1980) defined impression management as "the conscious or unconscious attempt to control images that are projected in real or imagined social interactions" (p. 6). He suggested that impression management permeates a variety of different forms of interactions – not only those where the need for a positive self-presentation is high. Impression management during interactions can serve to define, confirm and adjust self-identity and roles in society (Bozeman & Kacmar, 1997).

Schenkler's (1980) model of impression management suggests that an individual's desire to eat in conformance with gender stereotypes may assist women to establish self-identity. Research, in a number of fields, has established an association between the

way people eat and the way they see themselves (Bisogni, Connors, Devine, & Sobal, 2002; Mooney & Lorenz, 1997). Vartanian, Herman and Polivy (2007) reviewed the literature linking eating and impression management. They identified two truisms that highlight the association: “you are what you eat” and “you are how much you eat”. Therefore, it is likely that eating minimally could help women to maintain their feminine identity.

Other research has attempted to establish whether impression management and gender stereotyping of behaviour are reinforced. Wood, Christensen, Hebl and Rothgerber, (1997) observed that when people conform to their gender roles, they feel more positive. Effective impression management also leads to more positive personal evaluations by observers (Wayne & Liden, 1995). If this is the case, it would be expected that the desire to eat “lightly” (i.e., conform to a minimal eating norm) may extend beyond situations where concerns about self-presentation are paramount, to a variety of eating interactions. This was seen in the previous study in Chapter Five in which the presence of partners negatively predicted energy intake in female respondents. A partner belongs firmly within the primary reference group, influencing many of our behaviours, including eating. Paradoxically, the familiarity hypothesis suggests that, as interpersonal relationships become closer, the need to create a positive impression decreases (Tice, Butler, Muraven & Stillwell, 1995). Therefore, a way that this influence can be understood is not by exclusively considering the drive for self-enhancement but by also taking into account the desire to satisfy sex-role expectations such as appearing feminine.

6.1.2 *Fast food and impression management*

Participants in Fries and Croyle's (1993) study indicated that they would rather be friends with a person who consumed a low-fat diet than a fast food consumer⁹⁰. Ratings from the respondents revealed that fast food consumers had more negative characteristics, including being less studious and more likely to be overweight than people on the low-fat diet. Stein and Nemeroff (1995) found that people who were described as eating fast food were also seen as less active. There definitely seems to be evidence of negative stereotypes surrounding fast food consumption in the literature. Such stereotypes may increase the drive for impression management. However, it is unclear how pervasive the stereotypes surrounding fast food consumption are. As more people eat fast foods, the stereotypes about fast food consumers may evolve. Thirty years ago, Sadalla and Burroughs (1981) described a very different profile of fast food consumers; they were described as someone who is family orientated and conservative.

It is difficult to gauge how negative the current stereotypes of fast food consumers are and, consequently, the impact that they may have on behaviour. Nevertheless, recent research suggests that negative stereotypes still surround people who consume fast food (Dunn, Mohr, Wilson & Wittert, 2008). Therefore, there is a likelihood that eating fast foods (relative to other foods) triggers impression management strategies in women, especially considering that female targets described as eating energy dense foods are perceived as less feminine (Mooney et al., 1994; Mooney & Lorenz, 1997). Consequently, it is likely that women will feel pressure to eat minimally to reinforce

⁹⁰ The experimental description of someone who eats fast food also mentioned that they avoided diets. Therefore, it could be argued that this perception is not related solely to fast food consumption.

their feminine identity. More importantly, this means that it is likely that minimal eating norms may be particularly relevant in a fast food environment.

6.1.3 Aims of the current study

Chapter Five showed that presence of others had an impact on the amount consumed in a fast food meal; the number of people present at the eating occasion positively predicted the time spent eating which, in turn, predicted the amount eaten. This result, based on data from surveys, was interpreted as support for the time-extension hypothesis. A limitation of this study was the reliance on accurate recall of the amount of food consumed and the time spent eating following the most recent consumption of fast food. Although the data were consistent with Bell and Pliner's (2003) observational data which showed that the time spent eating increased in the presence of others, neither set of data clearly indicates whether the amount consumed also varied. This is critical to the determination of whether meal duration can be altered by the presence of others.

Given results of the previous Fast Food Survey (FFS), it is expected that, in a naturalistic environment, people eating in groups in a fast food restaurant will eat for longer which will, in turn, be associated with greater energy intake. These relationships were found consistently across males and females in the previous study. It is expected that the relationship between the number of people present and the amount eaten will be negative for women. In males, it is expected that relationship between the number of people present and the amount eaten will not be significant as there was no evidence of this relationship in any of the models of fast food consumption in the previous chapter. Consequently, the following are the hypotheses to be tested in an observational study of food consumed in a fast food restaurant:

Hypothesis 1.1: Fast food consumers eating in groups will eat for longer than people dining alone.

Hypothesis 1.2: Time spent eating will be positively related to the amount of fast food eaten and the number of people present.

Hypothesis 1.3: The total effect of others on the amount of fast food consumed will be negative in females observed.

It has been previously shown that lone diners may increase the time they spend at an eating occasion by reading (Sommer & Steele, 1997). Results from the study in Chapter Five supported the idea that time spent eating can increase the amount eaten in a fast food restaurant. It is therefore possible that if lone diners read and increase the time they spend eating, this may also increase the amount eaten. This possibility provides a basis for the following group of hypotheses:

Hypothesis 2.1: Lone diners who are reading will eat for longer than lone diners who are not reading.

Hypothesis 2.2: There will be positive relationship between the time spent eating and the amount consumed by lone diners.

Hypotheses 3 and 4 were designed to assess the effect of norms on consumption in a fast food environment (thus addressing the third research question posed in Section 3.5).

There has been some suggestion in previous studies (Roth et al., 2001) that matching of intake occurs when eating in a social circumstance (i.e., an intake norm is established by those participating in the meal event). It has been suggested that the presence of a female eater can emphasise the importance of this matching norm (Salvy et al., 2007).

Therefore, it is expected that there will be some matching of intake within groups of fast

food diners. It is unclear how matching will occur within groups that differ by gender composition.

Hypothesis 3: There will be evidence of matching within groups of fast food consumers in a naturalistic setting.

There is currently good evidence for the existence of a minimal eating norm for fast food consumption. This is evidenced in the negative total effect of the presence of others seen in when modelling fast food intake in the previous study and more generally by the previous studies demonstrating the effect. The 'unfeminine' nature of fast foods may trigger adherence to these norms when consuming this food. Previous studies using the FFS did not allow for assessment of these norms because the sex of the people present was not recorded in the survey data. Therefore, the final aim of the current study is to determine whether, minimal eating norms are activated in the consumption of fast food and whether these, in turn, alter the volume eaten (in terms of energy intake) in social interactions.

It was predicted that females eating with males in a naturalistic fast food environment would eat less than females eating with a group of other females. It is unclear how different gender compositions among social diners will affect males.

Hypothesis 4: Females [males] eating in the presence of mixed sex company while dining in a fast food restaurant will eat differently to females [males] in same sex groups.

6.2 Method

6.2.1 Development

Observational methods allow data to be collected from a naturalistic environment, and these data are generally viewed as higher in ecological validity than data collected in the laboratory. Traditional methods utilised in sociological observational studies have involved observing, recording, classifying and evaluating behaviours (Hennessy, Mabey, & Warr, 1998; Jorgensen, 1989). These contrast with other methods of observational recording, developed from a behavioural tradition, that involve the preliminary development of behavioural categories that are utilised in the development of a checklist designed to capture only data relevant to the purpose of the study (Hennessy et al., 1998). This method has been used in a number of observational studies of eating behaviours (Klesges et al., 1984; Sommer & Steele, 1997). In these studies, a researcher sits and unobtrusively observes people in an eating environment and records the time that eating starts and stops (Bell & Pliner, 2003; Sommer & Steele, 1997) and in some cases, the items consumed (Klesges et al., 1984). These studies were used to guide the development of the method used in the current study.

The observational data collection method limited the demographic data that could be recorded to sex, weight category and age group. The latter two required some estimation skills but both types of data have been reported in previous observational studies. For example, Sommer and Steele (1997) recorded age in deciles while Klesges et al. (1984) trained observers in weight status observations. Time spent at the table can be easily observed as can the items eaten. Calculating the energy content of the food consumed was made easier by the standardised portion size and the distinctive

packaging of items consumed in a fast food restaurant. For example, McDonald's employ a colouring system that defines different burgers – a Big Mac comes in a box with red colouring.

McDonald's restaurants were selected for observation because they account for the highest proportion of fast food sales in the quick-service restaurant industry in Australia (BIS Shrapnel, 2003). Moreover, data from the FFS in the previous studies indicated that McDonald's customers frequently "dined-in". Behavioural recording of meal content was facilitated by McDonalds' packaging which allowed the identification of diet and non-diet beverages and burger type. Finally, McDonald's also has a larger menu with more 'healthy' options than equivalent fast food chains allowing for greater variability in energy intake, the critical dependent variable of the study.

The human ethics committee at the School of Psychology in the University of Adelaide approved the current study⁹¹. The human ethics committee at CSIRO, Human Nutrition endorsed this approval.

6.2.2 Piloting

Preliminary visits were made to McDonalds' restaurants around the city of Adelaide and its surrounding suburbs. Floor plans were made of 11 restaurants to assess which had the most desirable layout for optimal observations. Over the period of one week, ten two-hour practice observation sessions were conducted at McDonald's restaurants in the north and north-eastern areas of Adelaide. The purpose of these observations was

⁹¹ Owners of the restaurants were not informed of the study. The ethics committee stipulated that to justify prolonged occupation of a seat in the restaurant, the observer/s would have to purchase items.

to: refine the behavioural checklist, estimate how busy the restaurants were, and develop a strategy for optimising observational accuracy. The McDonald's restaurants in the city centre were the only restaurants that were consistently busy⁹².

Double entry: Refining measures. On three data collection occasions, a second observer recorded data to assess and refine the measures being collected. Thirty-one cases were recorded over three occasions. Records of the items consumed and the time spent at the table demonstrated high consistency across the primary observer and the lesser experienced observer. The total time spent at the table recorded by each researcher was identical for all 31 nodal participants. One time there was discrepancy in the description of the order recorded. This was all resolved post-data collection and reflected an error in the recordings of the lesser experienced observer.

The sex of the participant matched perfectly between the two observers for the target person and their co-eaters ($n = 51$)⁹³. For three cases, the second observer recorded “overweight” while the primary researcher recorded the weight as “normal”. The definition for the weight status categories was clarified to make recording the weight status more accurate. Silhouette images of different-sized women used by Holdsworth, Gartner, Landais, Maire and Delpuech (2004) were used to construct a guide for recording weight status⁹⁴ (see Appendix 8).

⁹² At some of the restaurants outside of the city, data were only recorded for three people or groups who met the inclusion criteria during the two-hour observation period. For example, at one of the restaurants that was piloted, the clientele consisted predominantly of young families.

⁹³ Data for 31 diners were recorded. Nine ate with one other person, four ate with two other people one ate with three others. As age, gender and weight status were recorded for co-eaters, there were 51 cases in total to compare.

⁹⁴ As these were perceived weights, they were made to be slightly less strict than clinical assessments of overweight and obesity such as Body Mass Index (BMI) or waist circumference. Therefore, recordings of ‘normal’ weight status may technically represent people who are just overweight (e.g., BMI of 25-26).

The category that caused the most difficulty for recording was age. In over half of the cases where ages were recorded ($n = 26$) there was a five year discrepancy in the estimated age of a participant. For four cases, the difference in age estimation was between 10 and 15 years. The cases with the large age inconsistencies exclusively involved people over the age of 45. Given the lack of consistency in the observation of participant age, the measure of age was collapsed into four age groups (15-25; 26-35; 36-45; over 45). These groups encompassed all of the differences in estimations between observers and allowed for greater accuracy in recording the age of participants.

Following observations made by two observers, it was clear that measures could be recorded successfully and accurately by the primary researcher.

6.2.3 Procedure

Inclusion criteria. Data were collected only for people assessed as being of senior secondary schooling age and over (people 15 and over). There were two primary reasons for this restriction: (1) children require considerably less food than adults and could therefore confound the dependent variable, 'extra time' spent eating and, (2) people 15 and over have greater independence and ability to make their own food choices. This restriction meant that any group of people with a member under the nominated age was excluded from observation.

Sampling strategy. The sampling strategy was event-contingent rather than time-based (Haynes & O'Brien, 2000). Observation began when the "eating event" started. All participants who entered the restaurant during an observation session, and sat at one of the tables in the targeted observation area, were observed and information about their

behaviour recorded (c.f. Sommer & Steele, 1997)⁹⁵. The method for deciding who was to be included in the assessment of social influence was similar to one applied by Bell and Pliner (2003). If members left or joined the group before all members had left the table, the group size was adjusted accordingly. Those who started eating alone but finished in a group were excluded from observation as potential social influence on their consumption changed during the course of the meal event.

Time of data collection. Observations were made between 4pm and 7pm because this was identified as the busiest time at the restaurants during piloting. The duration of observations ranged between one-and-a-half hours and three hours. Data were recorded directly into a Personal Digital Assistant (PDA). Images of the packaging of the burgers were stored within the Excel file as a reference for observations (an example of the form used for data entry and the reference guide can be seen in Appendix 8). Twenty-four unique observation sessions were conducted between June and September 2007. Sessions were distributed equally across weekdays only.

Data recorded. The amount eaten was recorded for all individuals or members of a group who sat at chosen tables during the specified times. For groups, data were recorded for one randomly selected representative of those at the table. This group representative was chosen according to a predetermined seat at the table – usually the one most visible from the position of the researcher. For a small number of observations, data were recorded for all members of the group to allow descriptive analysis of the effects of the composition of selected groups on the amount consumed (Hypothesis 3).

⁹⁵ The observer ordered and consumed food items so as not to draw attention while observing tables.

Information categories coded within the PDA consisted of: the sex of the nominated individual; their age estimated to the nearest five years; their weight status (normal, overweight or obese); the characteristics of others present in the group (including their sex, age and weight status); the time eating started (from the moment the person started eating at their table); the time eating ended (recorded when a person left the table)⁹⁶; the presence or absence of reading materials or technology used for similar activities (e.g., laptops); and the foods eaten. It was not possible to determine whether diners consumed diet or non-diet beverages, consequently, characteristics recorded were confined to the size of the drinks ordered and whether they were thick shakes, soft drinks or hot beverages.

6.2.4 Calculation of energy intake

The items eaten were recorded according to their 'trade' names (e.g., Big Mac, small fries). The items eaten were used to calculate the total KJ consumed at the eating occasion observed. Nutrition information was taken from the McDonalds' website (McDonald's Corporation, 2006) and used in the calculation of energy consumption. Consistent with the limitation described above, drinks were not included in this calculation. The energy content of some items was difficult to determine because of variation in the constituent ingredients (e.g., Deli-Choice Rolls). For these items⁹⁷, KJs consumed was estimated as the mean for the different varieties available. At the time of data collection, the double cheeseburger, triple cheeseburger and the beef and bacon burger all came in the same packaging. Therefore, for these items, a mean KJ amount was also used.

⁹⁶ Some people remained at the table while their company visited the toilet prior to leaving. For these cases, the time that the eating occasion stopped was calculated according to the time the person left to visit the toilet.

⁹⁷ These items consisted of Deli-Choices Rolls, salads (excluding the green salad), and "McFlurries".

Energy intake for incomplete portions was recalculated according to the estimated proportion of the item eaten. There were only five people who did not consume the entire meal item they ordered, with most of the unfinished items being drinks. In a very small percentage of cases (2.7%), observed people returned to the counter during their eating occasion to order another item. If they then took this item with them as they left the restaurant, the item was not added to the calculation of the KJ they had consumed and the time they left table was recorded as the time they got up to complete their second order. Time spent ordering was subtracted from the overall time spent at the eating occasion.

6.2.5 Data screening

Data were originally recorded for 329 individuals or groups. Thirteen cases were removed because they consumed only a drink. Incomplete data were recorded for a further six cases. In eight cases there were changes to group size or behaviours that could not be adjusted for. The presence of outliers was assessed for the dependent variables extra time spent eating and kilojoules consumed. This revealed four univariate outliers for extra time spent eating (i.e., a result that was more than 3.29 standard deviations from the mean; Tabachnick & Fidell, 1989). These cases were removed from the analysis. In all of these cases, additional notes were recorded which indicated that these people were engaged in time-consuming activities in the restaurant; studying, doing taxes and waiting to leave for the airport⁹⁸. There were no outliers for kilojoules consumed. After removal of outliers, the remaining sample was 298.

⁹⁸ These notes were all made from conversations overheard by the observer.

6.3 Preliminary statistics

6.3.1 Descriptive data

Descriptive data for the sample can be seen in Table 19. The final sample was comprised of 195 males and 103 females. A majority of the sample was in the 15 to 25 years old age group ($n = 200$). Almost half of the people observed ate alone ($n = 141$). Most of the sample was rated as 'normal' weight ($n = 254$).

Table 19: Description of the sample as frequency data (n=298).

Variable	%	Variable	%
<i>Sex (Male)</i>	65.4	<i>Weight status[†]</i>	
<i>Age group</i>		Normal weight	85.3
15-25	67.1	Overweight	12.4
30-35	14.8	Obese	2.3
40-45	8.4	<i>Group size[‡]</i>	
Over 45	9.7	Loner diner	47.3
<i>Reading/using technology</i>	25.2	Pair	35.6
		Group 3 or more	17.1

[†]Given the small percent of the sample rated as obese, the overweight and obese categories were combined in all analyses.

[‡]Only five people (1.7%) ate in groups of four or more. Consequently, data was coded into group of 3 or more.

The amount of time required to eat fast food meals derived in a Section 5.3.3 was compared to the time that lone diners, who were not reading, spent eating in the current observational study. The mean for this group was 8.88 minutes and the modal time spent eating was 8 minutes. This provided good validation of the 8-minute time derived to describe the amount of time required to eat fast food prior to the larger FFS survey. Subsequently, the dependent variable *extra time spent eating* was calculated by subtracting the 8-minute time required to eat a fast food meal from the difference between the time eating started and the time it ceased.

The mean for the *extra time spent eating* was 6.91 minutes ($SD = 7.15$)⁹⁹. The mean energy consumed was 3399 ($SD = 1291$). The smallest orders eaten were three McNuggets (582KJ) and a soft-serve cone (613KJ). The two largest orders consisted of a Big Mac, a Double Quarter Pounder, large fries (7500KJ) and a Double Quarter Pounder, Cheeseburger, large fries, and three McNuggets (7260KJ).

6.3.2 Covariates

Analyses of variance (ANOVA) were performed to identify possible confounds for the outcome measures (*extra time spent eating* and *energy consumed*). The resulting means and standard deviations can be seen in Table 20.

Table 20: Comparison of energy consumed (KJ) and time spent eating between different levels of the variables measured*.

<i>Measure</i>	KJ intake			Time Spent Eating	
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<i>Weight status</i> [†]					
Normal	254	3348 ^a	1255	6.49 ^a	7.13
Overweight	44	3692 ^a	1463	9.34 ^b	6.86
<i>Age Group</i>					
15-25	200	3391 ^a	1305	6.41 ^a	6.76
26-35	44	3965 ^b	1186	8.14 ^a	7.99
36-45	25	3141 ^{ab}	1045	7.56 ^a	8.03
Over 45	29	2814 ^{ac}	1246	7.97 ^a	7.71
<i>Part of day</i>					
1600-1730	124	3189 ^b	1266	6.15 ^a	7.09
1731-1900	174	3548 ^a	1292	7.45 ^a	7.17
<i>Day of week</i>					
Monday	39	3524 ^a	1400	8.08 ^a	9.16
Tuesday	55	3214 ^a	1151	6.33 ^a	6.79
Wednesday	89	3558 ^a	1416	6.70 ^a	6.84
Thursday	68	3500 ^a	1281	8.06 ^a	7.65
Friday	47	3061 ^a	1061	5.36 ^a	5.13

*Numbers with shared superscripts for each measure identify values that are not significantly different from each other at the .05 level.

[†]Overweight and obese categories were combined.

⁹⁹ The unadjusted, mean time spent eating was close to those reported in the Fast Food Surveys indicating that general recall of the time spent eating may have been reliable.

There were no significant differences in energy (KJ) intake by weight status. Time spent eating did vary according to different weight status, $t(296) = -2.46, p < .05$, with overweight people spending significantly more time eating. There was a significant effect for age group on KJs consumed, $F(3, 294) = 5.36, p = .001$, with Bonferroni post-hoc testing indicating that those in the “26 to 35” year old age bracket ate significantly more than both the “15 to 25” and “over 45” consumers. Extra time spent eating (herein referred to as ‘*time spent eating*’) did not vary significantly between age groups.

As observations occurred between 4 and 7pm, it was suspected that this time period was inclusive of two separate eating occasions: afternoon tea and dinner. It was expected that the part of day in which the items were eaten might impact upon the amount eaten and possibly upon the time spent eating because dinner is generally a bigger, more sociable meal in Australia. Consistent with this possibility, a t-test revealed that KJs consumed varied significantly according to time of day ($t(296) = -2.38, p < .05$). Although the extra time spent eating was slightly higher in the later part of the day, this difference failed to reach significance. Day of the week did not significantly influence either energy consumed or extra time spent eating.

Given the significant influence of the time of day and age on energy intake, these were used as covariates in future analyses of KJ intake. Likewise, weight status was used as a covariate in analyses of time spent eating. Prior to hypothesis testing, all independent variables were screened to ensure they satisfied the assumptions of each of the analyses.

6.4 Hypothesis testing

6.4.1 Analysis of the effects of the presence of others

Hypothesis 1.1. An ANCOVA (analysis of covariance) indicated a significant difference in amount of time spent eating between lone diners and those eating with others, $F(1, 296) = 4.98, p < .05$. Those eating with others ate for significantly longer ($M = 7.71, SD = 6.86$) relative to those eating alone ($M = 6.01, SD = 7.38$).

Hypothesis 1.2.1. Without the same descriptive information that was obtained in the FFS, it was impossible to replicate the models of fast food consumption developed in the previous chapter. In an effort to explore whether there were similar trends to those observed in the previous study, bivariate correlations were calculated between the time spent eating and the amount eaten and the number of people present. There was a significant positive relationship between the amount eaten and the time spent eating, $r(298) = .20, p < .001$. The relationship between the time spent eating and the number of people present was also significant, $r(298) = .15, p < .01$.

Hypothesis 1.3. To assess the relationship between the number of people present at the eating occasion and the energy consumed and how this would vary between sexes, the sample was split according to sex. The total effect between the number of others present and the amount eaten failed to reach significance in males, $r(195) = .10, p > .05$. The association between the number of others present and the amount eaten was also negligible in females, $r(103) = .05, p > .05$ but in a positive direction.

6.4.2 Lone diners and reading

Restricting analyses to those eating alone resulted in a total of 141 participants (109 male, 32 female) from the original sample¹⁰⁰. Approximately 51.1% of the lone diners were reading while eating in the fast food restaurant. The lone diners were a slightly heterogeneous subset. There were more people than expected in the “over 45” group who were reading and less from the “15 to 25” age groups that were observed reading, $\chi^2(3, 158) = 17.47, p < .001$. There were no differences between lone readers and non-readers for sex ($\chi^2(1, 140) = 2.17, p > .05$), weight status ($\chi^2(1, 140) = 2.82, p > .05$) or part of the day the items were consumed ($\chi^2(1, 140) = .14, p > .05$).

Hypothesis 2.1. An ANCOVA was used to compare the time spent eating by lone diners, with and without reading material, controlling for their weight status. Lone diners who read ($M = 9.44, SD = 8.12$) spent significantly longer eating than those who did not read ($M = 2.43, SD = 4.24$), $F(1, 139) = 37.03, p < .001$.

Hypothesis 2.2. Analysis of the relationship between the time spent eating and the amount eaten was performed for all lone diners¹⁰¹. This association failed to reach significance, $r(141) = .14, p > .05$.

¹⁰⁰ Lone diners did show slightly heterogeneous qualities compared to groups of diners. People in the 15-25 age group had a higher percentage of people dining in groups, $\chi^2(3, 295) = 40.17, p < .001$ and more males than would be expected dined alone, $\chi^2(1, 297) = 16.67, p < .001$. There were no differences between weight status $\chi^2(1, 297) = 1.08, p > .051$ and the part of the day the items were eaten, $\chi^2(1, 297) = .16, p > .05$.

¹⁰¹ As the association between the time spent eating the amount eaten was consistently positive in all analyses for both males and females, there was no need to separate the analyses by gender.

6.4.3 Intra-group matching of intake

Previous studies suggest that people may engage in “matching” when choosing what and how much to eat in a social situation (Leone et al., 2007; Roth et al., 2001; Salvy et al., 2007). Matching *energy* consumption is a difficult behaviour; people are not necessarily aware of the energy content of various meal constituents (see discussion of portion size data in Appendix 7). It is more feasible for fast food consumers to operationalise matching behaviour by ordering ‘like’ products (e.g., a burger). To test this proposition, the menu items that were consumed during the observations were coded according to the type of food ordered. Eleven food item categories were created: small, medium or large fries or drink, burger, healthy choice item, coffee, nuggets and dessert items. The aim of this coding was to assess whether people eating together ordered the same types of food.

Hypothesis 3. The orders of all the people present at the eating occasion were recorded for 38 groups: 18 mixed-sex dyads, 7 same-sex dyads, 4 mixed-sex groups¹⁰², and 8 same-sex groups. Matching of intake was recorded when the same categories of items (of the 11 coded categories) were consumed by both or all eaters. The number of groups that showed evidence of matching is displayed in Table 21.

Table 21: Frequency of matching orders for groups of different sizes and different sex composition.

<u>Group description</u>	<u><i>n</i></u>	<u>Matched orders</u>
Mixed-Sex Dyad	18	9
Mixed-Sex Group	4	0
Same-Sex Dyad	8	6
Same-Sex Group	7	2

¹⁰² Groups had three or members at the eating occasion.

In mixed-sex dyads, a high level of matching occurred; males and females tended to order the same types and combinations of items. In eight of the nine groups where matching was not evident, the males ate more items than the females. In the last group, the members ordered different types of items (a meal versus a dessert).

The same-sex dyads observed also showed evidence of matching. This matching was clearer in same-sex groups of females compared to males. All of the four dyads of females matched their orders identically while only one of the three dyads of males ordered the same items. There seemed to be no consistency in the matching behaviour of groups of same or mixed sex. Only one group of males and one group of females matched their orders within the group (both were groups of three). In all other groups there was no consistency in matching and, as groups got larger, any trends were much less apparent.

A logistic regression was performed to assess whether the size and the gender composition of the group predicted order matching. Hosmer and Lemehow's Test revealed that the model had an appropriate fit ($p > .10$). Cox and Snell's R^2 indicated that the two predictors accounted for approximately 19.3% of the total variance in matching. The Wald statistic indicated that the sex composition of the group did not significantly predict order matching (Wald = 2.39, $p > .10$). The size of the group did predict matching (Wald = 5.49, $p < .05$). The odds ratio was .25 (95% Confidence Intervals: upper = 1.45, lower = .04)¹⁰³ indicating that eating in a group *decreased* the probability that matching occurred during fast food consumption. The small sample size limited assessment of interaction effects in the model.

¹⁰³ The confidence intervals indicate a large range of responses as a result of the small sample size.

6.4.4 Minimal eating norms

Hypothesis 4. A 2 X 2 X 2 ANCOVA was performed to test for differences in energy consumption. The independent variables were: participant sex (male/female), group composition (same-sex/mixed-sex) and group size (pair/larger group). Age and the part of the day in which the observations occurred were used as covariates.

Results indicated a main effect for participant sex, $F(1,156)=14.51, p<.001$, signifying that males consumed significantly more ($M = 3561, SD = 1302$) than females in the sample ($M = 3092, SD = 1219$). No main effects were observed for the sex composition of the group ($F(1,156)=.02, p>.05$) or the group size ($F(1,156)=2.96, p>.05$). There were two significant interaction effects. The first was a two-way interaction between participant sex and group size ($F(3,153) = 3.99, p<.01$). The second was a three-way interaction between sex, group composition and group size ($F(7,147) = 2.87, p<.01$). Post-hoc testing of these effects was done using one-way ANOVA. The means and standard deviations for the kilojoules consumed for in the various comparison groups are described in Table 22 (on the following page).

Post-hoc testing of the significant participant-sex-by-sex-composition comparisons indicated that males in either mixed or same sex groups ate significantly more than females in mixed-sex groups. The significant three-way interaction effect also indicated that males in mixed-sex groups consumed the most kilojoules, while females in mixed-sex groups ate the lowest amount of kilojoules. Bonferroni comparisons revealed that males in mixed-sex groups (three or more members) consumed significantly more energy than females in mixed company eating in a dyad or a group.

Table 22: Means and standard deviations for KJ consumption from fast food items for both two-way (sex by sex composition) and three-way interaction effects (sex by sex composition by group size)*.

Sex/Sex composition	<i>n</i>	<i>M</i>	<i>SD</i>
Female/Same	32	3275 ^{ab}	1264
Female/Mixed	39	2820 ^a	957
Male/Same	44	3551 ^b	1173
Male/Mixed	42	3692 ^{bc}	1431
Sex/Sex composition/Group size	<i>n</i>	<i>M</i>	<i>SD</i>
Male/Mixed/3 or more	8	4555 ^a	1575
Male/Mixed/Pair	34	3489 ^{ab}	1340
Male/Same/3 or more	17	3721 ^{ab}	753
Male/Same/Pair	27	3443 ^{ab}	1377
Female/Mixed/3 or more	14	2672 ^b	805
Female/Mixed/Pair	25	2903 ^{bc}	1039
Female/Same/3 or more	12	3651 ^{ab}	1593
Female/Same/Pair	20	3050 ^{ab}	998

*Numbers with shared superscripts identify values that are not significantly different from each other at the .05 level.

The three-way interaction is illustrated in Figure 17 (on the following page). In this figure it is clear that as group size increases, so does the amount eaten for all groups, with the noted exception of females in mixed-sex groups, where the amount seems to decrease, which is consistent with the minimal eating norm.

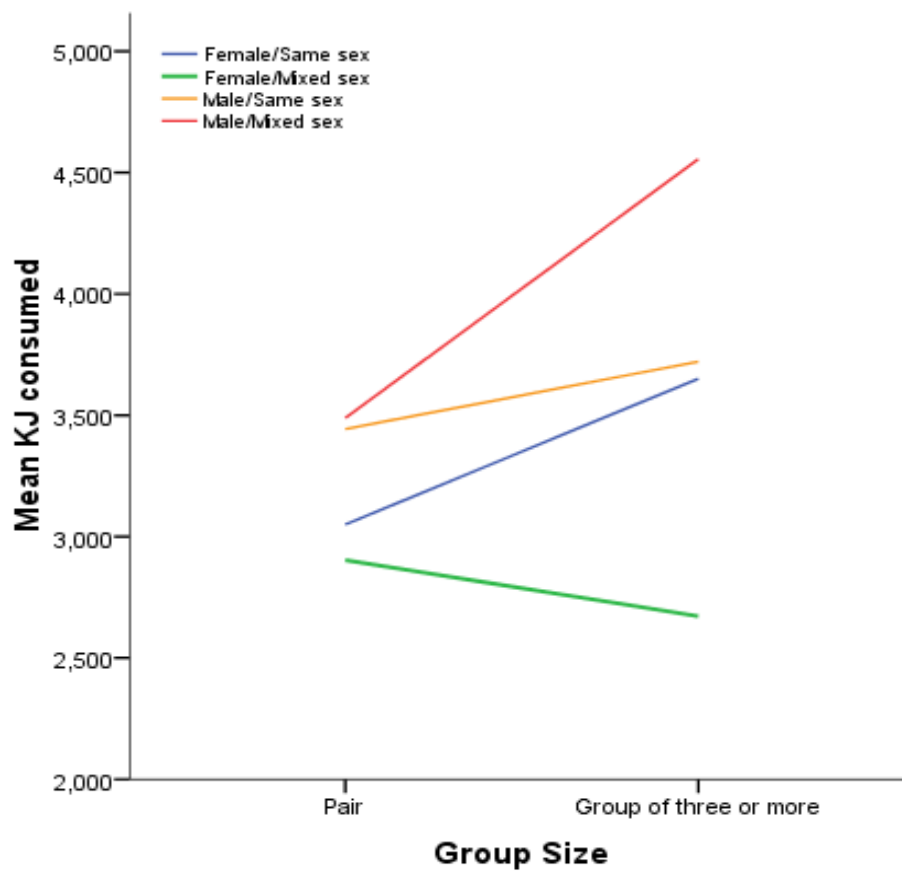


Figure 17: Interaction effects for subject sex, group composition and group size on KJ intake from fast foods.

6.5 Discussion

This study tested several hypotheses surrounding fast food consumption. These were concerned with exploring the extent to which time-extension, social facilitation, gender roles and impression management might impact on the energy consumed at a fast food eating occasion. Data were collected by observation of consumers at a number of McDonald's restaurants. Statistical analyses revealed varying levels of support for the hypotheses.

6.5.1 *Time-extension in a fast food restaurant*

The time-extension hypothesis predicts that people who eat in groups consume more and eat for longer (e.g., J. M. de Castro, 1990). Bell and Pliner (2003) reported that the time spent eating food could be increased through the presence of others. The current results showed that the people eating fast food in groups ate for longer than lone diners, which supports this literature. Moreover, there were positive correlations between the time spent eating and, both the amount eaten and the number of people present at an eating occasion. Both of these relationships were weak but significant.

The failure to observe a direct association between the amount eaten and others present is consistent with results from the previous FFS study (reported in Chapter Five). Without using modelling techniques, it is unclear how direct and indirect effects combined to create the total effect.

6.5.2 *Matching norms and their influence on fast food consumption*

Overall, the sex composition of the group failed to predict order matching. Part of the reason for this may be the limited sample size which restricted the ability to assess interaction effects (between participant sex and group composition, for example). The descriptive data indicated that in almost all of the groups of females observed, there was clear evidence of matching. The motivation for this could not be determined. Leone, Herman and Pliner's (2008) data suggests that a desire to be seen positively by others might underlie this behaviour and that this desire may serve to outweigh pressure to conform to the "feminine" minimal eating norm. Fast food consumption by a woman eating with other women observed in the study reported here offers some support for this suggestion; women eating with other women demonstrated matching intakes more

consistently than minimal eating behaviour. The extent to which normative matching of food consumption is gender specific (see, Salvy et al., 2007) requires further exploration with larger sample sizes.

Pliner, Bell, Hirsch and Kinchla (2006) suggested that as group size increases, matching norms become more difficult to discern. They argued that it is more difficult to determine the amount others are eating when there are more people to monitor. People eating in pairs were more likely to match their orders than people in larger groups. The descriptive data indicated this finding was true in mixed-sex pairs as well as same-sex pairs. Therefore, the results reported here are consistent with Pliner et al.'s contention.

Overall, it is difficult to determine what norms underlie 'matching'. For example, whether people ate the same type of meals as a result of the other people present or as a result of the eating occasion was not discovered in the current study. Given the fact that McDonald's label their meals as such, it could only be expected that people visiting the restaurant for dinner would all order a "meal". Determining the mechanism behind matching is an important step for further research.

Finally, the extent to which 'matching' could be confounded by the nature or closeness of the relationship between the people eating needs to be considered. In the largest group observed, there appeared to be three generations of people present including an elderly male/female pair, a middle-age female and two people in their twenties. These different relationships may change the norms surrounding the situation.

6.5.3 *Evidence of minimal eating in fast food consumption*

Literature identifying minimal eating has suggested that, in the presence of men, women decrease their intake (Chaiken & Pliner, 1987; Mori et al., 1987; Pliner & Chaiken, 1990). There was indication of minimal eating in the modelling of fast food intake reported in the previous chapter. Specifically, the number of people present had a direct, negative association with the amount eaten in the females observed. Given this evidence, it was expected that, when in the presence of a male co-eater, women would eat less. The results of the study supported this hypothesis in a naturalistic environment.

Eating with mixed versus same-sex groups may have influenced the intake of both males and females observed. The effect of the sex composition of the group was only significant in interaction with the eaters' sex. The reason for this was most likely the fact that the males and females observed behaved oppositely in the presence of mixed company; males in the presence of mixed company ate the most while females in mixed company ate the least. This finding supports the existence of and adherence to minimal eating norms.

Despite the fact that females ate less than males overall, in same-sex groups males and females ate similar amounts. This indicates that it may be the presence of males that reduced females' intake and not simply the different energy requirements of males and females that determined this difference. Minimal eating in the observations in the fast food environment may have been motivated by the desire to meet gender-role expectations rather than general self-presentational concerns. If women were restricting their eating purely in the desire to 'look good', then it would be expected that women in all groups would limit their intake. Yet, females observed here did not eat different

amounts to males when eating in same-sex groups, which indicates that perhaps eating in same-sex groups liberates women from gender-role expectations.

Some authors have suggested that eating larger amounts of food is perceived as a masculine behaviour (Bock & Kanarek, 1995). Paradoxically, others have shown that, when in female company, males can also eat less (Mori et al., 1987). In this study, males in the presence of females ate the most food. The amounts they ate were determined largely at the ordering stage (few made second orders or ate their eating companion's leftovers). This result reinforces the idea that males may have been driven by a desire to appear masculine when in the presence of female company. Yet, males' intake did not vary much between same-sex and mixed-sex groups, which could indicate that their behaviour was not driven by external norms. Salvy et al. (2007) and Eagly (1983) suggested that men are less likely to adhere to norms because they have a greater desire to appear independent. Furthermore, Salvy et al. (2007) found that men in the presence of other male friends ate more. It is likely that men were not acting in a way to increase their intake in order to appear masculine. Without assessing these behaviours in an experimental design, it remains unclear why and how men change their intake.

Unfortunately, there are few studies investigating how different environments influence eating behaviours in men or groups of people, therefore there is limited precedent.

The three-way interaction observed demonstrated that the differences in intake between males and females in mixed-sex groups varied with group size. This finding supports results from Klesges et al.'s (1984) study, which showed that female eaters in a fast food environment in mixed-sex groups ate less as group size increased. In that study, however, it was found that females in small mixed-sex groups ate a similar

amount to males in mixed-sex groups. In the current study, females in mixed-sex pairs ate significantly less than males in mixed-sex groups, but not males in mixed-sex pairs.

The model of social facilitation suggests that as the number of people present increases, so does the amount eaten. The three-way interaction in the current data indicated that increases in group size may also emphasise minimal eating norms in female eaters and, more indirectly, the desire to eat more in men (males with two or more people ate the most while women in larger groups ate the least). It is likely that when more people are present, women's desire for impression management increases. Other authors have suggested that women are more concerned with their appearance and also more interested in food (Klaczynski, Goold & Mudry, 2004; Pliner, Chaiken & Flett, 1990), and it may be the case that women are motivated to use the way they eat to control the impression they create or to define or reinforce their self-identity.

6.5.4 Lone diners and reading

In their observations of diners at cafes, Sommer and Steele (1997) reported that people frequently read when dining alone. They suggested that people dining alone used reading materials to reduce the discomfort associated with eating alone in public; it is clear from the results of other studies that eating alone is stigmatised (Redd & de Castro, 1992).

On average, people eating fast food alone spent almost three times as much time at the table if they read, supporting the suggestion that reading can be used to reduce the discomfort associated with dining alone. Considering the consistent relationship between the time spent eating and the amount eaten, it is possible that extending the

time spent eating also increases the amount eaten by lone diners. In the observational study, time spent eating while reading did not relate to the amount eaten.

Other research has confirmed that increased time spent eating does not inevitably lead to increased amounts of intake (e.g., Mathey, Zandstra, de Graaf & van Staveren, 2000).

The discrepancy in findings of the data for lone consumers as compared to groups of consumers suggests that increased consumption in group situations cannot be explained solely by increased time in the restaurant. There was evidence that lone diners could prolong the time they spend eating without increasing the amount they consume.

Although the results reported here indicate that the relationship between the number of people present and the amount eaten may operate indirectly through the time spent eating, the social nature of relationship may be crucial to increased intake as this is absent for lone diners. Without external influences and direct, social norms, food choice in a lone diner may simply be driven by personal preference or habit.

6.5.5 Conclusions

This study shows that the presence of others can have a significant influence on eating behaviours in a fast food restaurant. The influence of the presence of others was demonstrated through evidence of minimal eating norms as well as through further support for the time-extension hypothesis. It is interesting that, in contrast to social facilitation theory (which suggests that the presence of others increases intake), minimal eating norms operate so that the presence of others can decrease intake in certain circumstances. These two influences directly conflict with each other, and yet, may exist together in an eating environment. Although future studies will need to

replicate this observation, it emphasises the importance of not assuming that influences on consumption in men and women are uniform.

It is difficult to determine how exactly minimal eating norms operate in the fast food environment. Part of the reason for this is the complex nature of impression management theory. Authors have noted that the process of impression management is dynamic and changes depending on the target, the audience and the situation (Bozeman & Kacmar, 1997). Two people using similar impression management strategies can be judged differently depending on their predetermined role in society (Rudman, 1998; Westphal & Stern, 2007). The familiarity hypothesis suggests that there is also likely to be some influence of the type of relationship between people and how this moderates impression management (Leary et al., 1994; Tice et al., 1995). The motivations behind minimal eating cannot be conclusively determined through observational methods.

Eating fast food may emphasise the desire to conform to social norms because fast food consumption can be associated with negative judgements (Stein & Nemeroff, 1995). de Castro (1994) found that women eating with men more clearly demonstrated social facilitation, whereas the data from the current study suggest that women eating with men restrict their intake. The fact that de Castro assessed general eating while the current research focuses only on fast foods may explain this difference; fast foods may trigger minimal eating norms. Unfortunately, without observing people eating both fast and non-fast food, there is no point of comparison to allow such conclusion to be drawn.

The results of this study suggest that fast food eaters are driven by similar social influences as those reported for other forms of eating. The reason that the norms

surrounding consumption may be so pervasive and impact on fast food consumption, as well as 'regular' eating, may originate from the uncertainty individuals experience when trying to determine appropriate eating behaviours such as the amount to eat (Herman, Fitzgerald, & Polivy, 2003). Compliance with norms helps to eliminate behavioural uncertainty. By contrast, norm violation can result in poor outcomes for a non-compliant individual (Herman & Polivy, 2007; Ohbuchi et al., 2004). For example, in a professional context, women who fail to meet sex role expectations can receive negative judgment ratings (Rudman, 1998). Furthermore, people who satisfy normative expectations experience positive feelings (W. Wood, Christensen, Hebl, & Rothgerber, 1997).

In summary, the current observational study explored fast food consumers in a natural environment and overcame several limitations of survey methods¹⁰⁴. Key among these is the validity of both the dependent and independent variables. It is highly likely that social desirability contaminates self-report data on fast food consumption and it is also conceivable that people are unaware of how their own behaviour is influenced by the presence of others, thereby creating problems for measurement (Vartanian, Herman & Wansink, 2008). Although observational methods provide ecologically valid 'snapshot' data, they are limited by the scope of the information that can be recorded. The issue of the generalisability of observational data to other contexts, whether these be defined by

¹⁰⁴Recall of time spent eating was identified as an issue for the previous studies using the Fast Food Survey data. Observational methods overcame these problems as time and intake could be highly monitored. It was reassuring that the averages of the time spent eating and the amounts eaten were fairly consistent across methods. Previous social influence studies have been criticised for comparing groups of diners unlikely to exist naturally, for example, groups of strangers dining together. The fact that the groups in this study were naturally formed represents a strength of the current study. It was interesting to observe that certain combinations of groups seemed to be less common amongst fast food diners. Large groups were very uncommon in the fast food environment. Furthermore, it was interesting to find that, in this observational study and in contrast to the previous Fast Food Surveys, more males were observed eating fast food whilst more females responded to the surveys. This suggests that the survey data may not accurately represent the population of fast food consumers, but does show women's higher interest in health-related research.

franchise, time of day, geographic location, or food type, is an issue that remains to be addressed.

Given the importance of cultural norms and how these may modify intake (Devine, Sobal, Bisogni, & Connors, 1999), it is important that future research explores whether cultures outside of Australia, demonstrate similar patterns of behaviour. In order to compare different cultures and whether they were influenced by similar norms to the Australian sample a small, cross-cultural observational study was completed.

6.6 A Cross-Cultural Comparison of Fast Food Behaviours in a Naturalistic Environment

Results reported in the preceding chapters indicate that energy consumed at a fast food meal is influenced by the time spent eating and that increasing group size correlates indirectly with increasing intake (i.e., time-extension). In addition these studies indicated that female consumers are influenced by the minimal eating norms. The extent to which this result is generalisable beyond McDonald's restaurants in South Australia has yet to be confirmed. Dietary behaviour is potentially a behaviour likely to be amenable to normative influences (Herman, Roth et al., 2003) and display cultural variation (Devine et al., 1999; Marshall, 1995). There is a growing body of research exploring these cultural, normative differences. Comparisons between the food consumption behaviours of Americans and Europeans are among the most common. de Castro et al. (1997) found differences in the time spent eating and the amounts eaten between Dutch, French and North American people. Given the important influence of social context on time spent and amount consumed in the current study, these differences between culture in "typical" eating patterns may limit the generalisability of

the results reported in the previous study. Culture and ethnic identity help define the norms of behaviour, including dietary choices. Siwik and Senf (2006) reported that ethnicity predicted a differential tendency to eat out among Americans of disparate ethnic backgrounds. In a series of interviews, Devine, Sobal, Bisogni and Connors (1999) explored how ethnicity shaped food choice. They concluded that different cultures have varying norms that determine the way individuals view food and eating. Food was described as a mechanism for conveying cultural identity with both preparation and consumption of food “telegraphing” values. Thus, interpretation of the link between food and ethnicity or cultural identity is consistent with arguments in the impression management literature; the need to fulfil culturally acceptable roles is ‘played-out’ in the food consumption setting.

It is unclear whether the rigid formula that defines fast food production and dissemination overrides cultural constraints on eating behaviours. There is evidence that such is not the case; Rozin, Kabnick, Pete, Fischler and Shields (2003) noted that the portion sizes from McDonald’s in France were smaller than in the US, and yet, the French also spent longer eating. This suggests that uniformity in the brand may not override normative cultural influences.

The aim of this study was to compare the fast food eating behaviours observed in the Australian sample to eaters in an environment outside of Australia. In order to assess eating behaviours in a culture different to Australia, McDonald’s restaurants in central Oslo were observed. Oslo is the largest city in Norway. It has a population similar in size

to that of Adelaide¹⁰⁵. Unlike the population of Adelaide, the population of Oslo is estimated to be among the fastest growing in the world (Statistics Norway, 2009a).

Norwegian and Australian eating patterns have some similarities. In Australia, people eat their main meals in the evening. This is also true of people in Norway who eat a large, hot meal or 'middag' in the evening. There are also aspects of eating in Norway that differ when compared to typical Australian eating behaviours. The first is the seasonal variation in eating patterns in Norway. This is partly a product of the more marked seasonal variations observed in Norway compared to Australia (Perry, Silvera, Rosenvinge, Neilands, & Holte, 2001). The second difference is between traditional foods within each culture. Regardless of these differences, both cultures have embraced the fast food culture. The popularity of American fast food chains is blossoming in Norway (Euromonitor International, 2008). Furthermore, Norwegians have reduced the time they spend preparing food by 30 minutes over the past 20 years (Statistics Norway, 2009b). This suggests that there may have been a cultural shift in attitudes to food and that Norwegians are as vulnerable to time scarcity and the desire for convenience as Australians (see Section 1.3.2 for discussion of prevalence of fast food consumption in Australia).

This study was exploratory and no hypotheses were made regarding the nature of any differences between the behaviours observed in Australian and Norwegian cultures. The earlier work of de Castro (1997) suggested that differences might be observed on

¹⁰⁵ The population of Oslo was 1,283,533 in 2004 (Statistics Norway, 2009a). Adelaide's population was 1,158,259 in 2007 (Australian Bureau of Statistics, 2007).

measures of time spent eating and quantity consumed, however this work did not include a Norwegian sample.

Therefore, the current analyses aimed to assess the following questions:

1. Is the amount eaten and/or the time spent eating different between Australian and Norwegian McDonald's consumers?
2. Are the relationships between the number of people present at the eating occasion, the time spent eating and the amount eaten similar between the Australian and Norwegian samples?

6.6.1 Assessing eating behaviours in a Norwegian sample¹⁰⁶

In total, three restaurants in Oslo city were visited over three days. These restaurants were similar to those observed in Adelaide; they were near the centre of the city and not part of a food court. The restaurants were observed over periods of time comparable to those used in the previous study – between 5pm and 8pm. All observations occurred in late June, 2007.

The procedure used for this study was identical to that of the previous study (detailed in Section 6.2.3). The researcher sat in the McDonald's restaurants and unobtrusively observed diners. The time participants began eating, the time they stopped, their sex, weight status, the items they consumed and details of the co-eaters were recorded directly into a PDA. Additional descriptive information regarding any behavioural differences between the dining behaviours of people in the Norwegian and Australian

¹⁰⁶ This study was an extension of the previous observational study and was approved by the ethics committee as an amendment to the existing application.

restaurants was also collected. As in the previous study, the person sitting in the most visible seat was nominated to be included in data collection. This individual's intake was chosen to represent the intake of the group.

Before the items eaten could be converted into dietary information, correct nutrition details were collected from the McDonald's website in Norway (McDonald's Corporation, 2007)¹⁰⁷. This information was collected in early July. Energy content was provided in Kcal and converted into KJ by multiplying it by 4.184.

6.6.2 Results

Descriptive data. Data were recorded for 50 groups or individuals. Two of the 50 cases were deleted before analysis because the participant consumed only a drink. The description of each sample is detailed in Table 23.

Table 23: Demographic characteristics of the samples of consumers observed in Oslo ($n=48$) and Adelaide ($n=298$).

Variable	Oslo*	Adelaide†
<i>Sex (Male)</i>	58.3	65.3
<i>Age group</i>		
15-25	58.3	67.1
30-35	25.0	14.1
40-45	10.4	8.7
Over 45	6.2	10.1
<i>Weight status</i>		
Normal weight	91.7	85.5
Overweight	6.2	12.4
Obese	2.1	2.3
<i>Group size</i>		
Loner diner	43.8	47.3
Pair	41.7	35.6
Group 3 or more	14.6	17.1

¹⁰⁷ The nutritional composition of the McDonalds items sold in Norway is slightly different and the correct information is only available from the Norwegian website.

The demographics of the sample obtained in Oslo were compared to the Australian sample. Chi-Square tests revealed no differences at the $p < .05$ level in the demographic characteristics of the samples for sex, $\chi^2(1, 345) = 0.91, p > .05$; age, $\chi^2(3, 343) = 4.40, p > .05$; weight status, $\chi^2(2, 344) = 1.57, p > .05$; or group size, $\chi^2(2, 344) = 0.69, p > .05$.

6.6.3 Dining at McDonald's in Norway compared to Australia

Service at the Norwegian restaurants was not as fast as that which was witnessed in the Australian restaurants. The restaurants observed were also, on average, busier than the restaurants observed in Adelaide. The typical process for eating fast food in Australia involved "order, sit, eat and leave"; in the Norwegian restaurants, patrons arrived, selected a table, sat down, ordered and returned to their table (and, in many cases, their food was bought out to them). This meant that the time recorded had to be observed not from the time the participant sat at their table, but from the time the food arrived. None of the Norwegians returned to the counter to order 'seconds'¹⁰⁸. If people ordered a dessert, more times than not, it was brought to the table at the same time as the food.

Fast food eaters in Adelaide ate an average of 3399KJ ($SD = 1291$), whereas the consumers in Oslo ate an average of 3311KJ ($SD = 1387$, range 565 to 6171KJ). The difference between these energy intakes was not significant, $t(344) = -.43, p > .05$.

There was no opportunity to assess the average time required to eat fast food items in Oslo (as was done for Australian sample in Section 5.3.3), therefore the time spent eating was used without any adjustment. On average, the Norwegian sample spent 20.77

¹⁰⁸ In the observational study in Adelaide, only 9 people of over 330 observed (prior to removal of outliers) returned to the counter for a second order.

minutes ($SD = 11.77$) eating. The mean *unadjusted* time spent eating in the Australian sample was 14.39 minutes ($SD = 7.75$). The difference in time spent eating was significant, $t(53.75) = 4.88, p < .01$.

There was little evidence of time-extension in the people observed in the Norwegian fast food restaurant. The relationship between the time spent eating and the amount eaten was negligible, $r(48) = .04, p > .05$. There was evidence of a positive association between the number of people present and the amount of time spent eating, $r(48) = .38, p < .01$. For women, the relationship between others present and the amount eaten was negligible, $r(20) = -.09, p > .05$. Although this association was stronger in men, it failed to reach significance, $r(28) = .17, p > .05$.

There was a significant difference between the total KJ intake of men overall and women, $t(46) = 2.52, p < .05$. As in the Australian data, women ($M = 2745, SD = 1150$) ate less than men ($M = 3715, SD = 1419$). Given the small sample size, there were not enough people to run the same multivariate model comparing different group compositions as was performed for the Australian sample (see Section 6.4.4); there was only one female who was observed eating in a mixed-sex group. Therefore, it was impossible to assess possible differences created by potential minimal eating norms.

6.6.4 Discussion and conclusions

There has been some suggestion that cultural differences exist in eating behaviours (de Castro et al., 2007) and that these may extend to fast food (Rozin et al., 2003). This study set out to explore the differences between the behaviours of fast food consumers in

restaurants in Norway and Australia. There were both similarities and differences between the behaviours of fast food consumers in each culture.

In the current study, there were no differences in the amount of food consumed by patrons in McDonald's in Oslo and Adelaide, although the Norwegian consumers ate for significantly longer. This difference may be culturally determined. de Castro et al. (2007) reported that Dutch people ate more frequent, smaller meals, but also ate for longer than French and North American people. Rozin et al. (2003) reported that French people spent longer eating McDonald's than North American people. It may therefore be a more typically European behaviour to spend longer eating, regardless of food type. The eating style of Australians may be more similar to that of North Americans, but without any direct comparisons, this assertion is purely speculative.

There was no direct relationship between the amount eaten and the number of people present for males or females in data for consumers in either country. The association between the number of people present and the time spent eating was significant in both populations. However, time spent eating did not relate to the amount eaten in the people observed in the Norwegian fast food restaurants. This is a crucial association in the time-extension hypothesis; without it, the theory remains unsupported. The fact that the Norwegian sample ate longer, and that eating longer was not associated with greater intake, suggests that the time-extension hypothesis in fast food consumers may be culturally mediated.

In both countries, the amount of fast food eaten by men and women was significantly different. The small sample size restricted exploration of minimal eating norms in the

Oslo sample. There is very little research on minimal eating norms outside of North America. Given other differences in the eating behaviours of Europeans and North Americans, it would be interesting to explore whether these norms are applicable in European populations. A larger sample will need to be observed for this to be assessed.

This study shows that there are differences between the eating behaviours of consumers in Norwegian and Australian McDonald's restaurants. The broad demographic profile of people observed in each restaurant was not different, suggesting that these differences may be culturally determined. This means that although this research has largely supported the time-extension in Australian samples, these results may not be generalisable to other Western cultures.

Future studies are needed to further explore the cultural invariance of normative influences including time-extension, social facilitation and minimal eating. Additionally, these studies might explore other potential normative influences on eating behaviour that might vary in their importance between cultural groups. Future research could assess whether groups with members of mixed cultural backgrounds retain the normative influences specific to the culture of the constituent group members. The level of identification an individual feels with their culture can change adherence to norms (Jetten, Postmes, & McAuliffe, 2002).

As Westernised fast foods penetrate the Asian markets (Park, 2004), it would be interesting to explore the factors that influence typical consumption behaviour in fast food settings in these Asian countries. This group would also be an interesting point of comparison given that Western-style fast foods can be much less 'healthy' than tradition

Asian take-out lunches (Kamei, Ki, Kawagoshi, & Kawai, 2002). Differing cultural ideologies affect many social behaviours, including child rearing, food preparation and eating behaviours (Triandis, 1989). Furthermore, the values which are placed on feminine ideals may differ between each Western and Eastern culture (Beardsley & Pedersen, 1980). Therefore, it is possible that these cultures will create differences in eating patterns.

In conclusion, the current data suggest some consistent influences in amount of food eaten. For example, energy consumed did not vary between countries. In contrast, the failure to observe time-extension suggests that some social influences may be culturally dictated.

7 Chapter Seven: A summary of the findings and implications of the current research

Traditional diets are being slowly replaced with diets containing a high proportion of foods prepared away from the home (Binkley, Eales & Jekanowski, 2000; Kant & Graubard, 2004). Consistent with public health advocates, Stanton (2006) has argued that consumption of these “convenience foods” is associated with increasing energy consumption, particularly through fat. One of the largest constituents of foods prepared away from home in Australia is fast food (Australian Bureau of Statistics, 2000).

Several studies have shown a relationship between the consumption of fast foods and higher Body Mass Index (BMI; e.g., Duffey, Gordon-Larsen, Jacobs, Williams & Popkin, 2007) and others have demonstrated that increases in fast food consumption result in weight gain (French, Harnack & Jeffery, 2000). The association between increasing rates of obesity and more frequent consumption of fast foods, and the fact that many of these foods are less healthy than those prepared from home, has led to the suggestion that fast foods may be a contributor to the obesity epidemic.

Aside from potential health implications of fast food consumption, little is known about fast food consumption behaviours and whether they are subject to the same influences as other eating behaviours. There is evidence that the presence of others can influence eating behaviours, with research on social norms suggesting that this influence can encourage or inhibit food intake depending on the social context (Pliner, Bell, Hirsch & Kinchla 2006; Rosenthal & McSweeney, 1979; Roth, Herman, Polivy & Pliner, 2001).

Social facilitation studies have shown that the number of co-eaters present can increase the time spent eating, which increases the amount eaten (called the time-extension hypothesis; de Castro, 1990; 1994). There are also studies demonstrating that the type of people present may moderate social influences (Hetherington, Anderson, Norton & Newson, 2006; Leary et al., 1994; Salvy, Jarrin, Paluch, Irfan & Pliner, 2007). Although each approach has shown that the presence of other people may alter general food intake, none has considered how the presence of others may influence fast food consumption. The research presented in this dissertation aimed to explore how social influences could affect the consumption of fast food at a single eating occasion.

7.1 Overview of current research

Previous research on fast food consumption has explored the characteristics of people who consume fast foods (e.g., Mohr, Wilson, Dunn, Brindal & Wittert, 2007; Schroder et al., 2007) and the qualities that attract consumers to fast food (Bryant & Dundes, 2008; Driskell, Meckna & Scales, 2006; M. J. A. Schroder & McEachern, 2005). Overall, there are limited other data on fast food consumption. Therefore, in the initial stages of this dissertation data were collected on fast food behaviours and social influences using an exploratory approach. In order to capture information on fast food items consumed, a variety of correlates of fast food consumption, and to assess the viability of the survey, the initial Fast Food Survey (FFS) was developed and administered to a small sample at the Royal Adelaide Show (an agricultural fair).

The initial FFS demonstrated that social factors could be assessed through the FFS and were able to predict fast food consumption. Consequently, the FFS was administered to a larger sample in order to investigate further social influences on fast food consumption.

de Castro has reported on the effects of social facilitation in many eating contexts, but not fast food consumption (J. M. de Castro, 1990, 1994; Redd & de Castro, 1992; Stroebele & de Castro, 2004). An existing model of social facilitation (based on general food intake and developed by Feunekes, van Staveren and de Graaf, 1995) was developed and refined using data from the larger FFS. Contrary to the framework of social facilitation, the refined model of social influence for fast food consumption indicated that having people present at a fast food eating occasion may have an inhibitory effect on intake, a trend particularly apparent in the sample of women who responded to the FFS.

There is a growing body of research indicating that social norms may create gender-based differences in eating behaviours (Basow & Kobrynowicz, 1993; Chaiken & Pliner, 1987; Mori, Pliner & Chaiken, 1987; Pliner, Chaiken & Flett, 1990). Consequently, the primary aim of the next study was to address whether the inhibitory effect that the presence of others appeared to have on women's intake in the larger FFS could be explained by the activation of minimal eating norms (the tendency for women to eat less in the presence of a co-eater) and impression management. In this study, sex differences in fast food consumption were measured by observing diners, the items eaten and time spent eating in a fast food restaurant.

Finally, the observational study was repeated using a sample of people observed in a Norwegian restaurant in order to assess whether the trends observed in Australia were also observable in other cultures. Previous studies have indicated that eating can be strongly governed by cultural differences that alter the timing and styles of food eaten (J.

M. de Castro, Bellilse, Feunekes, Dalix & de Graaf, 1997; Prescott, Young, O'Neill, Yau & Stevens, 2002).

7.2 Social influence and fast food consumption behaviours

7.2.1 Social facilitation and the time-extension hypothesis

There was previously one tested social facilitation model that was used to guide the current research (i.e., Feunekes et al., 1995). The models developed and presented here provide further understanding of how social influence may operate in an eating environment by testing and redeveloping the model of social facilitation presented by Feunekes et al. This extended the previous model by separating models for men and women, including different interpersonal relationships and accounting for a number of fast food specific factors.

Overall, there was little support for the model of social facilitation for fast food consumption in the FFS data. Contrary to expectations based on theories of social facilitation (J.M. de Castro, 1990; J.M. de Castro & E.S. de Castro, 1989), women's fast food consumption decreased in the presence of others. The effect of the presence of other diners was small for male participants, also indicating little support for the model of social facilitation in fast food consumption. In the observational study, there was some evidence that the presence of others increased intake (in all groups except for women eating in mixed company). Yet, the direct relationship between the number of people present and the amount eaten still failed to reach significance. Although the presence of others has been shown to increase meal size in many social facilitation studies, there was not strong evidence that the presence of others directly increased intake in the context of fast food consumption.

In the models developed, there was evidence that the presence of others could predict the time spent eating, which consequently predicted intake from fast food items, even in the presence of a direct, negative influence of the number of other people present on consumption by female consumers. Before the social influence models were constructed, it was unclear whether the time-extension hypothesis would be observable in fast food consumption behaviours because fast foods are designed to be eaten quickly. To the contrary, the results from modelling supported the utility of de Castro's (1990) time-extension hypothesis while also partially supporting the model presented by Feunekes et al. (1995).

Although this research has demonstrated time-extension in the context of fast food, it does not account for what aspects of social influence prolong the time spent eating. There was some indication that it is not purely duration which increases intake and that it may be something about the presence of other people that facilitates the relationship between the time spent eating and the amount eaten. Data from the observational study indicated that, although lone diners who were reading ate for longer than lone diners who were not reading, the time spent eating did not relate to the amount eaten by these consumers. Further research is needed to clarify what it is about the presence of other people at an eating occasion that could increase the time spent eating. Hetherington, Anderson, Norton and Newson (2006) assessed this in their laboratory study. They reported that when people ate in groups, 40% of the time spent eating was actually spent talking. de Castro (1994) also suggested that prolonged eating time may be explained by social interaction. Future research on the time-extension hypothesis could incorporate naturalistic observational methods which also record the amount of time eating versus doing other activities.

7.2.2 *Minimal eating norms and gender*

The results from the observational study suggested that women in mixed-sex company conformed to minimal eating norms (i.e., restricted their intake in order to appear more feminine) when eating in a fast food environment. Therefore, impression management (motivated by self-presentational concerns and/or gender identity) may be an important aspect of social influence in a fast food environment.

If self-presentation underlies impression management and minimal eating, gender may not be the only factor that can activate these concerns. For example, obese people may be motivated by self-presentational concerns to eat minimally in social situations with normal weight diners (de Luca & Spigelman, 1979). Furthermore, if self-presentation motivates minimal eating, there may be something unique about fast food consumption that activates these norms as fast food consumption can be accompanied by negative stereotypes (e.g., Dunn, Mohr, Wilson & Wittert, 2008). Furthermore, other authors have suggested that certain food qualities can be associated with gender (i.e., appearing feminine; Mooney & Lorenz, 1997). At this time, it is unclear exactly how the fast food context moderates the influences on amount consumed which have been identified in previous research in other food environments.

Aside from maintaining self-presentation, minimal eating may help women to define themselves as it reinforces their feminine identity. If this is the case, minimal eating may become internalised and extend beyond social eating occasions. The internalisation of this norm may result in restrictive eating styles. In this event, there may be an association between adherence to minimal eating norms and dietary disinhibition later in the day or even disordered eating and/or body image concerns. Although speculative

at this stage, if this association exists, it has important health implications and warrants future research.

It is essential to incorporate the gender of the focal participant and the other people present at the eating occasion in future social influence research. Women suffer higher rates of disordered eating and body image concerns than men (Pliner et al., 1990). Women also seem to be more interested in nutrition and health research than men; Australian Bureau of Statistics (2007) data shows that there are almost 3.5 times more women majoring in the health field than men¹⁰⁹. Despite the fact that there is a body of research focussing on gender differences in eating which is centred primarily on minimal eating norms, the way in which these could alter eating behaviours has been overlooked in some social influence research (e.g., de Castro 1990; Feunekes et al., 1995). Social influence researchers need to be aware that men and women may be affected differently (especially in the context of nutrition research) and account for these differences in study design.

Prior to the observational study, the FFS failed to account for the sex of the other people present at the fast food eating occasion recalled. Failing to record the sex of the company present at the recalled fast food eating occasion in the FFS meant that the potential effects of minimal eating norms could not be controlled for in this study. It is possible that the sample in the FFS contained a high proportion of women adhering to minimal eating norms (given the high percentage of women, this is certainly possible). If women eating in mixed-sex groups were overrepresented, this may have obscured the ability to

¹⁰⁹ This difference was also clear in the female-dominated samples obtained through the FFSs.

detect any social facilitation effects in the FFS sample. Without details of the gender of the other people present, there was no way of determining this.

Aside from evidence of minimal eating norms, there was an indication that there were different influences at a fast food eating occasion for men and women. For example, perceived atmosphere was an important predictor for the time spent eating in women but not men in the model of social influence developed for fast food consumption (from the FFS data). Differing physiology may explain differences in basic energy requirements between the sexes, but it does not explain why varying factors in a fast food environment influence men and women differently. Theories on gender roles and norms offer explanation as to why differences in the type and volume of food eaten exist between sexes. These theories do not specifically account for why different aspects of the eating environment could affect men and women differently. It may be the case that the two influences are related; the different gender roles that surround eating may also determine how one perceives their environment.

Finally, the current research has supported previous studies by showing that adherence to minimal eating norms can be witnessed using observational methods (e.g., Klesges, Bartsch, Norwood, Kautzman & Haugrud, 1984). In the current research, the use of observational methods, although not as controlled as methods used in experimental settings, allowed different social influences to be witnessed simultaneously (e.g., minimal eating and matching norms). In the future, diet diary data may also be used to assess evidence of minimal eating norms and in what circumstances they may be witnessed (e.g., when eating 'out', when eating with certain types of people or when eating certain types of food).

7.2.3 *Where do norms start and finish?*

Normative theory provides a useful perspective for applied research as it attempts to consider the influences of naturally occurring environments on behaviour. The extent to which one particular norm influences behaviour is often difficult to discern, with norms potentially acting both additively and interactively and varying in their influence according to variables like participant sex. Research reported here suggests that the differential influence of the various norms may be contextually determined; it is likely that minimal eating norms may drive consumption for some people (women eating in mixed-sex groups) while other norms are important in other circumstances. For example, matching the intake of the co-diner (i.e., the matching norm) was important for people eating in pairs regardless of the gender mix of the group in the observational study. At a macro level, cross-cultural comparisons of fast food intake reported here indicate that culture may also be an important normative influence on intake. Consumers at McDonald's in Oslo ate for different times than those observed in Adelaide. Furthermore, there was no relationship between the time spent eating and the amount eaten in the Norwegian sample, thereby casting doubt on the applicability of the time-extension hypothesis in this sample.

The interrelated nature of norms means that it is difficult to distinguish which will be dominant in any given situation. This may be the reason why other researchers have found interpreting their results difficult when assessing the influence of multiple norms on eating behaviour (Pliner et al., 2006). Some of the ambiguity associated with the interpretation of normative influences is evident at the theoretical level. The Boundary Model of Overeating (Herman & Polivy, 1984) suggests that eating and, more specifically, the 'appropriate' amount to eat, is surrounded by uncertainty and that

people look to the behaviour of others in the environment to define 'acceptable' behaviour (described as matching). In contrast, minimal eating research suggests that there are some aspects of eating where there are clear rules and stereotypes about how much food should be eaten (e.g., minimal eating norms), presumably regardless of the environment. Under these circumstances, behaviour may be circumscribed by more broadly and fundamentally defined norms, such as gender norms. Although eating behaviours may be uncertain, gender roles tend to be clear and are ingrained in many social interactions (Eagly, 1987).

7.2.4 The 'who' factor of social influence

de Castro (1994) reported that eating behaviours were different between meals with family and co-workers. Feunekes, de Graaf, Meyboom and van Staveren (1998) reported that social networks can influence intake differently depending upon their nature. Other researchers have also suggested that friends can increase the intake of different types of food (Clendenen et al., 1994). The current research has shown that the presence of different people (i.e., family, friends and a partner) can also have varying influences on the consumption of a single type of food (fast food). For example, the number of friends present when consuming fast food had little influence on consumption by males in the larger FFS. Thus, despite the fact that fast food consumption has its own rules and norms, within these the people present may still be important for defining the eating environment.

There are a number of other characteristics outside of interpersonal relationships that may help to account for the different influences that varying types of people create. For example, measuring the closeness of a relationship shared with a co-eater may provide

more information than a simple description of the other people present (i.e., partner). Verlegh and Candel (1999) suggested that primary reference groups, such as families, can strongly influence eating. But even within families, there may be factors such as dominance, closeness and the way that individuals interact with each other that moderate these influences. Investigating the influence of these variables may contribute to knowledge about how the type of people present at an eating occasion influences eating behaviours beyond fast food consumption.

Including the weight status of the other people present while eating may help to determine how who is present affects eating environments. In their experimental study, de Luca and Spigelman (1979) found that obese people ate more lollies when eating with an obese confederate. The current research has not focussed on weight status because there were limited numbers of people confident in their self-reported heights and weights in the FFS and little variation in the estimated weight status of participants recorded in the observational study. Nevertheless, weight status may prove an interesting comparison in the future.

New approaches to the analysis of social influences could help to explain how other people influence eating behaviour. This could include structural equation modelling, in which a theory that describes the relative circumstances under which various norms are differentially influential is tested. Another suitable approach for future research is lag sequential analysis, in which the behavioural events immediately preceding fast food ordering or consumption (e.g., arrival of a desirable partner), are coded and differential probabilities for a target behaviour (e.g., ordering a small meal) examined. This approach to observational data analysis “aims to detect the recurring sequential

patterns in a stream of coding categories describing social interaction. These techniques can be employed to study the repertoires of individuals and of dyads and groups” (Gottman & Roy, 1990: p.2). Finally, recent advances in social network analysis techniques (Butts, 2008), particularly when utilised longitudinally, provide the scope to test whether fast food consumption behaviours are at least partially socially determined.

7.2.5 Do social influences affect fast food consumption?

There was evidence in the current research that social influences on general eating behaviours (i.e. time-extension and minimal eating norms) could be observed in a fast food eating context despite the limited availability of food items and emphasis on speed of service and consumption. In other words, the regimented and well-controlled portion sizes provided in fast food restaurants did not prevent the effects of social influence being witnessed¹¹⁰. Therefore, social factors may have a pervasive influence on consumption amount across a variety of eating contexts.

The finding that fast food eating contexts may be subject to similar influences to other eating situations means that the knowledge gained from previous research on social influence is relevant to the understanding of fast food consumption. It also means that any insights into the way in which these influences can be used to positively affect behaviours might also be applicable in a fast food context. It will be challenging to design health promotion approaches that utilise social influence to improve dietary behaviours. Advising women to eat in mixed-sex groups may result in lower total fast food intake at a single eating occasion but may not change the amount males eat. Therefore,

¹¹⁰ Across many circumstances, the average energy amounts consumed from fast food items were fairly consistent, yet there was enough difference in the intake of women in mixed groups to indicate significant differences.

understanding the applicability of minimal eating norms to fast food consumption alone provides limited direction regarding intervention. Yet, overall, knowledge of norms may help guide intervention programs. Previous research has directly applied a general normative approach to modify health behaviours (Berkowitz, 2003, 2005). This has involved altering societal expectations or by 'correcting' normative misperceptions, and thus individual behaviour and has proven successful.

7.3 Unravelling fast food consumption

There were several results from the current findings that supported the suggestion that fast food consumption could result in weight gain and therefore is a behaviour potentially related to obesity. Nutrition profiling revealed that traditional big brand fast foods were high in fat. Data from the initial FFS further indicated that few people ordered low-fat options when they were available. Finally, there was some indication that Body Mass Index was related to frequency of fast food consumption in the FFS.

Although the FFS tended to attract participants that were not representative of the wider Australian population, recruitment targeted only people who have actually consumed fast food. It is difficult to determine how representative the FFS samples were relative to the population of Australian fast food consumers. There is some indication in previous studies that certain demographic characteristics are related to frequency of fast food consumption (e.g., high income and being younger; Mohr et al., 2007).

Therefore, the fact that the samples tended to represent people of high income (and from areas with low socioeconomic disadvantage) may be attributed to the fast food nature of the surveys and not purely sampling bias. Furthermore, behaviours reported by the initial FFS sample recruited at the fair and the larger sample recruited via the

Internet were largely consistent, providing good validity of the FFS. Therefore, some of the insight gained about fast food behaviours and social influences in the current research can be used to provide direction for consumer advice and the development of intervention programs that attempt to reduce the association between fast food consumption and weight gain.

7.3.1 The culture surrounding fast food consumption

There are aspects of big brand fast food that are culturally distinct. Fast food is often seen as an icon of Westernisation and globalisation (Park, 2004) and is regularly presented as a slice of North American culture (Brailsford, 2003).

Data from the FFS indicated that some of the cultural aspects of fast foods were motivators for consumption. Convenience was reported as a dominant driver of fast food consumption in both surveys. The drive for convenience in fast food consumers is also supported by the high frequency of takeaway orders, and is evident among those who purchased items while travelling between activities in the FFS. The recent changes in activity patterns, time-demands and in eating behaviours (e.g., the tendency to eat while doing other activities) may mean that much modern eating is motivated by convenience.

It is clear that current Western culture has elements that result in feelings of time scarcity and, if convenience is the primary driver of consumption, increasing time scarcity is likely to further increase demand for convenience foods, including fast food. As the model of food cognition suggests, limited time is also likely to change food choices as people have less time to make decisions that satisfy desires for taste, cost, health and

convenience (Scheibehenne, Miesler & Todd, 2007). Lifestyle may therefore be a big contributor to the increase in fast food consumption over recent decades.

The pervasiveness of time spent eating as a predictor of the amount eaten suggests that there may be a reverse mechanism in which lifestyle factors could decrease fast food intake. If consumers spent less time eating, they may consume less fast food thereby reducing the likelihood of overconsumption (and negative health outcomes in the long-term). Limited time and convenience increasingly attract consumers to fast foods, but if these consumers ate for less time, they might also consume less food. In this sense, time may have a paradoxical effect on fast food intake by attracting consumers to fast food while also dictating that they eat their food quickly.

There are few ways to offer people more time in their day-to-day lives and therefore change their food choices. Yet, the cultural shift towards convenient food consumption is being opposed by a small but vocal segment in the community; the slow food movement¹¹¹. The aim of proponents of slow food is to reintroduce food as an important, valuable aspect of our culture. This movement is relatively small compared to the fast food market and has obvious contrast to fast food culture. Nevertheless, it suggests that if consumers valued food and food preparation more, they would be less likely to allow time pressures to interfere with their food choices.

¹¹¹ See <http://slowfoodaustralia.com.au/>. The slow food movement in Australia is part of an international association and claims 2000 members as of June 2008 on its website.

7.3.2 *Fast food consumption behaviours and the potential for weight gain*

Some of the unique aspects of big brand fast foods are the foods offered and the way in which they are sold to consumers. These are aspects that could be targeted to make fast food consumption less unhealthy.

Following the nutrition profiling in Chapter Two, it was suggested that choices could be made to alter the potential effect of fast food consumption on energy balance.

Specifically, meals from some companies provided more total energy than others. When actual consumer behaviours were assessed, the average intake supported the results of the nutrition profiling¹¹². The 'typical' Hungry Jacks meal was the largest amongst the traditional fast food items based on the nutrition analysis. Subsequent data from the initial FFS indicated that people eating items from Hungry Jacks ate more than people eating at other chains (McDonald's or Domino's Pizza). The models of social influence from the larger FFS also indicated that eating from Hungry Jacks was a significant predictor of increased intake, even when controlling for a variety of other behaviours and individual demographics. Thus, independent of what behaviours are typically displayed by diners at an eating occasion within the restaurant, the actual choice of fast food establishment, by itself, is a significant predictor of intake. This was largely determined by the size and cooking methods of the food provided. These are issues that companies themselves may be able to address to reduce the association between fast food consumption and weight gain.

¹¹² Typical medium meals ranged from about 3200KJ (Domino's Pizza) to 5100KJ (Hungry Jack's). The mean energy consumed from each of the fast food chains ranged from 2184 (Domino's Pizza) to 4338KJ (Hungry Jack's) in the first FFS.

It is not the food alone that can increase intake but also the marketing within the purchasing environment. The nutritional profile of the traditional meal at KFC was similar to the one from McDonald's, yet having KFC positively predicted energy intake (relative to McDonald's) in the larger FFS. An assessment of the orders of people who ate at KFC showed that meals were constructed from more items than the traditional burger, fries and soda. It is likely that these meals acted to promote increased intake because consumers are attracted to the value of larger portions (Vermeer, Steenhuis & Seidell 2009).

Although there was limited ability to assess energy balancing (i.e., the extent to which people balance dietary energy consumed in one day across all meals and snacks) throughout the day in the FFS, the energy content of the meals suggested that, as a main meal replacement, fast food intake may not upset energy balance. This was supported by data indicating that roughly 90% of people classified their fast food eating occasion as a meal (breakfast, lunch or dinner). However, those who reported having snacks did *not* eat significantly less than those who ate fast food as a meal, and this may therefore impact on their energy equilibrium. It is those who eat fast food as a snack who are probably at greatest risk for weight gain.

Frequency of consumption trended toward significance in the prediction of the amount of fast food eaten at a single occasion in the initial FFS. This finding failed to be corroborated in the larger FFS sample. More needs to be understood about the consumption behaviours of people who frequently consume fast foods. Existing literature indicates that fast food consumption relates to other unhealthy lifestyle behaviours (Bowman, Gortmaker, Ebbeling, Pereira & Ludwig, 2004; French, Story,

Neumar-Sztainer, Fulkerson & Hannan, 2001; Jeffery, Baxter, McGuire & Linde, 2006).

Some authors suggest that eating energy dense food encourages the consumption of other energy dense foods (Prentice & Jebb, 2003).

Neither of the approaches to data collection and analysis used in this research allowed assessment of general dietary behaviours. To understand the effects that fast food intake has on energy balance, and in the longer term obesity, other lifestyle behaviours need to be assessed. Understanding the impact of fast food consumption on risk for obesity requires mapping potential compensatory behaviours. These include exercise participation and energy intake throughout the rest of the day, week or month.

Currently, there is limited data on the patterning of energy input and output and how the balance is affected by the consumption of a fast food meal.

The greater understanding of fast food behaviours that this dissertation provides can be used to guide the development of diet diary-style assessment of the impact of fast food intake in the future. These diaries may also be able to incorporate measurement of other obesogenic behaviours associated with fast food consumption (e.g., participation in sedentary behaviours such as video gaming and television watching). Gaining a clearer picture of how the patterns of behaviour relate to one another will provide a clearer focus for behaviours which warrant attention from those concerned with improving public health outcomes. Changing some behaviours in a negative pattern of health behaviours may facilitate change in other areas but only the implementation and assessment of future interventions can determine this.

7.3.3 Integrating knowledge of fast food behaviours and social influence for health promotion

Feelings of time scarcity may change food choices, but not the general influences on eating behaviour. If consumers are eating fast foods more often, if these foods are higher in fat, and if social factors can increase consumption, there is a strong likelihood that fast food could be associated with overconsumption of dietary energy and negative health outcomes. It is therefore important to consider how knowledge developed from the current studies can be used to reduce the potentially damaging impact of fast food consumption.

In accordance with the social norms approach, there are various messages that could be conveyed to the public to alter social norms (Berkowitz, 2005) and potentially reduce associations between fast food consumption and weight gain. These messages need to be carefully constructed. People have a tendency to reduce foods into the most basic categories; foods are essentially good or bad (Rozin, Ashmore, & Markwith, 1996). Furthermore, people inherently believe that high-fat foods are bad (Roefs & Jansen, 2002). Many health professionals share and promote this view when discussing fast food. There are numerous psychological theories that suggest that purely demonising or banning an item can increase its desirability. Reactance theory suggests that people will react to having their freedom taken away by seeking the very thing they have had taken away from them (Brehm, 1989; Rains & Turner, 2007). Social disinhibition experiments have shown that when restrained eaters eat something 'bad', they can lose their inhibition for the rest of the day, consuming more 'bad' foods than usual because they

have broken their diet (Herman, Polivy & Leone, 2006)¹¹³. Providing public health messages that simply tell consumers that fast foods are 'bad' and that they should not consume them is a narrow and potentially a counterproductive approach.

Combining a normative intervention approach with an understanding of fast food consumption behaviours provides a more promising direction for developing messages to alter social norms. Health messages could be designed to remind consumers that fast food meals represent a main meal and not an 'extra' food added to the daily list of food sins. Simultaneously, fast food consumers need to be reminded of some of the overconsumption norms surrounding fast food consumption. For example, the fact that an individual burger can represent an entire meal's intake, even though it is not sold individually as a 'meal'. Finally, messages could also be communicated to educate consumers that some big brand fast foods are more likely to increase energy intake than others.

7.4 Conclusion

This dissertation has explored multiple forms of social influence on fast food consumption. The current studies contribute to the growing body of literature regarding the social influences on eating behaviour by showing that minimal eating norms, time-extension and, to some extent, matching norms, can be associated with fast food consumption. These results have been observed in studies utilising novel approaches to data collection that require further refinement. Ultimately, this dissertation represents the first comprehensive step toward a better understanding of fast food consumption

¹¹³ Research recently published contests the theory of dietary disinhibition (see Tomiyama, Moskovich, Byrne Haltom, Ju and Mann, 2009).

and its social and environmental influences. A more thorough understanding of fast food consumption and its associated behaviours can be used to develop public health messages and even interventions that aim to reduce any weight gain associated with the intake of fast food.

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Appendix 2: Nutritional information following Fast Food Survey

You ate ___ KJ in the fast food item/s you ate.
Energy
Most of the foods we eat and drink provide us with energy (otherwise referred to as kilojoules [KJ] or calories [cal] 1 calorie=4.2kilojoules). The kilojoules in foods and drinks are supplied through protein, carbohydrates (including sugar), alcohol and fat. Throughout the day we use these kilojoules in all of the activities we do (even when we are sleeping). When we eat more kilojoules than we use, we put weight on and vice versa.
The amount of kilojoules needed varies depending on things such as your size, age, height, sex, activity levels and whether or not you are pregnant. The Australian Guide to Healthy Eating (1998) provides some rough guidelines for how many kilojoules you may need. These guidelines are provided below. It is important to remember that these values are generalised and if you have further questions regarding your personal energy requirements you should contact a health professional.
You may also want to visit the following website www.healthactive.gov.au
<u>Women aged 19-60</u>
7200-11300KJ per day*
<u>Men aged 19-60</u>
9000-13700KJ per day*
*The lower energy values are applicable to older and smaller adults with low activity levels while the higher values are based on larger, younger adults with a light physical activity level.

You ate ___g of protein in fast food item/s
Protein
Protein is provided in foods such as meat, fish, dairy products and legumes. For each gram of protein we eat, we get 17KJ of energy. Protein is an important nutrient to the human body and is involved with things such as muscle development and general body repair. There are many diets that recommend different amounts of protein are needed in the diet. However, a way in which you can work out a rough estimate of the minimum amount of protein you need is by taking you body weight (in kilograms) and multiplying it by .75. Again, your protein needs will vary on a number of factors including how active you are. But this calculation can be used as a rough guide for the amount of protein you should eat.

You ate ___g of fat and ___g of saturated fat in the fast food item/s

Fat

Every gram of fat contains just over twice the kilojoules of protein. For each gram of fat eaten, we get about 37KJ of energy. This is why fat is referred to as energy dense. There are many different types of fat including saturated, polyunsaturated, monounsaturated and trans fats. There has been a debate surrounding the effect that these different fats have on the body. Research has suggested that eating a high amount of saturated and trans fats increases cholesterol levels in the blood and the risk heart disease in some people. The Australian Guide to Healthy Eating suggests that no more than 30% of the total amount of kilojoules you eat should come from fat. It also suggests that no more than a third (33.3%) of the total fat you eat should be saturated fat. So, if for example, you ate 9000KJ of energy, then the maximum amount of fat you should eat per day is around 73g which means that there should be no more than 24g of saturated fat.

You ate ___g of carbohydrate from the fast food item/s.

Carbohydrates

Carbohydrates (also referred to as carbs) are the main source of kilojoules in our diet. There are lots of sources of carbohydrate including sugar, rice, pasta, fruit, milk and grainy foods. All carbohydrates provide 17KJ of energy for each gram eaten. Different sources of carbohydrates release this energy into the body at different speeds. Simple carbohydrates (such as sugar) release the energy quickly while less refined carbohydrates (such as pasta) take longer to release this energy. The more slowly that energy is released to the body, the better our body can use it. As with protein, there are a variety of diets with different recommendations for the amount of carbohydrate you should eat. The amount of activity you do will again vary the amount you need. It is recommended by the Australian Guide to Health Eating that 52-57% of the energy you eat should be provided by less refined carbohydrates. If we use the example of a person who is not very active and eats 9000KJ of energy per day, then we could estimate that they would need about 275g of carbohydrate a day. Choosing carbohydrates as wholegrain breads and cereal, milk and fruit are the best options.

Sugar

Refined sugars are added to a lot of foods and drinks we buy including non-diet soft drinks, ice cream, chocolates and fruit drinks. There are also foods that naturally contain sugar including honey, fruits and milk. Diets high in sugar from drinks can result in weight gain because refined sugars do not satisfy hunger despite the kilojoules they provide.

You ate ___mg of sodium in the fast food item/s

Sodium

The most obvious source of sodium in our diet is table salt, but we actually get more sodium from processed foods such as bread and processed meat which are likely to be high in sodium. Unlike protein, fat and carbohydrates, sodium does not provide any kilojoules to the body. It is a micronutrient that helps the cells and nerves of our body function and is needed in the diet for this purpose. However, only a small amount of sodium is required by our bodies. The Australian Guide to Healthy Eating suggests that between 900 and 2300mg of sodium is required daily. To achieve this it is necessary not only to avoid adding salt to food but to keep many salty processed foods to a minimum. A single standard teaspoon of table salt contains 2000mg of sodium. Too much sodium can increase blood pressure which is a risk factor for stroke.

Appendix 3: Fast Food Survey Questions + Information Sheet

Please take a moment to recall the last time that you ate an item from: **McDonalds, Hungry Jacks, KFC, Red Rooster** or **Domino's Pizza**. In the first section of the survey you will be asked to select the item/s you ate from one of these locations on **the most recent time** you ate fast food. If you ate from any of these fast food restaurants on more than one occasion throughout the day you are recalling, please refer to only the most recent of these when answering the following questions.

Once you have selected the appropriate fast food restaurant, each screen has navigation buttons and access to the help menu. The tutorial takes only a few minutes and it is recommended that you do this before answering.

Following is the second section of the survey. It will ask you questions that aim to gain a further understanding of your fast food purchase behaviour the last time you had fast food. Record your responses to the questions by selecting from the available options or entering text where indicated.

Q1. How did you purchase the items you consumed the last time you ate fast food?
[take away][drive-thru][dine in]

Q2. Where did you eat the food?
[in the fast food restaurant][in the car][at home][other - describe]

Q3. Briefly describe what were you doing before you decided to get fast food?
[enter text]

Q4. Approximately how long did you spend eating on this last occasion?
[0-999mins]

Q5. Please use the scale below to indicate how sociable the atmosphere was when you ate this fast food.
[1 = unsociable → 7 = sociable]

Q6. Please use the scale below to indicate how pleasant the atmosphere was when you ate this fast food.
[1 = unpleasant → 7 = pleasant]

Q7. Please indicate how many of the people below were with you when you ate this food.
[Parents] [0-99]
[Siblings] [0-99]
[Children] [0-99]
[Other relative] [0-99]
[Partner] [0-99]
[Friends] [0-99]
[Colleagues] [0-99]
[Members of a structured social group (sporting, religious etc.)] [0-99]
[Other, please specify ____] [0-99]

Q8. On this occasion, did you purchase a 'meal deal' (multiple items packaged together for a single price)?

[Yes] [No]

Q9. What day was it when you ate these items?

[Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday]

Q10. On average, how much did you enjoy the all of the items you ate?

[1 = not at all → 7 = extremely]

Q11. Briefly describe why you ate fast food on this occasion?

[enter text]

Q12. Which meal occasion below best describes your fast food consumption this day?

[breakfast]

[lunch]

[dinner]

[in between meals snack]

Q13. Use the scale below to show whether you think you ate a bigger, smaller or typical-sized [insert Q11. response] this day.

[1 = much smaller, 4 = typical, 7 = much bigger]

Q14. Which part of the day did you eat these items?

[5-11.59 morning]

[12-1.59 midday]

[2-4.59 afternoon]

[5-8.29 evening]

[8.30-11.59 night]

[12-4.59 late night]

Q15. Use the scale below to show whether you think the total of all the meals and in between meal snacks you ate throughout the day when you last ate fast was more, less or the same than is typical for you in a day.

[1= much less, 4= typical , 7= much more]

Q16. Indicate below if your eating pattern was different from usual on this day by describing it below? If it was typical leave blank or write "typical"

e.g., I skipped breakfast or I had 2 lunches

[insert text]

Q17. How aware were you of those people around you when you were eating?

[1 = not aware → 7 = very aware]

Q18. How much fast food do you think those people around you ate?

[1 = not much → 7 = a lot]

Q19. How aware of the amount *you* ate do you think those people around you were?

[1 = not aware → 7 = very aware]

Q20. How concerned were you about what those people around you thought about you?
[1 = not concerned → 7 = very concerned]

The upcoming third section of the survey contains questions surrounding your perceptions of some food items and questions about some general fast food behaviours.

Please read the instructions supplied with each question and indicate your answers using the options supplied.

Q21. How big do you think the following items are in terms of the amount of food you get?

[All rated 1 = not enough food → 7 = too much food]

Q21.1 Ham & lettuce sandwich with mayonnaise

Q21.2 T-bone steak with tomato sauce and broccoli, carrots & potato

Q21.3 Big Mac

Q21.4 Medium Big Mac meal deal (Big Mac, medium fries & medium [non-diet] cola)

Q21.5 Big Mac with medium fries

Q21.6 Chicken salad with no dressing

Q21.7 4 Slices of ham & pineapple pizza

Q21.8 Quarter of roasted chicken (wing) with chips

Q22. Approximately how often do you eat fast food?

[0-99][day/fortnight/month or year]

Q23. Do you usually order the same items?

[1 = not at all true of me → 7 = very true of me]

Q24. How appealing is the concept of upsizing to you?

NB Upsizing refers to increasing the size of a meal deal for a small price.

[1 = not at all appealing → 7 = very appealing]

Most items we eat or drink contain energy otherwise referred to as kilojoules (KJ). This energy is supplied predominantly through carbohydrates (including sugar), proteins and fats.

For the following food items please indicate how many kilojoules (or energy) you think each contains by clicking on the bar below its description.

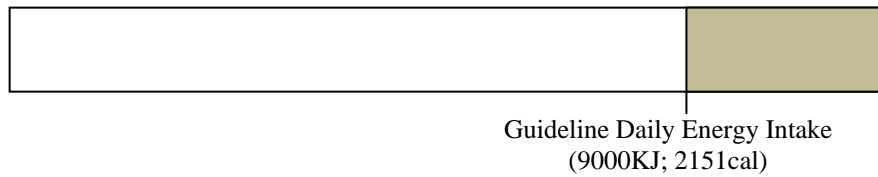
The amount of kilojoules needed throughout a whole day has been set at 9000KJ (2152 calories) in this case. Many people have suggested that an “average-sized” meal consists of approximately a third of daily kilojoule requirements.

Q24.1 Ham & lettuce sandwich with mayonnaise

Q24.2 T-bone steak with tomato sauce and broccoli, carrots & potato

Q24.3 Big Mac

- Q24.4 Medium Big Mac meal deal (Big Mac, medium fries & medium [non-diet] cola)
- Q24.5 Big Mac with medium fries
- Q24.6 Chicken salad with no dressing
- Q24.7 4 Slices of ham & pineapple pizza
- Q24.8 Quarter chicken (wing) with chips



[All perception of portion size questions are rated using the above. Users can put indication of size on bar it is programmed with 2.5% increments]

The fourth and final section of the survey asks you to provide some demographic information. The information you provide is confidential and will not directly identify you in any way.

Q25. Sex
[male/female]

Q26. Age
[16-100] years old

Q27. Estimated Height
[centimetres]

Q27.1 How confident are you that your estimated height is correct?
[1=not at all confident → 4=very confident]

Q28. Estimated Weight
[kilograms]

Q28.1 How confident are you that your estimated weight is correct?
[1=not at all confident → 4=very confident]

Q29. Postcode
[numbers]

Q30. Highest level of education obtained
[Below Secondary][Secondary][Trade/Apprenticeship][Certificate/Diploma][Bachelor degree or higher]

Q31. Gross annual household income
[20,000 and less][20,001-40,000][40,001-60,000][more than 60,000]

Q32. Are you of Aboriginal or Torres Strait Island origin?
[yes][no]

Q33. Country of birth
[Australia][UK or Ireland][Other]

Q34. Martial Status
[Married or living with partner][Separated/Divorced][Widowed][Never Married]

Q35. Work Status
[Full-time employed][Part-time/Casual employed][Unemployed]
[Home duties/Retired][Student][Other]

Q36. Pensioner Status
[Receive a pension from social security][Do not receive a pension][Don't Know]

Q37. Number of people in your immediate family, excluding yourself
[0-99]

Unravelling fast food consumption in everyday living

HUMAN ETHICS COMMITTEE APPROVAL NUMBER: 06-96

INTRODUCTION

Fast food consumption is increasing dramatically in Australia and internationally. The tendency for people to generally consume foods away from home has grown dramatically in the last 20 years. Part of the increase in the amount of these foods eaten is accounted for by the expanding number of fast food outlets. Although many people acknowledge the importance of fast food in eating patterns, little is actually known about fast food eating behaviours. Even less is known about these behaviours in the Australian community.

This study is being conducted as part of a PhD being undertaken at the University of Adelaide and CSIRO Human Nutrition. None of the fast food companies included in this study are associated with the study, development of the program used in the study, or CSIRO. Care has been taken to indicate trade marks where appropriate. To view the relevant trade mark information you can click ® icons in the first section of the survey. The program has been developed solely by the primary researcher of the study. All graphics and programming are copyrighted to the primary researcher.

WHAT IS THE AIM OF THIS STUDY?

To obtain data surrounding behaviours and perceptions relevant to fast food consumption.

WHAT IS INVOLVED?

- Completion of an interactive online survey that will take less than 10 minutes of your time
- You will need to recall the most recent time you ate McDonald's, Hungry Jack's, Red Rooster, Domino's or KFC
- You will also be asked to answer questions surrounding your general fast food purchasing and consumption behaviour

WHO CAN TAKE PART?

Any person who:

- Is at least 16 years of age,
- Has consumed fast food purchased from:
 1. McDonald's, Hungry Jack's, Red Rooster, Domino's or KFC
 2. In Australia
 3. Within the last 12 months
 4. Can accurately recall the details (location, people present, time eating etc.) of their last visit to one of these fast food restaurants

WHAT ARE THE BENEFITS OF PARTICIPATING IN THE STUDY?

You will get feedback from the program regarding the nutritional content of the items you ate. This will be included with more details surrounding the guidelines for ideal consumption. You will also get your unique Fast Food Profile. This is designed purely for fun and is loosely based on data from the previous fast food survey. Here you can read which of the five fast food consumer profiles you match the most.

ARE THERE ANY RISKS INVOLVED?

There are no anticipated negative effects for those individuals wishing to complete this survey. However, if you do have any concerns regarding this study, you are welcome to contact the researcher to discuss them (see, *If You Have Any Further Questions*).

HOW WILL MY PRIVACY BE PROTECTED?

This survey is designed to maintain your anonymity and confidentiality. There will be questions regarding demographic information (e.g., sex, age). These details will not directly identify you. The data collected from the survey will only be used for the purposes of the study as required by the *NHMRC National Statement on Ethical Conduct in Research Involving Humans*.

WHAT IF I WISH TO WITHDRAW?

Participating in this study is completely voluntary. At any time you wish, you may withdraw from the study (without prejudice). Exiting the survey can be done simply by closing your web browser or clicking on the exit button in the bottom left of the screen.

IF YOU WOULD LIKE TO TAKE PART

Follow the icon at the bottom of the page which will take you directly to the survey. Please note that clicking this link indicates to the researcher that you have agreed to take part and have read the information provided to you on this sheet.

This will take to a Flash Program. If you do not have a Flash Player on your computer, you can download it by clicking the Flash icon. This software is free and will help you viewing other Flash websites in the future.

The survey will take a minute to download if you have a broadband connection, but longer if you are using dial-up. While you are in the survey, you should not push back on your web-browser, because this will take you back to the very beginning of the program and your data will be lost. There are back and continue buttons in the survey screen which you should click if you need to go back.

Push the red submit button when you have finished with the program and this will shut your window and submit your data. But only hit submit when you have read your profile and viewed the nutritional information if this is what you wish to do.

IF YOU HAVE FURTHER QUESTIONS

Contact information:

Primary Researcher/PhD Candidate

Ms Emily Brindal

Phone: 8305 0633

Email: [Emily](#)

Supervisor

Dr Carlene Wilson

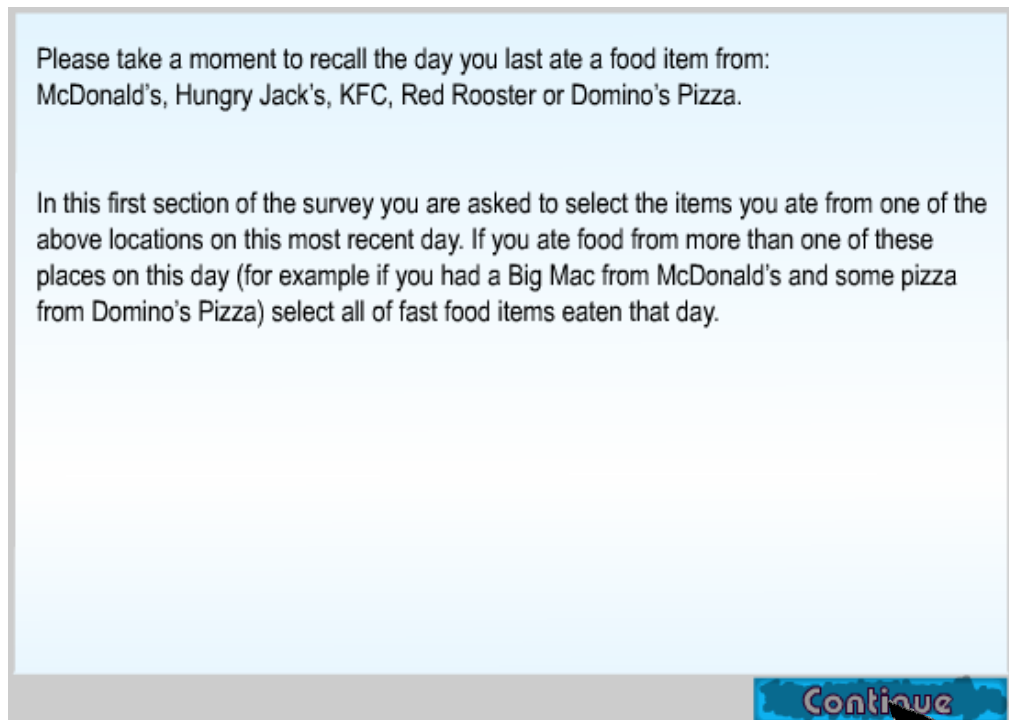
Email: [Carlene](#)

This study has been approved by the University of Adelaide School of Psychology Human Research Ethics Subcommittee.

If you would like to speak with someone with respect to ethical matters please contact Paul Delfabbro on 83034936, or [email](#) him.

Appendix 4: Example screenshots of Fast Food Survey (FFS)

Screen 1 (below): Introduction (appears after information sheet and download)



Screens 2-3: Instructions about how to use the program Screen 4 (below): Nomination of brand/s of fast food consumed.



Menu screens: After selecting fast food brand, participants were directed to the relevant menu. They could navigate these to select different items. The following three screens show selection of McChicken, medium fries and a Diet Coke.





Screen 5 (below): Participants check and can adjust amounts of item/s selected



Screen 6 (below): Participants detail any adjustments to orders


Additional comments on order

If you have any information that you need to add to your order, enter it below. This could include variations in portion size ("I had half of a Big Mac"), promotional products not listed in the menus ("Ate 1 Whopper with mushroom sauce"). Once you have finished, click "**Proceed, my order is accurate**" this will take you to the remainder of the survey. You can leave these boxes blank if it doesn't apply to you.

Adjustments to listed portion sizes

Items not found in menus provided

Other

 Help **Proceed, my order is accurate**

Screens 7 to 13: Questionnaire items (see Screen 7 below)

How did you purchase the items you consumed the last time you ate fast food?

Where did you eat the food?

Briefly describe what were you doing before you decided to get fast food?

Approximately how long did you spend eating on this last occasion?
 minutes

Please use the scale below to indicate how *sociable* the atmosphere was when you ate this fast food
unsociable 1 2 3 4 5 6 7 sociable

Please use the scale below to indicate how *pleasant* the atmosphere was when you ate this fast food.
unpleasant 1 2 3 4 5 6 7 pleasant

progress **Continue**

Nutrition Info

Energy (KJ)	3016
Protein	23
Total Fat	37.6
Saturated Fat	6.1
Carbohydrates	68.2
Sugar	3.7
Sodium	888

[Continue](#)

Screens 14 to 22: Nutritional feedback. Includes nutritional content of items eaten (see Screen 14 above) and further information about macronutrients and sodium (see Screen 18 below).

You ate **37.6** g of fat in the fast food item/s and **6.1** g of saturated fat

Fat

Every gram of fat contains just over twice the kilojoules of protein. For each gram of fat eaten, we get about 37KJ of energy. This is why fat is referred to as energy dense. There are many different types of fat including saturated, polyunsaturated, monounsaturated and trans fats. There has been a debate surrounding the effect that these different fats have on the body. Research has suggested that eating a high amount of saturated and trans fats increases cholesterol levels in the blood and the risk heart disease in some people. The Australian Guide to Healthy Eating suggests that no more than 30% of the total amount of kilojoules you eat should come from fat. It also suggests that no more than a third (33.3%) of the total fat you eat should be saturated fat.

So, if for example, you ate 9000KJ of energy, then the maximum amount of fat you should eat per day is around 73g which means that there should be no more than 24g of saturated fat.

[Back](#) [Continue](#)

Instructions:

Please fill out the following form by entering your answers into the Word document and sending it back to me via email emily.brindal@csiro.au by next Tuesday evening (the 22nd of August). Or you can print this out, fill it in, attention it to Emily Brindal and fax it back to me on 8303 8899.

1. How often do you use internet? Describe the primary reason for your internet use.
Daily. For work mainly research and email.
2. Follow the link to the home page www.fastfoodstudy.com.au Read the info sheet and continue with the survey. If you notice any typos in the info sheet or something is unclear, please write comments below:
No obvious errors/problems.
3. Now could you please write down the time it takes you to download the program:
Under 1 minute.
4. Once the program is downloaded, enter the password "pilot" and press continue. Read the instructions at the beginning of the program. Was there anything that did not make sense or any typos? Please comment below:
Was ok.
5. Use the program to select a quarter (wing) with chips and a 390mL Coke from Red Rooster, 3 slices of Aussie Bob on Puffection crust from Domino's and a chocolate sundae from McDonald's. Use the help menu if you need to. Did you have any difficulties doing this? Did you use the help? Comment below:
None at all, I love that the icons are so easy to identify and use. No use of help menu.
6. Continue to the rest of the survey and answer the remaining questions. Answer these questions however you wish. If there is a question that doesn't make sense, comment below.
All ok.
7. You can choose to enter the competition or not (you will not actually be entered into the competition). Now click "Submit" or "Submit & view nutritional information". Please indicate which you clicked and any problems that occurred below:
Went to competition and nutritional info. There was one typo in the end information section under Protein where there was a reference to "you" instead of "your" other than that, nothing outstanding.
8. How long do you think the whole survey will take to complete?
5-10 minutes.

I did follow the steps with another version, and found that the overall usability was outstanding, very easy to understand and kept me interested. Overall well done.

Summary: Piloting of the internet-based Fast Food Survey

The eight people who responded to the pilot varied in familiarity with web-based technology. Four people were highly familiar with web-based technologies and indicated that they worked in occupations where the internet was used daily. Two participants were retired and indicated that they used their computers a few times a week, primarily to check email. The other two participants used computers regularly for non-work based activities.

Users had access to a variety of internet connections ranging from high-speed broadband to regular dialup. Those with broadband (6 users) all reported a download¹¹⁴ time of approximately one minute. Downloading the program using dialup took considerably longer with reported times ranging from 10 to 12 minutes. The time to complete the survey, following download, ranged from 8 minutes to 20 minutes. Participants who took longer to finish the survey tested all aspects of the survey including viewing the nutrition information and entering the competition.

The responses from the pilot testing were also used to test the 'back end' of the online database. All responses were successfully and accurately saved to the database by the program using the *.php* linking file. This type of file is a server-side scripting language that executes code on a server allowing dynamic storage, manipulation or retrieval of data. The responses recorded in the database indicated that participants were 100% accurate at choosing and adjusting the items requested by following the instructions. None referred to the help screen or the tutorial. No issues with functionality were reported.

¹¹⁴ As the program was programmed in Flash, rather than downloading each page to be viewed individually, the entire survey is downloaded initially. This means that the initial download time is slower but that the program works faster during responding.

General positive comments were sent regarding the design of the buttons and tempo of the survey. One participant suggested minor changes in spacing and formatting for clarity. The only other comments that were given pertained to the identification of typographical mistakes.

Appendix 6: Request for participation in Fast Food Survey to NWAHS members



Dear North West Adelaide Health Study Participant

Can you please help us? If you have eaten fast food from McDonalds, Hungry Jacks, Red Rooster, Domino's or KFC within Australia in the last 12 months and can reasonably recall the details of your last visit to one of these fast food restaurants, we would very much appreciate assistance with an online survey to help us understand perceptions and behaviours surrounding fast food consumption. The study involves answering some fairly simple questions surrounding aspects of the last time you ate fast food from one of these restaurants, your general fast food purchasing behaviour and your perceptions of some food items.

It should only take approximately 15 minutes to complete and will give you some interesting information about the particular fast food you nominated.

By completing the survey, you can choose to go into a draw for a *FREE* double movie pass. If you would like to take part in this survey please go to the following link www.fastfoodstudy.com.au and follow the instructions. If you have any questions, please do not hesitate to call the researcher, Emily Brindal on (tel) 8305 0633 or Janet Grant, North West Adelaide Health Study Co-ordinator on (tel) 8226 6054.

Thank you for your ongoing participation in the North West Adelaide Health Study. Your contribution is very much appreciated.

The North West Adelaide Health Study Team

Appendix 7: Summary of Exploration of Portion Size Items

The results presented below were presented as part of a symposium at the 2009 Annual Meeting of the International Society for Behavioural Nutrition and Physical Activity, June 20, Lisbon, Portugal. Symposium title- Portion Size Guidance for Healthy Eating - Intervention Issues, chaired by Professor Annie Anderson.

Perceptions of portion size of fast food items

Numerous studies have demonstrated that larger portion sizes result in increased energy intake (Diliberti, Bordi, Conklin, Roe, & Rolls, 2004; Ledikwe, Ello-Martin, & Rolls, 2005; Jeffery et al., 2007; Rolls, Roe, Kral, Meengs, & Wall, 2004; Wansink, Painter, & North, 2005; Wansink & Park, 2001) which may over time lead to weight gain and obesity. Portion size is therefore considered to be an important contributor to overeating and obesity (Herman, Roth, & Polivy, 2003). The “value for money” that large portions offer remains appealing for some consumers despite potential health outcomes (Vermeer, Steenhuis, & Seidell, 2009).

There are few published studies trialling portion size interventions and these have generally been unsuccessful (Steenhuis & Vermeer, 2009). One of the limiting factors in these studies is the paucity of information relating to consumers’ perceptions and understanding of portion sizes. Portion size information has many components. In order to use portion size to control intake, consumers need to be aware of the volume of foods they are eating and how ‘large’ these servings are relative to their daily intake. The cognitive processes to achieve this require that an individual is readily able to locate appropriate nutritional information, understands their daily energy requirements, and can integrate this information into a coherent approach to managing intake for the remainder of the day. Previous research suggests that most people find are unable to accomplish the processes listed above, irrespective of level of education (Schapira,

Kumar, Lyman, & Mcmillan, 1990). Nutrition students have been shown to have poor accuracy in choosing 'medium' serving sizes according to recommendations (Young & Nestle, 1998), and in another study approximately, 75% of doctors and nurses were unable to estimate the energy content of food dishes to the closest 250kcal (Ashley, Davidson, Wilkins, & Thompson, 2004). Interestingly, 'dieters' appear to be more accurate in calorie estimation tasks (Carels, Konrad, & Harper, 2007), whereas obese people are more likely to underestimate their food intake (Rasmussen, Matthiessen, Biloft-Jensen, & Tetens, 2007; Rennie, Coward, & Jebb, 2007; Waling & Larsson, 2009).

Meal characteristics such as size and 'healthiness' may be better determinants of consumers' accuracy at kilojoule estimation (Wansink & Chandon, 2006a, 2006b). It has been shown that study participants assigned calorie content with greater accuracy to small meals (Wansink & Chandon, 2006b) and for individual food items (Chandon & Wansink, 2007) as compared to large meals.

While studies have investigated the ability of consumers in the USA to estimate the calorie content of fast food items (Chandon & Wansink, 2007; Wansink & Chandon, 2006b), it is unclear whether this is apparent elsewhere, and the ability of consumers to interpret meals relative to daily intake remains unknown.

The aims of this study were: (a) to determine whether fast food consumers could accurately estimate and interpret the KJ information for fast food items, (b) to explore how fast food items are perceived relative to 'standard' foods and (c) to test a novel energy estimation format.

Method

Perception of portion size was measured as part of the larger Fast Food Survey (FFS). The FFS asked participants to recall the items consumed at their previous visit to McDonalds, Hungry Jacks (aka Burger King), KFC, Red Rooster or Domino's Pizza. This recall was followed by 38 questions about the context of consumption, fast food behaviours (including frequency of consumption) and participant demographics. This survey recruited two cohorts of fast food consumers who completed a computer-assisted survey regarding the behaviour surrounding their most recent consumption of a fast food item.

Study Population

Two independent samples completed the FFS. The first sample consisted of people attending the annual Royal Adelaide Show (RAS sample; $n=116$). These people were asked to complete the survey at a computer station while engaging in an interactive display for a national scientific organisation. The second sample was recruited exclusively through the internet (internet sample; $n=419$). In this case, recruitment methods included promoting the web address of the survey widely through the community (using mass media, word-of-mouth and snowball emailing).

In addition to the FFS respondents, a small sample of dieticians was asked to complete the KJ estimation task and provide feedback on the difficulty of the tasks (for themselves and for the general population). These items were rated using a single-item 6-point scale where, 1 = impossible, 2 = very difficult, 3 = difficult, 4 = reasonable, 5 = easy, 6 = very easy. This was done in order to obtain a benchmark for how difficult the task was for an expert sample as well as their accuracy at completing the items.

Portion size measures within the FFS

Subjective ratings of amount of food: The initial set of portion size questions asked participants to subjectively rate of the amount of food in the eight items: six fast food items and two 'standard' meals (described below). Subjective ratings of amount of food were used to assess whether consumers thought the food items described provided enough food. The food items were rated using a scale with scores ranging from 1 (not enough food) to 7 (too much food).

Kilojoule (KJ) estimation: The second set of portion size questions asked participants to estimate the KJ content of each of the items relative to a daily intake. In this task, a visual scale representing a 9000KJ recommended daily intake was used. Participants could indicate a KJ amount at any point on the bar. The bar could be dragged at increments of 225KJ (2.5% of the daily intake). Thus the minimum value that could be indicated was 225KJ and the next was 450JK and so on. Faint lines indicate 25% intervals of the daily intake. Participants were told before the task that a regular meal could be conceived of as roughly a third of daily intake. The response bar extended 20% beyond the daily intake (indicated by a line across the bar). A screenshot of the items can be seen in Figure 1.

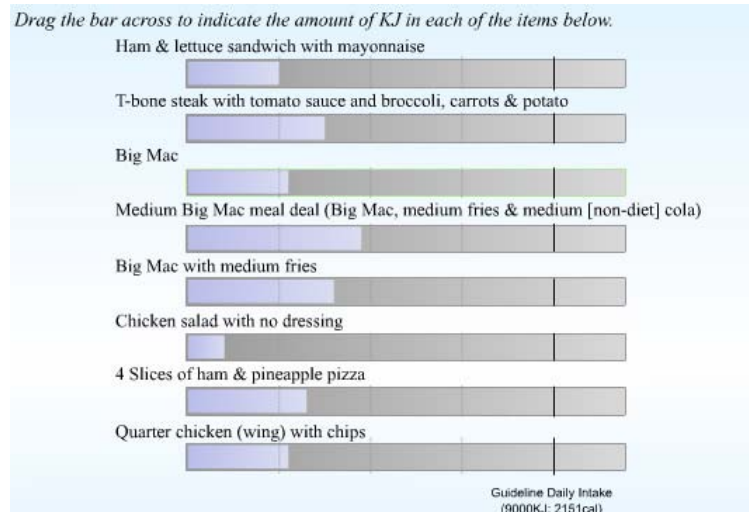


Figure 1: Screen shot of completed estimation of KJ items

The fast food items rated in each set of portion size items represented ‘typical’ burger, chicken, and pizza fast food meals. McDonalds’ Big Mac was used to represent burger options. The reason for this was McDonalds’ pre-eminent market status and the iconic nature of the Big Mac. The burger was listed alone and in a medium-sized “value meal” (with medium fries and a medium non-diet drink). A quarter chicken with chips was chosen for the chicken meal. Four slices of pizza (half a large) was used to describe a pizza meal because this was an equivalent weight to the other meals. Ham and pizza (Hawaiian) topping was chosen because it is available across a range of different brands (www.calorieking.com). As the chicken and pizza items were listed without a drink, a variation of the Big Mac meal without a drink was also included in the portion size measures. Finally, a “healthy” meal available from fast food restaurants was also nominated – a chicken salad. The description of the salad specified that it contained no dressing to maintain the healthiness of this item.

The descriptions of the two standard meals used common Australian food items so they would be easily recognisable for the participants. Each meal was designed to represent both a large and a light meal. To represent the large meal, a t-bone steak meal including tomato sauce, broccoli, carrots and potato was constructed. The light meal consisted of a ham and lettuce sandwich with mayonnaise.

Kilojoule (KJ) information

The actual KJ content of food items was gathered from company websites in mid-2006. The nutritional KJ content for the chicken salad and burger items was obtained from McDonalds' website. The Red Rooster and Domino's Pizza websites were used for the chicken and chips and pizza respectively. These brands were used to represent KJ content as they are among the most popular quick-service restaurants in Australia (see, Brindal, Mohr, Wilson, & Wittert, 2008). Kilojoule information for the standard meals was calculated in FoodWorks¹¹⁵ using 'standard' serving sizes.

Once the actual KJ information for the items had collected from the relevant sources, there were three resulting versions of KJ information: the FFS samples' estimations, the expert sample estimations and the actual KJ content of the items. For the ratings of the amount of food, there were only the ratings from the FFS samples.

¹¹⁵ FoodWorks is the trademark name of a computer program that breaks down the nutritional content of various food items.

Results

Samples

After the portion size measures were screened for outliers and missing responses, there were a total of 395 participants in the internet sample and 104 in the RAS sample. The demographics of each sample are described in Table 1.

Table 1: Frequency of demographics for the Royal Adelaide Show (RAS; n=104) and internet samples (Net; n=395).

Variable	%RAS	%Net	Variable	%RAS	%Net
<i>Martial status</i>			<i>Employment status</i>		
Married/living with partner	47.1	50.1	Full-time	39.4	57.2
Never married	49.0	44.1	Student	26.9	21.0
Other	3.8	5.8	Part-time/casual	22.1	13.7
<i>Household income</i>			Home duties/retired	7.7	4.7
20 000 and below	14.4	7.8	Unemployed	3.8	1.8
20 001 to 40 000	17.3	9.9	<i>Frequency of patronage*</i>		
40 001 to 60 000	23.1	26.6	<1/half	-	4.6
60 000 and above	45.2	55.7	1/half - <1/month	16.3	16.7
<i>Highest level of education</i>			1/month	14.4	21.5
Bachelor	36.5	57.7	1/fortnight - <1/week	25.0	23.0
Trade/certificate	24.0	22.5	1/week	21.2	19.0
Secondary School	34.6	18.7	≤twice a week	17.3	9.4
Below Secondary School	4.8	1.0	> twice a week	5.8	5.8
<i>Australian born</i>	83.7	79.7			

*Only fast food consumers participated in the survey

The final samples were predominantly female with 67.1% of the internet sample and 61.5% of the RAS sample being female. The mean ages of the samples were 31.51 ($SD = 11.73$) and 29.96 ($SD = 12.11$) for the internet and RAS sample respectively. The

internet sample had more participants possessing a Bachelor's Degree, $\chi^2(3,496)=23.01, p<.001$, more people in the highest income bracket, $\chi^2(3,496)=9.93, p<.05$, and more fulltime employed people, $\chi^2(4,495)=11.81, p<.05$, than the RAS sample.

Nine registered and/or practicing dietitians completed the survey. All the dietitians found the task reasonable to very easy in difficulty. Two dietitians described the KJ estimation task as of "reasonable difficulty" for potential participants; the remaining respondents believed the task to be difficult to very difficult for the general population.

Demographic differences in portion size ratings

There were no systematic differences in the ratings of the amount of food in, or KJ estimation of, the food items between the RAS and internet samples. Therefore results from these items were combined for both cohorts these data were used to represent responses from a lay sample ($n=499$).

There were no significant relationships between age, level of education or self-reported BMI¹¹⁶ and any of the portion size items. Sex differences were observed in the ratings of the amount of food in all food items ($p\leq.001$). The KJ estimations for males and females for the three Big Mac items and the pizza were also significantly different according to independent samples t-tests ($p<.05$ for the Big Mac; $p<.01$ for the Big Mac and fries and the pizza; $p<.001$ for the Big Mac meal). In light of these differences, analyses were performed separated for males and females in the lay samples.

¹¹⁶Only people who reported 'confidence' in the self-reported height and weights were used in these correlations ($n=414$).

Subjective ratings of amount of food

Manipulation check. To assess whether participants perceived the ham sandwich to be a light meal relative to the t-bone meal, a paired samples t-test was performed. The mean rating of the amount of food in the sandwich was below the midpoint while the t-bone meal was ranked above the midpoint. The difference between these items was significant in both males, $t(169) = -14.63, p < .001$, and females, $t(328) = -24.74, p < .001$.

Results: The means and standard deviations from males and females in the lay sample for the subjective ratings of the amount of each food item can be seen in Table 2.

Table 2: Means and standard deviations for ratings of amount of food in the fast food and standard food items for males and females.

<i>Items</i>	Actual	Males*		Females**	
	<i>grams</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Ham sandwich	147	3.13	0.90	3.59	1.18
Big Mac	201	3.21	1.38	3.97	1.50
Big Mac, medium fries	299	3.98	1.29	4.84	1.39
Medium Big Mac Meal	299	4.46	1.35	5.29	1.50
Chicken salad	300	3.25	0.95	3.58	1.23
4 slices Hawaiian pizza	316	4.18	1.49	5.02	1.40
Quarter chicken & chips	441	4.30	1.16	5.02	1.31
T-bone meal	447	4.82	1.07	5.29	1.16

* $n=170$; ** $n=329$

Overall, males rated the food items as subjectively less food than the females. The ranking of amount of food for each item corresponded to the actual size of the items. On average, the t-bone meal was rated as the largest amount of food and the ham sandwich was rated as the smallest by males. In females, the t-bone meal and Big Mac meal were rated equal largest and the ham sandwich and chicken salad were rated as the smallest items.

As items were added to the Big Mac (first the medium fries then the drink), ratings of the amount of food increased. A paired-samples t-test revealed that the difference between the Big Mac alone and the Big Mac with fries was significant in both sexes, $t(169) = -9.92, p < .001$ (males); $t(328) = -17.23, p < .001$ (females). The rating for the Big Mac with fries *and* drink was higher again when compared to the Big Mac and fries, $t(169) = -7.39, p < .001$ (males); $t(169) = -10.96, p < .001$ (females).

Conclusion: Most consumers thought that the fast food items described provided an adequate volume of food although this differed slightly by sex. As the fast food item contained more items, ratings of the amount of food provided increased; even when only a drink was added to the burger and fries. This indicated that consumers did perceive differences in the amount of food provided and adjusted their ratings appropriately.

Can consumers accurately estimate kilojoules in fast food items?

The mean KJ estimations for the dietician and lay samples along with the actual estimation of KJ from the fast food companies and FoodWorks are described in Table 3. The percentage of the 9000KJ daily intake that these estimations represent is presented in Figure 2.

Table 3: Kilojoules (KJ) of food items (“Actual”) with estimations from dieticians, males and females in the lay samples.

	Actual	Dieticians	Males	Females
	<i>KJ</i> ¹	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>
Chicken salad	972	1102(471)	3229(1896)	2912(1604)
Ham sandwich	1179	1252(493)	3630(1854)	3565(1857)
Big Mac	2010	2304(387)	5701(2553)	6211(2544)
T-bone meal	2157	2404(676)	5136(2003)	4976(1858)
4 slices Hawaiian pizza	2928	3731(1009)	6353(2167)	7069(2277)
Big Mac, medium fries	3270	3531(374)	6507(2347)	7133(2266)
Quarter chicken & chips	3741	3205(907)	6217(2238)	6586(2228)
Medium Big Mac meal	3866	4282(465)	7309(2432)	8174(2299)

¹As estimated via FoodWorks; *All values were significantly different between the lay samples (both males and females) and the dieticians at the $p < .001$ level.

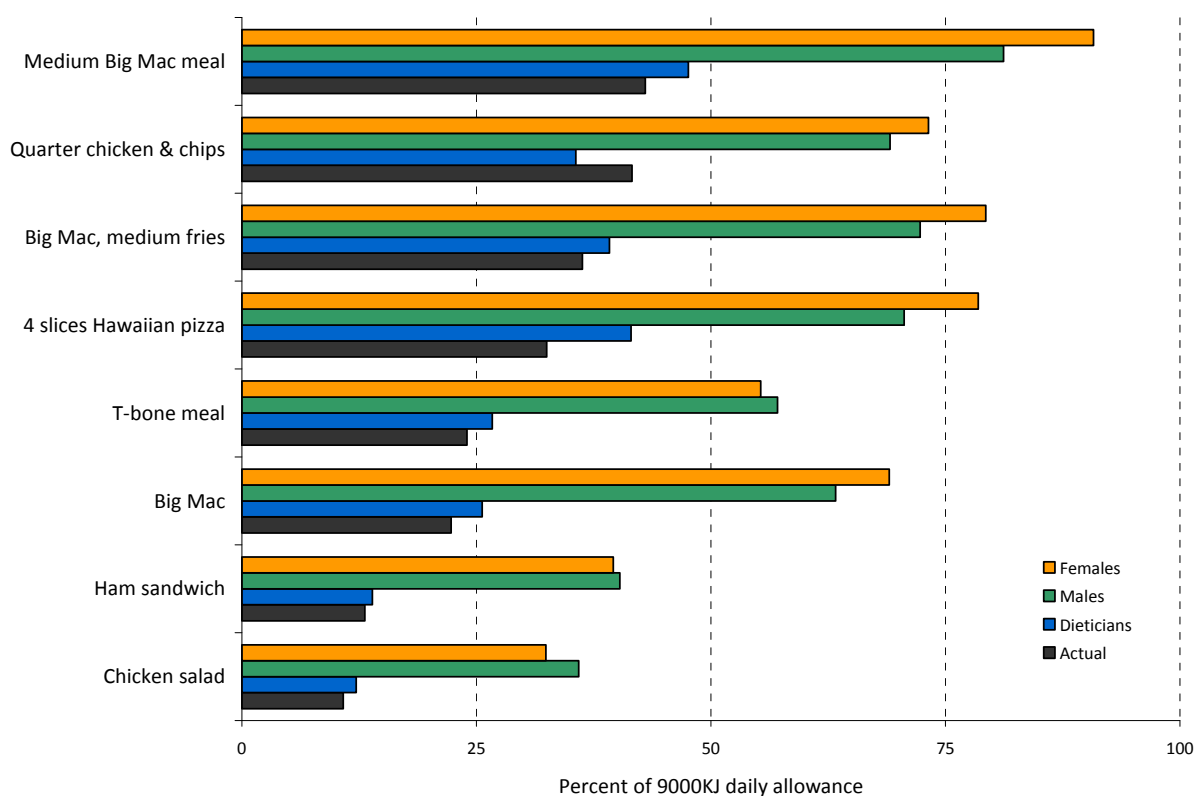


Figure 2 Percentage of the 9000KJ daily intake accounted for by food items including estimations from the dietician sample and males and females in the lay samples.

The estimations that the dieticians gave corresponded closely to the actual daily amounts that the meals accounted for. On average, males and females in the lay samples

estimated large KJ values for all the food items (both fast food and standard items). All participants estimated that the Big Mac meal accounted for a high portion of the daily intake, with females and males indicating that the meal accounted for over 90% and 80% of the daily intake respectively.

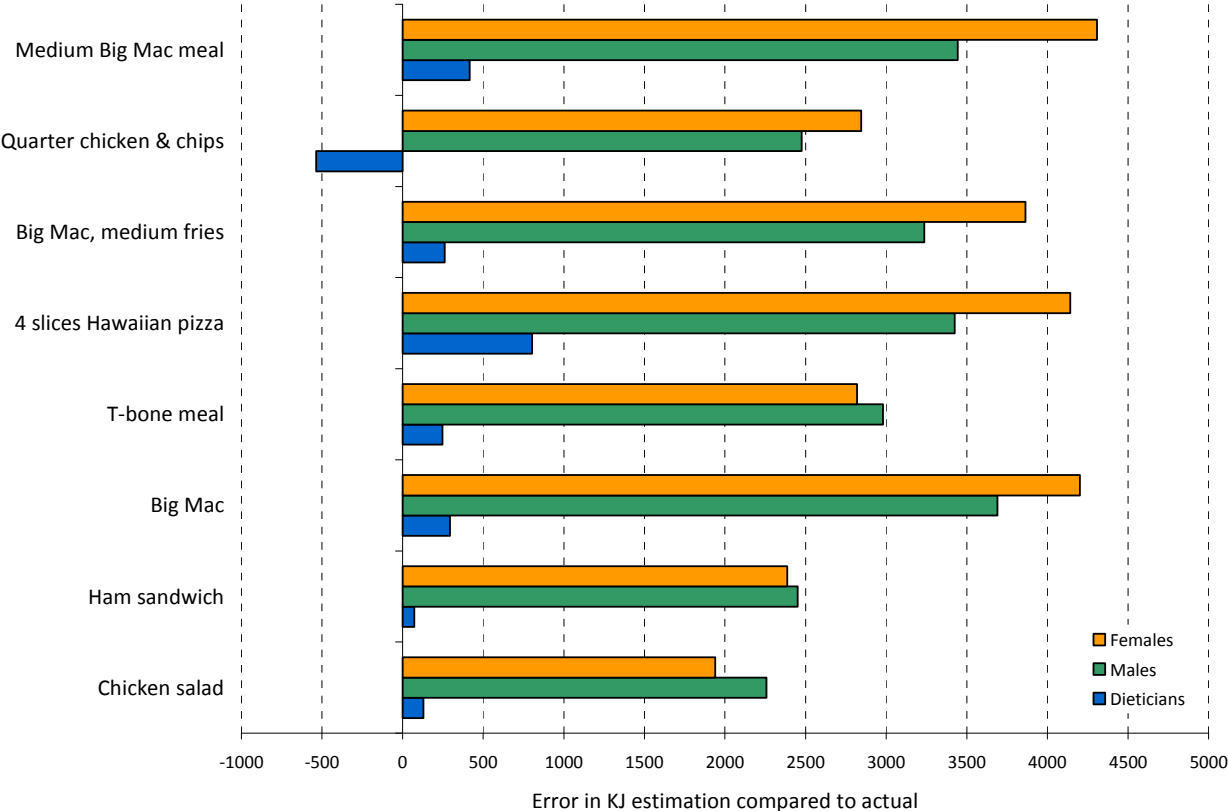


Figure3: Error in KJ estimation for all food items by dieticians, and males and females in the lay samples.

The percentage of error estimation from the actual KJ amounts is depicted in Figure 3. The difference in the overall errors between the lay and dietician samples was highly significant for all items ($p < .001$). In all samples overestimations were more common than underestimations. The only item that was more frequently underestimated than overestimated by the dietician sample was the quarter of a chicken and chips.

How are fast food items perceived relative to standard food items?

A ratio for each of the fast food items relative to the large meal was created by dividing the participants' KJ estimation of the item by their estimation of the 'standard items'. Thus ratios corresponded to the ham sandwich (light meal) or the steak meal (large meal). Resulting ratios above 0 but below 1 represent a KJ estimation smaller than that for the standard item while values above 1 represent a KJ estimation greater than that of the standard item. A final ratio of 1 indicates that the estimations for the fast food item and standard meals were identical. The advantage of the ratio is that it controls for each individual's error in estimation. The resulting average ratios for the lay samples can be seen in Table 4.

Table 4: Average ratios for estimations of food items relative to a large meal ("Steak Meal") and a light meal ("Ham Sandwich").

	Steak Meal			Ham Sandwich		
		Males	Females		Males	Females
	<i>Actual</i>	<i>M(SD)</i>	<i>M(SD)</i>	<i>Actual</i>	<i>M(SD)</i>	<i>M(SD)</i>
Big Mac	0.93	1.23(0.72)	1.35(0.72)	1.70	1.75(0.78)	2.03(1.16)
Medium Big Mac Meal	1.79	1.63(0.86)	1.82(0.82)	3.28	2.10(0.95)	2.43(1.47)
Big Mac, medium fries	1.52	1.44(0.79)	1.58(0.75)	2.77	2.42(1.16)	2.83(1.64)
4 slices Hawaiian pizza	1.36	1.39(0.70)	1.56(0.72)	2.48	2.09(0.98)	2.41(1.25)
Quarter chicken & chips	1.73	1.35(0.72)	1.44(0.68)	3.17	2.02(0.94)	2.21(1.14)
Chicken salad	0.45	0.65(0.33)	0.60(0.30)	0.82	0.94(0.41)	0.90(0.45)

With the exception of the healthy fast food item (the chicken salad), all of the fast food items were rated more closely to the large meal than to the light meal by both males and females. It is noteworthy that when comparing fast food to a steak meal that the ratios for the estimations were reasonably close to the actual ratios.

Discussion

Many of the dieticians who completed the portion size items indicated that they thought that the task would be difficult for untrained consumers. The large inaccuracies in energy estimation by the lay samples confirmed that they did have difficulty with the task. Errors in estimation indicated that the overestimation in of energy in the food items was not limited to the fast food items. When a ratio of the estimations of fast food items relative to the standard food items was created (thus controlling for general error in estimation), the estimations appeared to be much more accurate. In other words, it appeared as though consumers could rate the fast food items' energy content relative to standard meal items but overall, their ability to estimate energy content was poor.

In the past, close to 70% of consumers have indicated that they would like nutrition labels that are easier to understand (Kristal, Levy, Patterson, Li, & White, 1998). Non-numerical styles of presentation, such as the traffic light system in the UK, are designed to improve the useability of nutritional information by simplifying details and providing a daily context for interpreting the information. While debate remains as to what the most effective format for presenting nutritional information is (Bussell, 2005), the need to change from the current numerically based system is clear. Providing a daily energy allowance did not appear to be advantageous in the portion size task used here.

Although the average rating of the Big Mac meal was almost an entire day's intake, the same group of consumers rated the amount of food in the meal as slightly more than 'enough food'. This further suggests that consumers had difficulty with the task.

Difficulty was the KJ estimation task may be the result of a lack of understanding of dietary energy.

Nutrition education may improve consumers' understanding of KJ information and therefore help them use this information to guide their understanding of portion size. Calorie counting is a skill that can be taught (Martin et al., 2007). Translating this skill into behaviour change presents a further challenge. For example, 44 to 57% people report that they would not be likely to use nutrition information if it was available in restaurants (Krukowski, Harvey-Berino, Kolodinsky, Narsana, & DeSisto, 2006). Furthermore, it may take considerable effort and resource to educate consumers until they are sufficient in energy estimation. New innovations for improving consumers' portion size estimations are being developed (Ayala, 2006; Godwin, Chambers, Cleveland, & Ingwersen, 2006; Hernandez et al., 2006; Riley, Beasley, Sowell, & Behar, 2007). Nevertheless, Hernandez et al. report that "precision in portion size estimation is not yet a realistic expectation" (p.S22).

The public need guidance about how to eat fast foods in a way that restricts any damage to their future health. A more efficient way of communicating this information may be by translating the KJ content of fast food items relative to 'standard' food items; by informing people that a Big Mac is close to a steak meal in the dietary energy it provides, for example. Presenting information in this way may 'play on the strengths' that consumers possess – they have relatively good perception of the size of items relative to other items.

The current sample was limited in its representativeness. It consisted solely of fast food consumers who may possess varying skills in interpreting nutrition information than non-fast food consumers. Godwin et al. (2006) reported that half the people who reported eating high calorie foods did not engage with nutrition information.

Nevertheless, previous studies have looked at fast food consumers' estimations of fast food items (Chandon & Wansink, 2007; Wansink & Chandon, 2006b). There were also technical limits to the task that may be alterable to make the task more user-friendly in the future. An example that gives feedback about accuracy could precede the actual items. In the current format, the minimum amount of KJ that people could enter was approximately a quarter the KJs of the smallest item whereas the estimation bar extended to an amount of KJ three times the largest item listed. This may have created a floor effect with few people estimating lower KJ amounts. Having a response bar that is displayed larger and has smaller increments may be also be useful for participants.

This study has provided unique data on the way in which Australian consumers perceive portion size. Further data on how consumers view portion size is needed if interventions involving portion size will be successful in the future. Given the potential implication of portion size in the obesity epidemic, better understanding the best way to advise consumers about portion size will be important for future research

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Appendix 8: Data collection instrument for the observational study

Below is an example of form completed in PDA for the observational study

Case	1	2	3	4	5	6
Location	Adel, H	Adel, H	Adel, H	Adel, H	Adel, H	Adel, H
Day (M/TU/W/T/F)	T	T	T	T	T	T
Time Seated (24h)	1727	1729	1732	1739	1755	1802
Burgers						
Hamburger						
Cheeseburger		Double		1		1
Quarter Pounder						
McOz						
Big Mac			1			
Lean Beef Burger						
McChicken	Deluxe					
Double Quarter Pounder						
Fillet-o-fish						
Type unknown or specify					Name It	
Fries						
Small		1			1	
Medium	1		1			1
Large				1		
Drinks						
small unsure		1			1	
med unsure	1		1	1		1
large unsure				1		
bottled juice						
coffee						
Others						
3 McNuggets						
6 McNuggets						
10 McNuggets						
Pasta Zoo Happy Meal						
Type unknown						
Salads						
Garden						
Crispy cut						
Herb fusion						
Type unknown						
Deli-Choice Roll						
Desserts						
Soft-serve cone						
chocolate sundae						
strawberry sundae						
caramel sundae						
flake						
muffin						
apple pie						
fresh apple						
cookies						
mcflurry						

Thickshake						
small unsure						
med unsure						
large unsure						
Sex (M/F)	m	m	m	m	m	f
Age						
15-25	1	1		1		1
26-35			1		1	
36-45						
46 and over						
Weight Status (n/ov/ob)	n	ov	n	n	n	n
Reading material (y/n)	n	n	n	y	n	y
Technology (y/n)	n	n	n	n	n	n
Leftovers (if any, detail)						
Group # for session			1	2		
Total others in group			1	1		
Details of first other						
Sex		m	f			
Age		20	25			
Weight Status (n/ov/ob)		n	n			
Details of second other						
Sex						
Age						
Weight Status (n/ov/ob)						
Details of third other						
Sex						
Age						
Weight Status (n/ov/ob)						
Details of fourth other						
Sex						
Age						
Weight Status (n/ov/ob)						
Time leave table	1742	1751	1746	1752	1803	1823

Below are photos of McDonalds' items for reference during observation



Black with plastic bowl
Crispy or herb fusion salads



Cube-shaped box with pics
Happy meal
Pasta Zoo or Cheeseburger



Roll wrapped with green end
Deli-choices roll (white)
Unspecified variety



Roll wrapped with brown end
Deli-choices roll (multi-grain)
Unspecified variety



Small burger wrapped in
paper with yellow logos
Cheeseburger



Small burger wrapped in
paper with purple logos
Hamburger



Fries in paper package
Small fries



Fries in cardboard package
Medium fries



Fries in cardboard package
Large fries



Cup with coloured images
Small drink



Cup with red bottom
Medium drink



Cup with red bottom
Large drink



Box with red
Big Mac



Box with dark brown
Quarter Pounder



Box with maroon/red
Double/Triple cheese burger
Double Quarter Pounder



Box with light blue/pictures
Lean beef burger



Box with light blue
Filet-O-Fish



Box with green
McFeast (formerly McOz)



Box with light brown/dark
mustard
Premium chicken burger



Box with orange
McChicken



Yellow Square Box
10 McNuggets



Box with mustardy
6 McNuggets

Below is the weight status indicator used to classify normal, overweight or obese consumers:

