Exploring the impact of point of purchase marketing promotions on healthy food ordering in a restaurant environment: An Australian case study

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Abstract

The Food Service Sector (FSS), a core component of the Tourism and Hospitality Industry, plays a pivotal yet under-examined role in shaping population dietary behaviours and public health outcomes. While the sector has been widely implicated in the proliferation of obesogenic food environments, prevailing literature has largely advanced a null hypothesis suggesting that restaurant-based marketing and advertising functions exert minimal influence on consumers' healthier food choices. This assumption has constrained both scholarly inquiry and policy development, leaving a critical gap in understanding whether hospitality practices can be repurposed as scalable public-health interventions.

Addressing this gap, the present study provides robust real-world evidence that integrated marketing communication (IMC) strategies can meaningfully and measurably shift consumer behaviour toward healthier choices in full-service restaurant settings. Drawing on Fogg's Behaviour Model as the primary theoretical lens, this longitudinal field experiment employed a post-test-only control group design within an operational restaurant in Melbourne, Australia. A sequential mixed-methods approach was used, comprising a dominant quantitative phase analysing weekly point-of-sale transaction data across multiple intervention stages, followed by a dominant qualitative phase involving in-depth consumer interviews.

The quantitative phase tested four progressively layered marketing and advertising interventions—semiotic menu design, evocative menu language, nutritional labelling and information disclosure, and point-of-sale poster advertising—using t-tests and chi-square analyses. Results demonstrate a statistically significant and cumulative increase in healthy meal selection across intervention stages, with healthy orders rising from 96% in the initial intervention to 629% when all IMC elements were implemented concurrently. These findings decisively reject the prevailing null hypothesis and confirm that even low-cost, non-intrusive environmental cues can trigger immediate behavioural change without reliance on staff persuasion or consumer deliberation.

The qualitative findings further illuminate the behavioural mechanisms underlying these effects, revealing how motivation, ability, and situational triggers interact at the point of choice.

Consumers reported reduced cognitive effort, increased confidence, and heightened salience of healthier options when IMC elements were aligned, reinforcing the explanatory power of real-time behavioural models over attitudinal or intention-based frameworks.

This research makes three original contributions. First, it delivers rare longitudinal, transaction-level evidence from a live restaurant environment, enhancing ecological validity and generalisability beyond laboratory and survey-based studies. Second, it reconceptualises restaurant marketing, which was previously a contributor to public-health harm, as a practical lever for prevention. Third, it offers actionable insights for policymakers and industry stakeholders, demonstrating that voluntary, design-based interventions can complement regulatory approaches to obesity prevention.

This study makes an original theoretical contribution to marketing by empirically demonstrating, using longitudinal, real-world transaction data, that integrated marketing communication functions operate as generalisable behavioural mechanisms that can trigger immediate and scalable consumer choice change at the point of decision. In doing so, it extends marketing theory beyond attitudinal persuasion toward situationally embedded, behaviour-first models of influence.

Overall, the study establishes the Food Service Sector as a critical intervention site for public health and positions IMC-driven environmental nudges as a scalable, generalisable, and commercially viable strategy for promoting healthier eating in restaurant contexts.

Declaration

I, Boris Kolar, declare that the PhD thesis entitled "*Exploring the impact of point of purchase marketing promotions on healthy food ordering in a restaurant environment: An Australian case study*" is no more than 80,000 counted words in length, including quotes and exclusive of tables, figures, appendices, bibliography, references, and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.

I have conducted my research in alignment with the Australian Code for the Responsible Conduct of Research and Victoria University's Higher Degree by Research Policy and Procedures.

All research procedures reported in this thesis were approved by the Victoria University Research Ethics Committee *HRE22-170*

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List of Abbreviations

AIWH - Australian Institute of Health and Welfare

ARCA - Australian Restaurant & Cafe Association Ltd

CDC - Centre for Disease Control

EDNP - Energy-dense, Nutrient-poor

IMHE - Health Metrics and Evaluation

FSS - Food Service Sector

WHO - World Health Organisation

WEF - World Economic Forum

ABS - Australian Bureau of Statistics

SCD - Single Case-study Design SCD

Chapter 1. Introduction

1.0 Introduction

Since the beginning of the 20th century, urbanisation and industrialisation have induced a global shift in economic development from a predominant agrarian economy to the new 'experience economy' (Pine & Gilmore, 2011). This shift has also introduced lifestyle changes in the global population as they adapt to the new ways of working in the modern, industrialised economy. Industrialisation led to changes in food production, supply chain, and dining environments, which have impacted consumption patterns, consumers' choices, and their perceptions about nutrition, influencing new lifestyles (Hall, 2018; Pine & Gilmore, 1998). Consequently, eating out of the home has become a lifestyle choice and a social and cultural activity integral to everyday life in many countries, such as Australia (National Library of Medicine, 2017). This change has led to the development of a robust Hospitality industry and Food Service Sector worldwide. (Бакало & Маховка, 2024). At the same time, the hospitality industry, particularly the food service sector (FSS), has played a key role in further shaping food consumption patterns and eating habits.

However, whilst eating out of home has had distinct economic advantages for the governments (Бакало & Маховка, 2024), lifestyle studies have uncovered an association between the food service sector, dietary intake and overweight/obesity (Patel et al., 2018; Wu, Wang, Zhu, Gao, & Wang, 2021). Furthermore, numerous studies highlight FSS's utilisation of marketing and advertising functions, as well as targeted interventions, to influence food consumption patterns and promote detrimental lifestyles negatively.

Several studies suggest that people who eat out of the home more often are at increased risk of weight gain and obesity, leading to public health problems (Bezerra, Curioni, & Sichieri, 2012; Senauer, 2003). Studies have uncovered unhealthy eating habits, poor dietary patterns, and the consumption of energy-dense foods as some of the key factors contributing to the obesity pandemic (Hall, 2018; Patel et al., 2018; Senauer, 2003; Weinsier, Hunter, Heini, Goran, & Sell, 1998).

The World Economic Forum reported that the number of obese people worldwide rose from 105 million in 1975 to 641 million in 2014 to nearly a billion in 2022, indicating a steep rise in the global obesity problem (Hallett, 2016; World Health Organisation, 2024). According to a Lancet report, "more than half of adults and a third of children and adolescents predicted to have overweight or obesity by 2050", highlighting a public health crisis in the making that calls for urgent preventive measures (Ng et al., 2025). Public policy studies indicate that there is an urgent need to address unhealthy dietary patterns at the population level. They have noted the need to 'transform diets within sustainable global food systems and to support comprehensive strategies that improve people's nutrition' and foster healthy dining environments (Gorski & Roberto, 2015; Health Metrics and Evaluation (IHME), 2025).

The Centre for Disease Control (CDC) describes public health as "*the science of protecting and improving the health of people and their communities" and stresses "promoting lifestyles" as a critical approach for achieving public health* (CDC, 2025, p. 4). The Victorian government introduced in 2018 a kilojoule labelling scheme that applies to large chain food businesses and supermarkets to help promote healthier lifestyles through informed choices (Department of Health, 2018). In this regard, limited studies have examined the use of menu labelling as a potential strategy to combat the obesity epidemic in the FSS.

Studies explore marketing and advertising strategies, as well as targeted interventions, used to nudge consumer behaviours and purchase patterns toward healthier diet and lifestyle choices. However, the effectiveness of such strategies and interventions on both consumer behaviours and organisational sales remains unclear due to an acute dearth of longitudinal empirical studies with larger sample sizes conducted in real-world retail environments. This absence creates a critical gap in public health policy literature.

The present study addresses this critical gap by investigating the application of traditional marketing and advertising functions as interventions in a real-time case study in FSS of Australia. The case study method was chosen as it enables a detailed, context-specific examination of how marketing and advertising functions shape consumer food choices in a real restaurant setting. Unlike broader multi-site studies, which often face challenges such as incomplete data, heterogeneity in sales registers, or reliance on manual entry (Ayala et al., 2017; Goffe et al., 2019; Lee-Kwan et al., 2015), this single-site approach allows for consistent data collection and controlled intervention testing. By implementing strategies within the natural environment of Zeppo Restaurant, a very busy venue since it opened for trading, and collecting extensive data, the study ensures ecological validity while generating practical insights into the Food Service Sector's role in addressing overweight and obesity. This single-site field experiment examines the shift in consumer choice, its impact on sales, and the factors influencing these choices when healthy diet plans based on the Victorian Kilojoule Labelling Scheme (VKLS) are introduced among larger communities. In doing so, this research locates hospitality's FSS studies in public health policy literature. The following sections start by locating the study and discussing the development of this thesis.

1.1. Background and Rationale

Tourism and Hospitality are one of the fastest-growing industrial sectors of the world and have played a vital role in the establishment of the globalised economy (Smith, 1998). The Food Service Sector (FSS) is a part of the Tourism and Hospitality industry, which has been a key driver of the global tourism and hospitality industry's expansion in Australia (Statista, 2024). The Food Service Sector encompasses 'businesses, institutions, and companies responsible for any meal prepared outside the home' and includes restaurants, cafes, catering services, and delivery-based platforms.

According to market research agencies, the global food service market was valued at USD 3 trillion in 2024 and is expected to grow at a CAGR of 3.4% from 2025 to 2030. The global food service market is projected to reach USD 3.67 trillion by 2030 (Virtue Market Research, 2025) and $5.19 trillion by 2031 (SkyQuest, 2024). The growth of the FSS depends on how often and how many meals cooked outside of their home environments the global population consumes.

Paradoxically, alongside the growth in food consumption in the FSS sector, there has also been an increase in the deterioration of global population health. Studies correlate the growth of the food service sector with an alarming rise in obesity problems worldwide. Studies emphasise the role of FSS marketing and advertising in promoting unhealthy diets and lifestyles. In response to growing obesity numbers, public health policies have highlighted the urgency to respond to the overweight and obesity problem through healthier lifestyles and dietary planning. However, despite decades of attention to preventive measures, this public health issue has seen an alarming rise and is predicted to affect one-third of the global population by 2050.

As such, the Australian Prevention Partnership Centre, funded by the Australian Government Department of Health and Aged Care, has stressed the importance of 'Engaging the food service sector to encourage healthier eating' (The Australian Prevention Partnership Centre, 2017). In this regard, the prevention potential of FSS marketing and advertising in mitigating obesity risks by fostering healthier dining environments, influencing healthier lifestyles, diets and eating habits is less explored. It creates a critical gap in existing literature. Furthermore, studies examining this phenomenon in the Australian context are rare. Furthermore, while substantial research on why people eat and what they order in the public domain has been done, very little is known about how people respond to various stimuli related to marketing and advertising functions at the point-of-sales promotion, how they alter their ordering behaviour in a restaurant setting and how their responses impact sales (Epter, 2009; Fraikue, 2016). This single-site field experiment addresses the critical gap in FSS and Public Health Policy literature. This empirical study examines the role of the FSSs in contributing to public health by investigating the potential of marketing and advertising functions to instigate consumer behavioural changes towards healthier food choices in a real-time Full-Service fine dining restaurant in Melbourne, Australia, as there is currently no empirical evidence of similar research in the Australian hospitality sector. The study employed a single-case study of a full-service restaurant to facilitate a once-off intervention, allowing for the observation of consumer choices in response to marketing and advertising interventions over extended periods of time. This single-site field experiment study addresses the critical need to examine the role of the Food Service Sector (FSS) in advancing public health by investigating whether marketing and advertising functions can shift consumer behaviour towards healthier food choices in a real-time, full-service restaurant setting in Melbourne, Australia. The rationale for this study stems from the absence of empirical evidence in the Australian hospitality sector, despite the growing recognition of restaurants as vital intervention points for obesity prevention and diet-related

health improvement (Glanz & Hoelscher, 2004; Wellard-Cole, Davies & Allman-Farinelli, 2022). Prior research in international contexts has highlighted several methodological challenges that undermine the quality and generalisability of findings. For instance, multi-site interventions have often reported incomplete or inconsistent sales data, heterogeneity in point-of-sale registers, and labour-intensive manual entry processes that compromise data accuracy (Ayala et al., 2017; Goffe et al., 2019; Lee-Kwan et al., 2015). These limitations demonstrate the need for more controlled and longitudinal approaches.

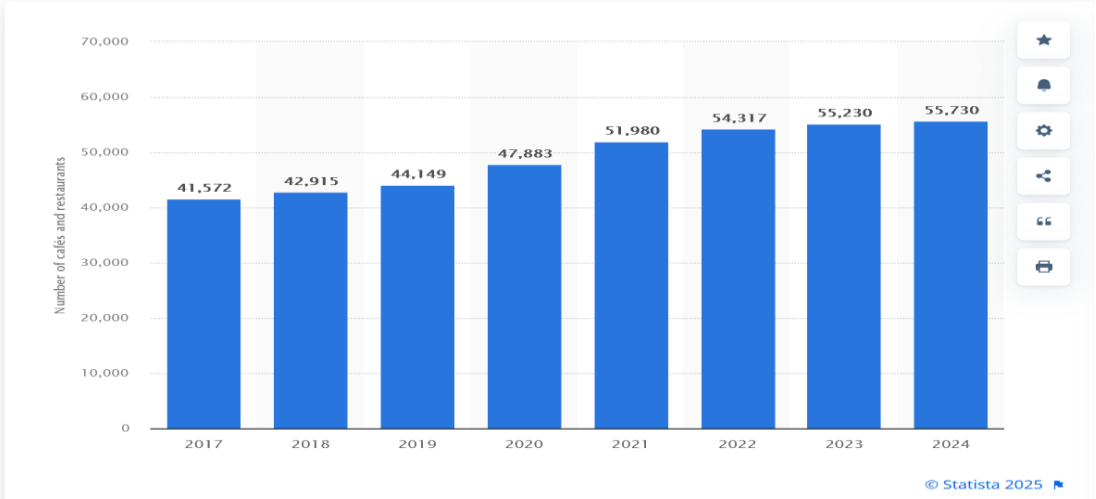
To address these gaps, this study employed a single-case design of a full-service fine dining restaurant, allowing for consistent, high-quality data collection and systematic testing of sequential interventions over extended periods of time. A once-off data collection for each intervention was particularly critical, as it enabled the observation of both immediate and sustained shifts in consumer decision-making, thereby providing more substantial evidence of behavioural change than short-term or simulated experiments (Burton, Howlett & Tangari, 2009; Roberto et al., 2010). By situating this research in the naturalistic environment of a working restaurant, the study enhances ecological validity and responds directly to calls for applied, context-specific research that links food service operations with public health outcomes (Ayala et al., 2007; Wansink & Van Ittersum, 2013). Ultimately, this design not only overcomes many of the operational and methodological barriers faced by earlier studies but also generates evidence of practical value for policymakers, hospitality operators, and public health practitioners in Australia.

1.2 Growth of the restaurant sector in Australia

The first hotel became operational during the colonial times. According to the records of the National Library of Australia, the first restaurant in Australia was attached to the Freemasons' Arms, the first licensed hotel in New South Wales, and opened in 1796 in Parramatta (The Sydney Gazette and New South Wales Advertiser, 2016). Since then, Australia's Food Service Sector has been steadily expanding and evolving into new types of commercial and non-commercial businesses such as restaurants, cafes, Catering and Banquets, Retail Food Operations, stadiums, airlines, and Cruise Ships (ServSafe Benefits, 2022).

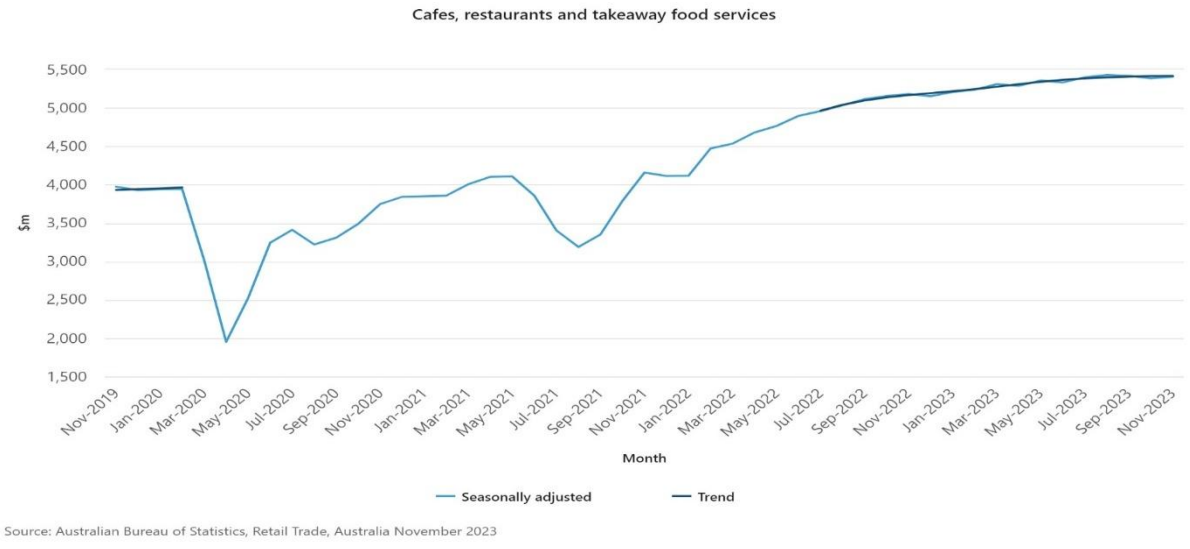
According to the Australia Foodservice Market, it is segmented by Food service to include by Type, Cafes & Bars, Cloud Kitchen, Full-Service Restaurants, Quick Service Restaurants, by Outlet, Chained Outlets, Independent Outlets and by Location, Leisure, Lodging, Retail, Standalone, Travel (Mondor Intelligence, 2024). According to Statista, in 2022, Australia had more than 23,899 full-service restaurants. The total number of cafes and restaurants in operation in Australia reached 55,000 in the year ended June 2024. This includes both full-service and quick-service establishments (Statista, 2025).

Figure 1.1 Number of cafés and restaurants in operation in Australia from the financial year 2017 to 2024 (Statista, 2025)



A full-service restaurant is a dining establishment that focuses on providing a complete, personalised dining experience, characterised by table service, diverse menu options, and higher-quality food preparation compared to quick-service restaurants. Guests are typically seated by a host, order from a menu, and have their food and drinks brought to their table by wait staff (Krish, 2024). According to Mondor Intelligence, in 2022, the total number of restaurant outlets in Australia grew by approximately 3,500 compared to 2017. Due to the high prevalence of franchise establishments, the country had over 1,100 franchisors, 65,000 franchise units, and 8,000 company-owned units that year. Consumer spending and the number of orders also rose, reaching AUD 50 per month. Full-service restaurants held the second-largest market share, with over 23,899 establishments in 2022. These restaurants enhance customer satisfaction by offering diverse menu options, which enrich the on-premises dining experience (Mondor Intelligence, 2024).

Figure 1.2: Growth in the number of cafés, restaurants and takeaway food services in 2023(ABS, Retail Trade, 2004)

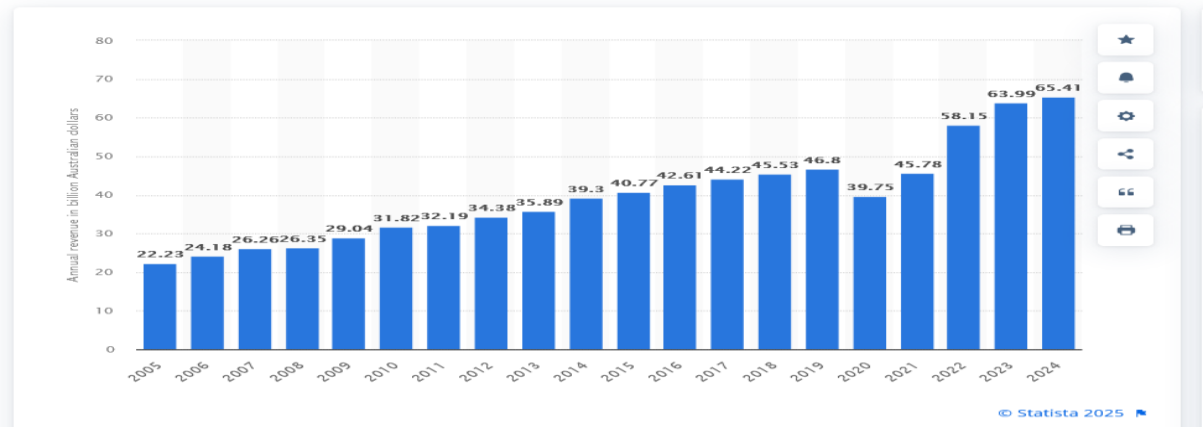


Source: Australian Bureau of Statistics, Retail Trade, Australia November 2023

Stimulated by Australia's multicultural migrant population and globalised economic activities, the habit of eating out at home among the local population has contributed to the

development of a robust hospitality sector and the country's GDP. The Australian hospitality industry, which includes restaurants and food service, contributed over $100 billion to the country's GDP in 2024 (savvysme, 2025)

Figure 1.3 Annual revenue of cafés, restaurants, and takeaway food services in Australia from 2005 to 2024 (in billion Australian dollars) (Statista, 2025)



According to the Integrated Ballistics Identification System (IBIS, 2023) report, the increasing demand for food delivery platforms like Uber Eats has supported industry revenue by allowing time-poor consumers to purchase home-delivered, restaurant-quality food. According to Research and Markets (2024), the trends will continue to increase, and projections are as follows:

- Quick-service restaurants (QSRs) were the largest channel in the Australian foodservice profit sector in 2022, accounting for a share of 42.2% of the sector's value. The channel generated value sales of AUD36.6 billion ($25.3 billion) in 2022, increasing from AUD26.2 billion ($20.1 billion) in 2017, registering a Compound Annual Growth Rate (CAGR) of 6.9%
- Full-service restaurants (FSR) were the second-largest channel in the Australian foodservice profit sector in 2022, generating sales of AUD22.2 billion ($15.4 billion). FSR recorded a CAGR growth of 4% during 2017-22. The number of outlets decreased at a negative CAGR of 0.2%. Meanwhile, the number of transactions increased at a

CAGR of 2% during 2017-22, as tourism increased, and more consumers opted to eat out of their homes.

- The coffee & tea shop channel accounted for 4.3% of the profit sector's sales in 2022. The channel was valued at AUD3.7 billion ($2.6 billion) in 2022 and registered growth at a CAGR of 2.4% during 2017-22. The channel is projected to grow at a CAGR of 4.9% during 2022-27, primarily led by rising transaction count and average transaction value
- Pub, club & bar was the third-largest channel in the Australian foodservice profit sector in 2022, accounting for 16.7% of the profit sector's sales in 2022. The channel's value reached AUD14.4 billion ($10 billion) in 2022, after having registered a CAGR of 0.8% during 2017-22.

Overall, industry revenue has risen an annualised 4.0% over the past five years and is expected to total $20.2 billion in 2023-24 (IBIS, 2023, pg. 1). The Australian Foodservice Market is expected to experience robust growth, with a CAGR of 11.44% between 2025 and 2030 (Mondor Intelligence, 2024). The growth of the Restaurant Sector in Australia is mainly due to the evolution and shaping of Australia's dining experiences and lifestyles.

1.2.1 Evolution of Australia's Dining Environment

Dining out is a common practice worldwide. It is particularly prevalent in Australia, where dining out is an integral part of the country's culture. Australians dine out approximately 38 times a year, averaging around three meals at restaurants per month (Lightspeed, 2024). In May 2024, spending on food and dining rose by 1.4 per cent, reaching a record high of $5.4 billion for cafes, restaurants, and takeaway food services (smh, 2024). A survey conducted in Australia in May 2023 revealed that New South Wales had the highest average weekly spending on food delivery among the states, amounting to AUD72. In contrast, the average

weekly expenditure on takeout in Queensland was 51 Australian dollars. The State of Victoria, where this research will be conducted, spends approximately $ 59 per week (Statista, 2023). Also, over the past decade, the restaurant industry in Australia has experienced significant changes, driven by factors like advancements in technology and evolving lifestyles (DiPietro, 2017). Restaurant guests are now more informed than ever, with a better understanding of food costs, the quality of ingredients, and appropriate meal pricing. They are also more likely to have opinions on aspects such as décor and marketing strategies restaurants are using, whether online or in-store (Ryu & Han, 2011; Ngah, et.al., 2022).

The Australian Bureau of Statistics (ABS, 2024) reported that household spending on hospitality, including hotels, cafes, and restaurants, rose from 2.0% in December 2023 to 3.4% in January 2024. Research shows that, over the thirty-year period from 1984 to 2013, household spending on eating out as a proportion of their weekly food budget rose from around one-fifth to over one-third (Good Food, 2013; ABS, 2015).

Furthermore, studies found an association between food insecurities related to household income and dining out patterns. According to research by the Australian Institute of Family Studies about food insecurities, certain groups in Australia were more susceptible to food insecurities and included unemployed people, single-parent households, low-income earners, rental households and young people (Rosier, 2011). Dining experiences are influenced by income, with higher-income earners tending to dine out more frequently and allocate more money to it, and lower-income earners preferring to eat in cafes and fast-food outlets due to limited resources or time (Burns, 2004). People who earn $40,000 to $60,000 a year eat out 3.5 times each month and get a takeaway on 3.7 occasions (city-data, 2021).

Households with higher incomes spent more on both nutritious and less nutritious foods, purchasing from a variety of sources (French, Wall, & Mitchell, 2010; French, et. al., 2019). Brindal (2010) emphasised the shift in Australia toward consuming food away from

home. According to IBISWorld, 'the fast-casual restaurant industry in Australia has experienced steady growth, driven by consumer demand for healthier and more convenient dining options' (ChefHire, 2024).

Considering the current growth of the restaurant industry in Melbourne and Australia overall (The Conversation, 2023), it is becoming imperative to develop the best possible formula for promoting healthy eating in the restaurant industry. According to Commo (2023), "Australians have spent 27% more on Dining and Restaurant experiences during the year's first quarter compared to 2022, with millennials leading the way" (pg. 1). In the same research by Commo (2023), in December 2022, restaurant and cafe retail spending in Australia experienced a year-on-year growth of 25.34%. As of January 2023, when measured on a Moving Annual Total (MAT) basis, this growth has reached 26.72%. Notably, residents of Sydney and Melbourne are showing the strongest appetite for dining out, with growth rates of 36.94% and 34.9%, respectively. Given the rising health challenges associated with dining out, particularly the contribution of energy-dense meals to Australia's growing rates of obesity and diet-related disease, the Australian government must demonstrate a more substantial commitment by allocating greater resources and supporting policymakers in this area (Australian Institute of Health and Welfare [AIHW], 2023; Department of Health and Aged Care, 2024). A key component of this commitment should involve identifying which marketing and advertising functions are most effective in promoting healthier dining experiences for restaurant patrons, ensuring that public health objectives are embedded within everyday hospitality practices (Carter et al., 2022; Neal et al., 2021).

While these notions and definitions are diverse and emphasise different elements of the hospitality industry, the common thread is the provision of services genuinely to create a hospitable experience (Teng, 2011). Recent studies examining casual dining trends in Australia

reveal that the casual dining landscape is constantly evolving, driven by shifting consumer preferences and innovative concepts. The studies find the rise of fast-casual dining, Food Halls, and Global Fusion Cuisines (ChefHire, 2024; Deliverect, 2024).

Whilst the hospitality industry has focused on quality of service and presentation to attract the consumers, emphasis on quality of product [food] is found to be lacking. Existing research reveals that the evolution of the hospitality industry and the fast-food sector has done little to promote healthier lifestyles. Critical studies uncovered an association between the growth of the food service sector and the escalating public health problem of overweight and obesity globally.

1.2.2 Rise in obesity rates in Australia, a Public Health concern

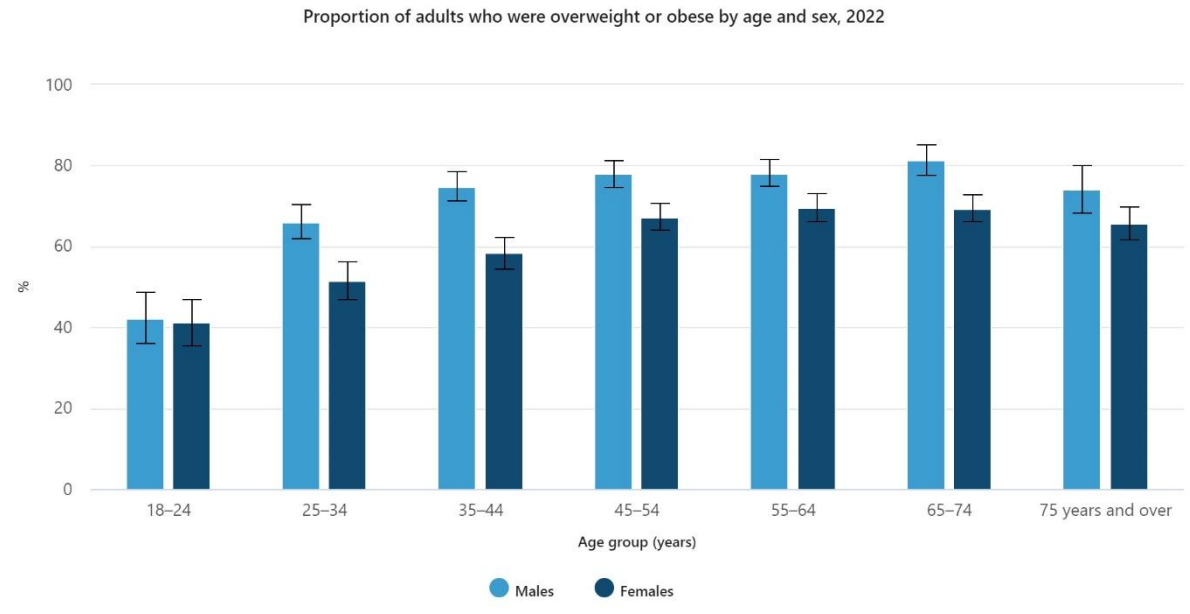
Obesity studies describe obesity as a complex chronic disease in which abnormal or excess body fat (adiposity) impairs health, increases the risk of long-term medical complications and reduces lifespan (Wharton et al., 2020). Australian Institute for Health and Welfare (AIHW) observes that 'Overweight and obesity mainly occur when there is a sustained energy imbalance, where too much energy is consumed through food and drink, and not enough is expended through physical activity' (Australian Institute of Health and Welfare, 2024). A body mass index (BMI) of 25 or higher is considered overweight, and a BMI of 30 or higher is considered obese. In 2019, an estimated 5 million noncommunicable disease (NCD) deaths were caused by higher-than-optimal BMI (World Health Organisation, 2025). Obesity is also linked to chronic diseases, including type 2 diabetes, hypertension, coronary heart disease, elevated cholesterol levels, depression, and musculoskeletal disorders (Soeters & Sobotka, 2012; Avsar, Ham & Tannous, 2017). According to the World Health Organisation (WHO),

worldwide adult obesity has more than doubled since 1990, and adolescent obesity has quadrupled.

The Australian Bureau of Statistics (ABS) reported that in 2018, 67% Australian adults were overweight or obese (ABS, 2018), which was a consistent increase from 63.4% in 2014-15, and 62.8% in 2011-12 and a notable rise from 56.3% in 1995 (ABS, 2015). According to the Australian Institute of Health and Welfare, in 2022, approximately two-thirds (66%) of Australian adults were living with overweight or obesity. This includes 34% who were overweight but not obese and 32% who were obese. Additionally, one in four children and adolescents aged 2-17 was also overweight or obese (Australian Institute of Health and Welfare, 2024).

Furthermore, more recent papers published by the Australian Government Health Department reveal a further increase in obesity rates in Australia, jumping from 63.4% in 2014-15 to 69.7% in 2022. Currently, those figures are even more alarming, as per the graph below:

Figure 1.4. Proportion of adults who were obese by age and sex (2022)



Source: Australian Bureau of Statistics, Waist circumference and BMI 2022

Roughly 27.4% of children between the ages of 5 and 17 were either overweight or obese, with 19.2% classified as overweight and 8.2% as obese, according to AIHW's 2023 report. This represents a higher prevalence compared to the 25.7% reported in 2011-12. In 2022, 1 in 8 people in the world were living with obesity; 2.5 billion adults (18 years and older) were overweight. Of these, 890 million were living with obesity; 37 million children under the age of 5 were overweight (World Health Organisation, 2024). In 2024, the NCD Risk Factor Collaboration (NCD-RisC) published findings that estimate that more than one billion people in the world are now living with obesity, nearly 880 million adults and 159 million children and adolescents aged 5-19 years" (NCD Risk Factor Collaboration, 2016). Buchmueller & Johar (2015) looked in the alarming rate of increase in obesity levels in Australia and associated cost (health expenditure), as well as "increases the cost of recovery from acute health shocks". Furthermore, according to World Health organisation, "more than 1 billion people worldwide are obese – 650 million adults, 340 million adolescents and 39 million children. This number is still increasing. WHO estimates that by 2025, approximately 167 million people – adults and children – will become less healthy because they are overweight or obese" (WHO, 2023).

1.2.3 Cost of public health problems

Baker (2017) cites the cost of obesity increasing from $0.84 billion in 1995 to $8.6 billion in 2011 (PricewaterhouseCoopers, 2015) and to $ 11.8 billion in 2019 (Bupa, 2020). According to Timpario (2000) and Chang et al. (2009), it is extremely important to note that most men worldwide are unconcerned about being overweight. Furthermore, according to Crosland et al. (2019), the cost of obesity in Australia is estimated at $ 14.9 billion. The study indicates that the costs specific to obesity, without linking other forms of cost to the economy

that are indirectly related to obesity ($15.6 billion due to physical inactivity and loss of productivity). Menon et al. (2022) estimated that a 5% reduction in obesity levels would benefit the Australian economy by $ 170 trillion over the next 10 years.

Research has found a strong association between overweight and obesity and eating habits and food consumption patterns. In the wake of growing overweight and obesity among the Australian population and the cost to the economy, governments worldwide have recommended healthier diets and standards as self-regulatory preventive strategies that citizens can adopt.

1.2.4 Public health policy and Government standards of healthy diet and menu labelling

The Australian government has established general standards for healthy eating in terms of ingredients and calorie content. The Australian Dietary Guidelines advise 'drinking plenty of water and eating a variety of nutritious foods from the 5 food groups every day' (EatForHealth, 2025). According to Australian government agency (Health Direct, 2019), a healthy meal consists of key ingredients to include (a) vegetables and legumes (beans), (b) fruit, (c) grains and cereals, (d) lean meat, poultry, fish, eggs, tofu, nuts, seeds, and (e) milk, cheese, yoghurt, or alternatives. Australian dietary guidelines recommend Australians reduce their intake of foods containing saturated fat, added salt, and added sugars (Dietary Association of Australia, 2019). The restaurant industry has experienced a massive shift (busy lifestyle, work from home) in recent years (IBIS, 2023). Most importantly, the expectations are that revenue for the industry will shrink in 2030, which makes it even more important to cater for the specific interests of consumers (healthy eating). According to Ridoutt (2016), there are some positive changes taking place in Australian dietary selection. Nuts, various seeds, fruit,

and vegetables are becoming more popular to gather with healthier versions of bread and cereals (brown and wholegrain). However, according to The Conversation (2022), the Australian government has placed a “very little, if any, to low” emphasis on promoting healthy eating.

In this regard, a plethora of behavioural studies as well as nutritional studies have investigated how people choose to eat what they eat and why they choose to eat the way they eat (Fechner, Karl, Grün, & Dolnicar, 2024; Horii & Rothman, 2025; Van Dyke, Murphy, & Drinkwater, 2024).

Figure 1.5: Australia is lagging in promoting healthy eating. In 5 years, we have made woeful progress.

Over the years, research has indicated that 'quality/freshness' (74%), 'price' (43%), 'taste' (38%), 'trying to eat healthy' (32%) and 'what my family wants to eat' (29%) are just some of the reasons why people are ordering types of meals (EUFIC, 2005). Even as the

obesity numbers rise among the human population, there is increasing evidence that restaurants are contributing to higher obesity levels globally (Fraser et al., 2012; Currie et al, 2010).

1.2.5 Association between eating out-of-home habits and an increase in obesity

A large body of existing empirical evidence supports the relationship between obesity and restaurant food consumption. However, Australian cultural trends towards dining out. This is evident in the continuous growth of the industry and the increased number of dining venues that have opened in the last 10-15 years (ABS, 2024), which correlates with the rise in obesity.

Thomas and Karunaratne (2008) suggested that the obesity epidemic in Australia has arisen out of social and cultural structures, and not only individual choices. Baker (2014) suggested that a strong correlation exists between an increase in obesity and the rise in the number of food outlets in Australia. Story et al. (2008, p. 255) also suggest that "*eating environments likely contribute to the increasing epidemic of obesity*". According to Sharp (2013), physical availability (the presence of high-nutritional-value items on menus) is the primary contributor. He suggests that customers rarely go far in the search for a specific restaurant. In other words, the variety of venues means there is no need to travel far to find preferential cuisine and experiences. There is also a cognitive component whereby the physical presence or advertising materials linked to fast-food restaurants trigger memory formation (Harris & Graff, 2012; Frankland, Josselyn & Köhler, 2019). Consumers who are more exposed to specific visuals are more likely to form memories about what they represent (Shaw & Bagozzi, 2018). According to Moore et al. (2009), exposure to more fast-food outlets in the neighbourhood was associated with a 11%–61% increased odds of consuming fast food near home and a 12%–17% decreased

odds of having a healthy diet. This is important when understanding the availability of these venues and their proximity to the customers. Availability nudging operates by increasing the visibility and proximity of healthier options, ensuring that consumers' cognitive associations and habitual responses, shaped by environmental cues and memory triggers, are directed toward nutritious rather than fast-food choices.

Stanton (2006) and Bezerra et al. (2012) primarily focus on fat content, but their broader argument aligns with a large body of evidence indicating that food prepared outside the home is typically higher in added sugars. Research consistently is consistent that commercially prepared meals, particularly those from restaurants, cafés, and takeaway outlets, contain significantly more added sugars than meals made at home.

For example:

- Lachat et al. (2012) and Nago et al. (2014) found that frequent consumption of food prepared outside the home is associated with higher intake of added sugars, saturated fat, and total energy.
- A large Australian dietary study by Wellard-Cole et al. (2018) showed that meals and beverages purchased outside the home frequently contain excess added sugar, contributing to poor diet quality and higher energy intake.
- The Australian Bureau of Statistics (ABS, 2023) reports that foods purchased from restaurants, takeaway outlets, and cafés are a significant source of added sugars, particularly sugar-sweetened beverages, desserts, and sauces accompanying meals.

So, while Stanton (2006) and Bezerra (2012) emphasise fat content, contemporary evidence clearly supports the additional claim that restaurant-prepared foods also tend to contain more added sugars than home-prepared meals—further compounding the public health risk created by frequent out-of-home eating.

For example, Stanton (2006) suggests that burgers made at restaurants can have between 24 and 42 grams of fat, whereas burgers made at home with lean meat can have around 7 grams of fat. The longitudinal research on fast food consumption and Body Mass Index (BMI) in the USA reported that consumers who ate fast food more than twice a week over 15 weeks gained an extra 4.5 kg of body weight and a more significant increase in insulin resistance (Anderson et al., 2011; Braithwaite et al., 2014; Duffey et al., 2007; Rosenheck, 2008). Nutritional studies related to obesity suggest that dietary management can have significant implications for addressing obesity and obesity-related health problems (Hwalla & Jaafar, 2020). However, research shows that the FSS has applied marketing and advertising functions to increase sales and profitability at the cost of public health.

1.2.6 Role of Marketing and Advertising in promoting FSS and influencing Lifestyle change

The role of Marketing and Advertising in promoting food services and products is well recognised. FSS marketers have employed several strategies, including decision heuristics, digital media, menu labelling, and nutrition information disclosure, to promote FSS, increase outdoor food consumption, and influence lifestyles. However, as discussed below, research highlights the role of FSS marketing and advertising functions in facilitating unhealthy lifestyles by promoting unhealthy options as healthy diets through glamorisation and glorification of food products and influencing consumer perceptions, choices and buying preferences.

1.2.6.1 Semiotics in Menu Design

Several studies examined the use of low-cost and unconventional guerrilla marketing strategies, as well as semiotics, 'the study of signs and symbols, and how they are used to create meaning'. A study investigating the impact of visual and textual elements in advertising content on consumer perception found the role of Semiotics in creating unconventional guerrilla marketing campaigns (Bilici & Seren, 2025). They observed that 'synergy of visual and verbal elements' could 'increase message memorability and consumer engagement' (Bilici & Seren, 2025). Another study demonstrated that semiotics could maximise elements of an advertisement and significantly affect the message, making more potential consumers recognise and be attracted to the [food] product (Soegoto, Albar, Aisyah, & Luckyardi, 2020). A study by Rabab'ah & Al-Qudah (2022) explored persuasion strategies in American-cuisine restaurant menus in Jordan. It sought to identify the power of language used by advertisers to attract and persuade patrons. This study investigated persuasive strategies used in 26 American cuisine restaurant menus in Jordan and found that the menu included 'five major appeals, namely *sensual, emotional, desire, pleasure, and thought and brand appeals*, whose ultimate goal is to provoke some desired mental images to influence the patrons' food choice decisions' (Rabab'ah & Al-Qudah, 2022, pg 2).

Ellison, Lusk & Davis (2014) found that symbolic traffic light labels encouraged restaurant patrons to choose lower-calorie menu items, suggesting that colour-coding the menu labels could increase the effectiveness of numeric calorie labels on consumer choices. Burton (2003) investigated nutritional information disclosure and consumer behaviour, noting that disclosures created a favourable attitude towards food products, but did not examine the consumer's actual ordering pattern. Zimmerman & Shimoga (2014) examined the same phenomenon from a

different perspective, indicating that individuals exposed to food advertisements chose 28% more unhealthy snacks than those exposed to non-food advertisements. According to these research attempts, it appears that customers find information disclosure important in their decision-making process. Research indicated that food advertisers could leverage semiotics to draw consumer attention to foods that were not necessarily healthy.

1.2.6.2 Nutritional Information Disclosure and Menu Labelling

Sneed and Pascarella Burkhalter (1991) first highlighted the importance of nutritional information disclosure and established a new wave of marketing applications in the hospitality industry. Participant in their research indicated that they were willing to change their ordering pattern towards the healthier alternatives, provided nutritional information was disclosed. Grazin & Olsen (1997), Clay, Emenheiser, & Bruce (1995), and Soo et al. (2018) all support the trend of healthy advertising in the hospitality industry (specifically restaurants) and its importance. Survey responses from all studies indicate that they plan to continue focusing on the nutritional aspects of their menu offerings. The promotion of food, and to a lesser extent, beverages on healthy menus has led to an increase in the number of nutritious meal options over the course of these studies. Grazin and Olsen (2008) suggested that marketers could enhance their strategies by combining health- and nutrition-related attitudes and behaviours with demographic information.

Research shows that restaurants have applied innovative marketing strategies, predominantly driven by developments in technological communication, to steer the customers toward healthy eating, such as displaying the calorie count of each meal and its nutritional value on their menu and websites (Kozup, Creyer & Burton 2003; Gheribi, 2017; Bennett, 2017).

According to Wellard-Cole et. al. (2018), the introduction of menu labelling did not lead to any significant or consistent reductions in energy intake. Australians did not decrease their energy consumption across the five fast-food chains. The study recommended that the government collaborate with the industry to establish targets for reformulating nutrient content (Wellard-Cole et. al., 2018). Burton (Burton, et. al., 2006) discovered that the actual calorie content of a selection of "less-healthful" food items was almost double what consumers had estimated. Many studies where food advertisements were based on positioning variables such as 'tasty' and or 'healthy', considering the importance of taste and hedonic appeal testing, the variables' impact on consumers' choices was unclear (Goldberg & Gunasti, 2007; Raghunathan, 2006; Fishbach & Zhang, 2008). Another study systematically reviewed 'Calorie Labelling and Modified Calorie Labelling' Interventions examining the Impact on Consumer and Restaurant Behaviour (Bleich et al., 2017). Of the fifty-three studies included, 18 were in real-world restaurants, nine in cafeterias, and 21 in laboratory or simulation settings. Only five studies examined restaurant offerings. The study concluded that due to a lack of well-powered studies with strong designs, the extent to which menu labelling encourages lower-calorie purchases and whether this translates to a healthier population remains unclear (Bleich et al., 2017).

Magnusson (2010) argues that restaurant calorie labelling initiatives have the potential to enhance the population's diet through two key avenues: by educating consumers about the nutritional content of foods (offering nutritional information), encouraging healthier choices by using marketing and advertising communication functions, and, perhaps more importantly, by prompting the reformulation and improvement of menu offerings.

Ellison, Lusk & Davis (2014), Long et al. (2015), and Bleich et al. (2017) concluded in their findings that a structural model of consumer demand indicated that numeric labels did not impact food choices. On the other hand, menu calorie labelling policies are primarily built on the assumption that consumers will *rationally process* numerical nutrition information and

adjust their choices accordingly (Bollinger et al., 2011; Roberto et al., 2010). This logic reflects traditional information-processing and rational-choice models, which presume that providing more detailed calorie information enables healthier decision-making (Harnack et al., 2008). However, a substantial body of behavioural research shows that this assumption often fails in real-world restaurant contexts, where choices are made quickly, automatically, and under strong environmental and emotional cues rather than through deliberate evaluation of calorie numbers (Cohen & Babey, 2012; Downs et al., 2009; van Kleef et al., 2005). There is little evidence to suggest that menu labelling significantly affects the number of calories purchased at restaurants in Australia. This thesis aims to examine this evidence.

1.2.6.3 Negative Themes in Food Advertisements: Digital Marketing and Television Commercials

FSS often use marketing and advertising functions to develop 'contextual food cues' to promote impulsive sales, many of which lead to increased caloric consumption and poor dietary choices (Cohen & Babey, 2012). Often, marketing and advertising functions have been overtly or covertly nudging consumers towards new products, and diets that exacerbate weight gain, inflammation and related health issues (NIH, 2022). A recent study reviewing the impact of decision heuristics on calorie underestimation and the implications for unhealthy eating found that "consumers' reliance on heuristic-based decision-making could aggravate the problem because a misinterpretation or misrepresentation could lead to calorie under" (Wang & Begho, 2024)

Lashley (2008) argued that "*commercial hospitality provision has been criticised as offering less than authentic hospitality, a pale sham of the real thing which can only be found in domestic settings offered by hosts who are genuinely hospitable*" (pg.1). Another study that

explored (1) the differences in perceptions toward and trust in food advertisements between racial/ethnic population subgroups; and (2) the associations between perceptions toward food advertising and the consumption of energy-dense, nutrient poor (EDNP) foods' found that as positive perceptions toward food advertising increase among adults, there is an increase in daily frequency of consumption of EDNP foods and drinks (Thai, Villarreal, & Thai, 2025). A recent study that investigated 'How and why people eat the way they do' noted that 'neither actual dietary intake data nor measures of nutritional knowledge' were collected, and future studies were needed to determine the extent to which the various barriers and enablers affected healthy eating (Van Dyke et al., 2024).

With advancements in technologies and their application in the hospitality industry, FSS has used innovative approaches from social media, digital tools, and virtual reality to increase the sensory appeal of the products (Cosme, Rocha, Marques, Barroso, & Vilela, 2025). In an examination of U.S. television Food Commercials and the adult obesity issue, the study found that advertisers used nutrients and the wellness effect to influence consumer food perception, purchase intention, and consumption levels through content analysis of food advertising. (Delgado, 2009)

Several studies found that consumer exposure to food advertisements predominantly featuring unhealthy foods is prevalent throughout Australia (Kelly et al., 2010; Deshpande et al., 2023). In 2006, a study found that only 19% of food advertisements and 6% of total advertisements in Australia contribute to promoting healthy foods (Chapman et al., 2006). Pettigrew et al. (2012) examined the use of negative themes in television food advertising in Australia, finding that advertisers employ these themes to capture the audience's attention and elicit an emotional reaction. Among the 93,284 food advertisements analysed, 16% (14,611) featured negative themes, with mood improvement and food cravings being the most frequently portrayed harmful elements. The researchers who investigated the link between the rise in obesity and

junk food advertisements (Northcott, 2014) found that ‘diets high in ultra-processed foods (UPF) were harming human and planetary health’ (Northcott, Lawrence, Parker, Reeve, & Baker, 2025). This is directly linked to food promotion that leads to the consumption of unhealthy food in restaurants.

A recent study on unhealthy food advertising on social media analysed a dataset of 1,703 ads promoting top-selling unhealthy food brands, which 141 different advertisers had placed on the Facebook feeds of 367 individual Australians (Northcott, Sievert, et al., 2025). The study found that young people (18–24), especially young men, were being targeted by unhealthy food (Northcott, Sievert, et al., 2025). The study also found that ‘unhealthy food brands used potentially harmful marketing strategies to appeal to children, young people, parents and the broader community, including cartoon characters, and associations with popular sports and greenwashing (Northcott, Sievert, et al., 2025).

1.2.6.4 Interventions to measure change

Research has found that menus are often the primary research instruments used to develop interventions for studying consumer behaviour in restaurants (Gynell, Kemps, & Prichard, 2022; Ip & Chark, 2023). Researchers also noted the inability to measure actual changes in consumption and sales data, relying instead on consumer recall of their last purchase, which was often subject to memory errors and affected the truthfulness of the data (Martinez et al., 2015; Seymour, Yaroch, Serdula, Blanck & Khan, 2004). Existing studies indicate that research on restaurant interventions and healthier eating has faced the challenge of having limited or no access to longitudinal sales data in Australia (Radnitz et al., 2018; Marcano-Olivier et al., 2020). Camelia Kailani Mihart observed an acute scarcity of studies that identify opportunities to increase the impact of marketing and advertising functions on

consumer behaviour and their decision-making process at the point of purchase in restaurant settings (Mihart, 2012). Researchers have found that longitudinal studies that investigate the application of different marketing advertising functions in an uncontrolled environment, such as a restaurant setting, for extended periods of over 5 months are rare (Lepkowska-White, Parsons, & Berg, 2019; Park & Jang, 2012). In the case of studies that applied interventions, numerous limitations concerning both the design and application of strategies had direct implications for empirical effectiveness (Jostock et al., 2022, 2025). A scoping review highlighted that engaging a wide range of restaurants, both independent and chain, in health-promoting initiatives faced barriers such as logistical constraints, food sourcing issues, and limited stakeholder motivation, with many operators expressing reluctance due to concerns over potential revenue decline (Fuster et al., 2021). Similarly, empirical interventions often faced methodological challenges: some relied on short implementation periods that limited the ability to capture sustained behavioural change, while others struggled with heterogeneity in point-of-sale systems or the labour-intensive nature of data entry, which affected data reliability (Ayala et al., 2017; Goffe et al., 2019; Lee-Kwan, Bleich, Kim, Colantuoni, & Gittelsohn, 2015). Many studies also measured ordering behaviour rather than actual consumption, raising questions about whether observed changes in menu selection translated into meaningful dietary improvements (Burton & Creyer, 2004; Roberto et al., 2010). Furthermore, consumer perceptions were often influenced by the "health halo" effect, in which nutritional information and claims distorted evaluations, leading to an overestimation of healthfulness (Kozup, Creyer, & Burton, 2003; Burton, Howlett, & Tangari, 2009). Another limitation lies in the failure to account for contextual moderators such as nutrition knowledge, menu complexity, and habitual preferences, which may condition the effectiveness of nudges and restrict broader generalisability (Sharp & Romaniuk, 2016). Recent experimental work by Vandenbroele, Slabbinck, Van Kerckhove, and Vermeir (2020) reinforces these challenges: while descriptive

labels and strategic positioning of vegetarian dishes in real-world restaurants successfully increased selection, the effects were modest, context-dependent, and subject to situational variables such as dining companions. Collectively, these findings underscore that while restaurant-based interventions can produce measurable shifts in ordering behaviour, their effectiveness is frequently constrained by methodological shortcomings, contextual variability, and stakeholder hesitancy, which together limit scalability and policy translation.

A study noted that in cases where multiple interventions were used, there was little clarity on which interventions were more successful than the others (Martinez et al., 2015). A systematic review focusing on healthy eating interventions investigated the characteristics, effectiveness, and acceptability of interventions to encourage healthier eating in small, independent restaurants and takeaways (Jostock et al., 2022, 2025). The review, which screened 4,624 records, included 12 studies describing 13 interventions in 351 businesses. The review found that 'most studies were of poor quality. Customer-level intervention components primarily operated on the lower rungs of the Nuffield ladder. They most had limited positive effects on increasing demand, as measured by sales or orders of healthy options (Jostock et al., 2022). The study uncovered weak intervention design and noted that 'separate interventions were needed for small, independent restaurants, which were effective in improving food healthiness whilst being feasible and acceptable to restaurants' (Jostock et al., 2022). Furthermore, these studies indicate that in most cases, fewer interventions were used and were inadequate in nudging consumers towards healthier food choices. These studies identified a future need to examine healthy restaurant business models, to gather potential lessons learned for other restaurants wishing to facilitate healthier eating (Fuster et al., 2021; Jostock et al., 2022).

In studies relying on sales data, several challenges were identified that compromised both data quality and research reliability. Within multi-case study designs, at least three

recurring issues emerged: firstly, not all participating restaurants or takeaways provided complete data (Goffe et al., 2019); secondly, variation in cash registers and till systems across venues complicated data processing and standardisation (Ayala et al., 2017); and thirdly, manual entry of paper order slips was labour-intensive and susceptible to errors (Lee-Kwan, Bleich, Kim, Colantuoni, & Gittelsohn, 2015). These limitations highlight a significant gap in the literature—the lack of longitudinal case studies conducted in venues where researchers can access consistent, high-quality, and comprehensive sales data over time. This study directly addresses that gap through Zeppo restaurant, where the researcher provided unrestricted access to accurate, consistent, and ongoing sales data, thus overcoming barriers faced by previous studies. The review found that 'most studies relied on descriptive statistics and short follow-up periods and had no control or comparator sites, likely partly due to resource constraints and recruitment difficulties' (Jostock et al., 2022). This creates a gap in the literature in this area and highlights the need for more robust longitudinal studies, stronger interventions, and larger samples to improve validity.

Another systematic review studied Interventions to Promote Healthy Meals in Full-Service Restaurants and Canteens (Mandracchia, Tarro, Llauradó, Valls, & Solà, 2021). A total of 35 randomised controlled trials (RCTs) and 6 non-RCTs were included in the systematic review and analysed by outcome, intervention strategies, and settings (school, community, workplace). Emphasising a methodological gap, the study observed that 'Higher-quality RCTs were needed to strengthen the results' (Mandracchia et al., 2021). Espino et al. systematically examined literature on Community-Based Restaurant Interventions to Promote Healthy Eating. Their review included 27 interventions described in 25 studies published from 1979 through 2014 (Espino et al., 2015). Studies have also highlighted that most restaurant-based interventions were conducted in the United States, with relatively few situated in the Australian context. Espino et al. (2015) noted that evidence on effective community-based strategies to

promote healthy eating in restaurants remains limited, emphasising the need for more research employing robust study designs, standardised evaluation methods, and consistent measures of sales, behaviour, and health outcomes. This gap is particularly salient in Australia, where dining out constitutes a growing proportion of caloric intake (ABS, 2014). However, empirical studies examining how integrated marketing and advertising functions influence real-time consumer decisions are scarce. Addressing this lacuna, the present research advances the field by implementing a longitudinal, mixed-method case study in a full-service Australian restaurant, allowing for the systematic evaluation of consumer ordering behaviour in response to a series of interventions—including semiotic cues, evocative menu descriptions, nutritional disclosure, and point-of-sale advertising. In doing so, this study responds directly to Espino et al.'s (2015) call for context-specific, methodologically rigorous research, while extending the evidence base beyond the North American dominance of prior scholarship. Studies also drew attention to methodological gaps in the implementation of health promotion strategies in restaurants. Several recent studies investigating consumer preferences observed very small sample sizes, a need for more up-to-date data, as shortcomings of their research and called for studies with larger sample sizes to increase the validity and reliability of findings (Şenel, 2024; Van Dyke et al., 2024). Research also found that studies focusing on understanding consumer behaviour were often qualitative, and studies with into observing change in consumer behaviour in response to interventions were quantitative. Fewer studies measured that examined the phenomena of consumer behaviour holistically, where implications of qualitative findings could be studied in relation to quantitative findings and vice versa. Furthermore, in most studies, the results were limited to the US context. Many studies also observed that many of the experiments examining the food service sector were conducted in controlled environments (Wansink & Sobal, 2007; Jensen & Hansen, 2007). As such, the implications of

the findings for real-time dining environments were unclear due to a lack of empirical results and created a need for real-time studies conducted in real environments.

The escalating rates of obesity and diet-related chronic disease in Australia, combined with the increasing trend of dining out, highlight a pressing need for research into how marketing and advertising strategies within restaurants can effectively nudge consumers toward healthier choices. However, much of the existing evidence is drawn from experimental simulations, fast-food outlets, or cross-sectional studies, leaving a significant gap in longitudinal, real-world investigations within independently owned restaurants. At these very venues, most Australians frequently dine. This research is uniquely positioned to address this gap through direct access to Zeppo restaurant, which provides an unprecedented opportunity to collect unrestricted, high-resolution longitudinal sales data and observe the impact of successive marketing interventions in situ. Unlike studies constrained by external data access or regulatory limitations, this project can test, refine, and evaluate multiple integrated marketing communication strategies, including semiotic cues, evocative menu language, nutritional labelling, and point-of-sale posters, over an extended period with methodological consistency and ecological validity. By leveraging this rare combination of access, control, and continuity, the study makes an original contribution to knowledge in both marketing and public health domains, offering policymakers and hospitality practitioners actionable insights grounded in empirical evidence from a real-world restaurant context.

Through a critical literature review, this research identified several gaps in the hospitality industry and limitations in the existing literature on the role of FSS marketing and advertising, as well as on FSS-associated public health problems. The study consolidated the findings of this section into three critical overarching areas of interest in the hospitality industry: one in advertising content, two in interventions used, and three in methodology.

First interest: Whilst numerous studies have critically examined the use of marketing and advertising functions to promote sales at the cost of public health (Cairns et al., 2013; Boyland & Whalen, 2015; Nestle, 2013), fewer have explored how these same functions might be harnessed to advance public health objectives while sustaining commercial outcomes (Vandenbroele et al., 2020; Hollands et al., 2021). This gap underscores the need for research that reconceptualises marketing and advertising strategies in food service settings as potential vehicles for healthier eating without compromising revenue.

Second interest: Although multi-component interventions combining menu labelling, nudges, and promotional strategies have been trialled, researchers consistently report difficulty in isolating and comparing the effectiveness of individual strategies (Goffe et al., 2019). Furthermore, studies often struggle to measure genuine behavioural change or link shifts in menu choice to actual sales outcomes, with many relying on self-reports or inconsistent measures (Lee-Kwan et al., 2015; Afshin et al., 2015). This lack of methodological standardisation has constrained the comparability and generalisability of findings across interventions.

Third interest: Many intervention studies were conducted in simulated environments, using small samples and short durations, which limits their external validity (Roberto et al., 2010; Harnack et al., 2008). Behavioural studies were predominantly qualitative, while intervention trials were mainly quantitative, with few integrating both approaches (Bauer et al., 2022; Hillier-Brown et al, 2014). Moreover, the impact of individual interventions was often unclear, particularly in multi-component strategies, where attributing outcomes was problematic (Afshin et al., 2015). Empirical studies that were longitudinal and conducted in real-world

settings were rare (Lee-Kwan et al., 2015; Vandenbroele et al., 2020), leading scholars to call for more rigorous, long-term evaluations using robust outcome measures (Espino et al., 2015). The present research directly responds to this gap. Research examining the impact of web marketing promotional functions (Hwang, Yoon, & Park, 2011) and focusing on emphasising specific benefits, such as locally sourced (Kim, Huang, & Kim, 2022), is in its early stages.

These specific hospitality industry interests can be categorised into specific gaps, and a table will be developed in the next section that links gaps, objectives, and research questions.

1.3 Research Purpose, Aim and Objectives

The previous section focused on reviewing existing studies that examine the potential of marketing and advertising to promote healthier dietary choices among consumers. The review found that application of marketing and advertising strategies, such as (1) Semiotics, (2) Advertisement themes, (3) Nutritional information disclosure, (4) Decision Heuristic cues, through strategic interventions promoted unhealthy dietary habits among consumers. Often, these marketing and advertising functions were used to increase sales and profitability at the cost of consumer health and thus contributed to the rise in overweight and obesity problems. Decision heuristics often promoted false choices due to the misrepresentation of calorific values. Segmented, targeted, positioned and differentiated advertisement themes promoted positive perceptions about unhealthy food choices to target populations. Negative themes in advertisements increased food craving and consumption of Energy-Dense, Nutritionally Poor (EDNP) foods. Semiotics contributed to greenwashing poor diet choices as healthy options, altering consumer perceptions and preferences. As such, a large body of research intersecting

the food service sector and public health domain uncovered that marketing and advertising functions were often being applied to manipulate consumer behaviour by strategically nudging consumers towards unhealthy diets. Marketing and advertising strategies in the food service sector have traditionally leveraged information asymmetry and the glorification of energy-dense, nutrient-poor products to attract consumers and stimulate demand, often at the expense of public health (Nestle, 2013; Cairns, Angus, Hastings, & Caraher, 2013). This dominance of persuasive promotion for unhealthy meals has fuelled the hypothesis that "food service sector marketing and advertising functions did not nudge customer choices towards healthy food selection." Indeed, several experimental and field studies have reported that the independent variable, marketing and advertising interventions such as calorie labelling or nutritional disclosures, had either limited or no statistically significant influence on the dependent variable, namely consumers' healthier meal choices (Harnack et al., 2008; Roberto et al., 2010; Swartz, Braxton, & Viera, 2011). For example, Harnack et al. (2008) found that calorie labelling in fast-food restaurants did not significantly alter purchase behaviour, while Swartz et al.'s (2011) systematic review concluded that the overall evidence linking menu labelling to healthier consumer decisions was weak and inconsistent. These findings, combined with critiques that consumers frequently misinterpret nutritional claims and fall prey to the "health halo" effect (Kozup, Creyer, & Burton, 2003; Burton, Howlett, & Tangari, 2009), substantiate a null hypothesis emerging from the literature: marketing and advertising functions in the food service sector, as currently applied, have not meaningfully shifted food consumption patterns towards healthier dietary choices.

The purpose of this study emerged from the rationale that a large segment of the food service sector continues to use marketing and advertising functions to promote unhealthy diets to an unsuspecting global population and thus continues to contribute to the growing obesity and overweight health crisis. The study argues that through appropriate health promotion

strategies and interventions, the FSS marketing advertising functions can be leveraged to nudge consumer behaviour and choices towards healthier diets, ordering patterns and lifestyles. According to official Australian health standards (the Australian Dietary Guidelines), a "healthy meal" can be defined as one that contributes to a pattern of eating consistent with national recommendations — namely, one that includes a variety of foods from the five core food groups (vegetables and legumes, fruit, grain/cereal foods (mostly wholegrain), lean meats and alternatives, and dairy or alternatives — mostly reduced fat), and limits foods high in saturated fat, added sugars, salt, and discretionary choices (eatforhealth, 2026).

As such, this study aims to investigate the potential of marketing advertising functions in nudging consumers towards healthier eating patterns by testing the hypothesis in a real-world restaurant setting. Most marketing advertising functions interventions are conducted in the U.S./Europe, with limited evidence in the Australian context, despite dining out contributing significantly to caloric intake (Espino et al., 2015; Wellard-Cole, Davies, & Allman-Farinelli, 2022). As previously stated, existing studies indicate that research on restaurant interventions and healthier eating has faced the challenge of having limited or no access to longitudinal sales data in Australia (Radnitz et al., 2018; Marcano-Olivier et al., 2020). **This study consolidates and identifies five critical gaps that this research aims to address**:

First gap: The influence of semiotic cues (e.g., colour, symbols, visual framing) on actual ordering behaviour remains underexplored in full-service contexts in Australia; existing evidence is largely laboratory-based or self-reported (Wansink & Love, 2014; Hwang & Lorenzen, 2008; Choi et al., 2020; Fogg, 2009).

Second gap: Limited empirical research isolates evocative language as a persuasive cue in healthy food positioning in Australia; most studies focus on indulgence or sensory appeal

rather than health-related motivation when using evocative stimuli (Wansink et al., 2001; Elder & Krishna, 2012; Huang & Lu, 2016).

Third gap: While nutritional labelling has been tested in fast-food chains, its effect in full-service restaurants and in combination with other cues is under-researched, particularly in the Australian context (Burton & Creyer, 2004; Roberto et al., 2010; Morley et al., 2013; NSW Health, 2018).

Fourth gap: Few studies evaluate how environmental advertising within restaurants (posters, digital signage) acts as a contextual trigger for health-related choices. The IMC linkage between menu and spatial advertising remains unclear in the Australian hospitality industry (Glanz et al., 2012; Neal et al., 2016; Fogg, 2009).

Fifth gap: Integrated IMC interventions that combine multiple marketing communication tools (semiotics, nutritional info, advertising) have rarely been tested in longitudinal restaurant-based field experiments. Fogg, 2009; Laran & Janiszewski, 2011; Higgs, 2015; Kozup et al., 2003.

Five specific objectives were designed to achieve the aim and answer the research questions. The first five objectives aimed to apply marketing and advertising functions in a restaurant setting and observe consumer behavioural change towards healthier meal choices.

Objective 1: To evaluate how visual semiotic design elements (e.g., green folders, health icons) act as behavioural triggers that alter customers' ordering decisions in real restaurant settings.

Objective 2: To examine how evocative menu language enhances motivational components within Fogg's Behaviour Model, influencing the uptake of healthier items.

Objective 3: To assess whether nutritional information disclosure improves customers' ability to identify and select healthier options when ordering. To examine how

poster advertisements combined with menu-based marketing and advertising strategies can influence consumer perceptions and sales.

Objective 4: To determine the extent to which point-of-sale advertising posters serve as external behavioural prompts that steer customers toward healthy selections.

Objective 5: To evaluate the combined and cumulative effects of integrated marketing communication strategies on real-time behavioural change toward healthy ordering.

The research questions were developed to address research gaps in the previous section.

RQ1. How does introducing a Light and Healthy Menu (use of semiotics) change customers' ordering patterns in restaurants?

RQ2. How does introducing a Light and Healthy Menu (use of semiotics and evocative food description - positioning) change customers' ordering patterns in restaurants?

RQ3. How can introducing a Light and Healthy menu, along with nutritional information about each meal, steer customers' choices toward healthier alternatives in restaurant settings?

RQ4. How does introducing advertising posters with nutritional information change customers' ordering patterns in restaurant settings?

RQ5. How does a combination of a light and healthy menu in a green folder, and point-of-sales advertising of nutritional information have an impact on consumers' ordering patterns in restaurants?

The study aims to answer the research question by testing the hypothesis and investigating the MAF application to evaluate the empirical implications on consumer choices and on restaurant sales. In testing the hypothesis and addressing the research questions, the study fills critical gaps in the existing literature.

Table 1.1 Mapping of Research Gaps, Research Objective and Research Questions

Corresponding Research Gaps (RG) (from literature review)	**Linked Research Objectives (RO)**	**Research Questions (RQ)**
The influence of *semiotic cues* (e.g., colour, symbols, visual framing) on *actual* ordering behaviour remains underexplored in full-service contexts; existing evidence is largely laboratory-based or self-reported. Wansink & Love, 2014; Hwang & Lorenzen, 2008; Choi et al., 2020; Fogg, 2009	**Objective 1**: To evaluate how visual semiotic design elements (e.g., green folders, health icons) act as *behavioural triggers* that alter customers' ordering decisions in real restaurant settings.	**RQ1:** How does the introduction of a *Light and Healthy Menu* using semiotic cues influence customers' real-time ordering patterns in a full-service restaurant setting?
Limited empirical research isolates *evocative language* as a persuasive communication cue in healthy food positioning; most studies focus on indulgent or sensory appeal rather than health-related motivation. Wansink et al., 2001; Elder & Krishna, 2012; Huang & Lu, 2016	**Objective 2:** To examine how *evocative menu language* enhances *motivational components* within Fogg's Behaviour Model, influencing the uptake of healthier items.	**RQ2:** How does the addition of evocative food descriptions (positioning) to a *Light and Healthy Menu* affect customers' motivation and choice behaviour toward healthier options?

While *nutritional labelling* has been tested in fast-food chains, its effect in *full-service restaurants* and in combination with other cues is under-researched, particularly in the Australian context. Burton & Creyer, 2004; Roberto et al., 2010; Morley et al., 2013; NSW Health, 2018	**Objective 3:** To assess whether *nutritional information disclosure* improves customers' *ability* to identify and select healthier options when ordering.	**RQ3:** To what extent does including *nutritional information* on the Light and Healthy Menu guide customers' ordering decisions toward healthier alternatives?
Few studies have evaluated how environmental advertising within restaurants (posters, digital signage) serves as a contextual trigger for health-related choices. The IMC linkage between menu and spatial advertising remains unclear. Glanz et al., 2012; Neal et al., 2016; Fogg, 2009	**Objective 4:** To determine the extent to which *point-of-sale advertising posters* serve as *external behavioural prompts* that steer customers toward healthy selections.	**RQ4:** How does the display of *advertising posters with nutritional information* at the point-of-sale influence customers' ordering behaviour in restaurant settings?
Integrated IMC interventions that combine *multiple marketing communication tools* (semiotics, nutritional info, advertising) have rarely been tested in longitudinal restaurant-based field experiments. Fogg, 2009; Laran & Janiszewski, 2011; Higgs, 2015; Kozup et al., 2003	**Objective 5:** To evaluate the *combined and cumulative effects* of integrated marketing communication strategies on real-time behavioural change toward healthy ordering.	**RQ5:** How does an integrated intervention—combining a *Light and Healthy Menu* (green semiotic design) with *point-of-sale advertising of nutritional information*—impact customers' selection of healthier meals in a full-service restaurant?

These objectives brought clarity to the 'What', 'When' and 'How many' questions – i.e., what they chose? When did they choose? How many purchases did they make? Were the interventions effective in increasing trade? What interventions were more effective in nudging consumers towards healthy choices? The findings from this stage informed the formation of

the sixth objective, determined by a qualitative probe to identify situational factors influencing consumer choices. In this stage, the 'Why' and 'How' questions were answered – i.e., why the consumer chose what they chose. How were their choices influenced?

The following section will develop the theoretical framework and model used in this thesis, focusing on the behavioural model needed to understand this research.

1.4 Theoretical framework of this research

This section outlines the theoretical framework and model that describe the processes that occur following the initial application of marketing and advertising functions used in this research. This study is grounded in the Social Ecological Model theoretical frameworks and informed by Behaviour Change theories, Public Health theories and marketing theories, which leverage overlapping yet distinct topics, viz., models of behaviour and theories of change, applying advertising function, to examine human choice, why human behaviours change and how they change. The quantitative phase will examine behavioural changes resulting from the introduction of marketing and advertising functions, while the qualitative part will investigate the application of a behavioural model.

While numerous studies have examined persuasive communication through frameworks such as the Theory of Planned Behaviour, the Elaboration Likelihood Model (ELM), the Heuristic–Systematic Model, Cognitive Dissonance Theory, and Social Judgment Theory, these models were not found to be highly applicable to the specific focus of this research. The central aim of this study is to identify and apply behavioural theories that

demonstrate *practical*, real-time impacts on encouraging consumers to select healthier options from restaurant menus. Although the ELM has gained increasing popularity in recent persuasive communication research, particularly for understanding how message processing influences consumer choices, it is less suited to contexts where decisions are made rapidly and with limited cognitive deliberation (Ajzen & Fishbein, 1975; Van der Linden, 2013). Instead, this study's objectives align more closely with models grounded in knowledge–attitude–behaviour and expectancy-value principles, such as the theory of reasoned action (TRA or ToRA), which examines how attitudes and intentions shape behavioural outcomes and has been widely applied to consumption patterns and food-related decisions in restaurant settings (Axelson et al., 1986; Bagozzi et al., 2000; Kim et al., 2011). Given the need to understand how prompts, motivation, and ability interact at the moment of choice, Fogg's Behaviour Model (FBM) provides a more suitable theoretical foundation for this thesis, offering a practical lens to examine how environmental cues and marketing functions influence healthier menu selections in real time. Theories of marketing are used for designing sales and marketing interventions for the quantitative phase of the study. The central focus of investigation is Public Health, which is about 'understanding the factors that influence people's health and finding ways of improving it' (Whittall, 2008). The Fogg Behaviour Model (FBM) was selected as the central theoretical framework for this thesis because it provides a practical and dynamic lens for examining real-time decision-making in restaurant settings. Unlike traditional behavioural theories that often focus on long-term attitudes, intentions, or social norms, the FBM highlights the convergence of three critical elements — ***motivation, ability, and triggers*** — at the precise moment a behaviour occurs. This immediacy is particularly relevant in hospitality contexts, where food choices are often made spontaneously, under time pressure, and in response to environmental cues such as menu design, advertising posters, or nutritional information. The FBM not only accommodates these situational influences but also aligns directly with the

intervention strategies employed in this study, such as semiotic nudges, evocative menu descriptions, and point-of-sale advertising. By focusing on the conditions that must co-exist for healthier choices to materialise, the FBM offered a robust and contextually appropriate framework for both the design of interventions and the interpretation of consumer responses. Grounded in the aforementioned theories, this research applies Fogg's Behavioural Model to achieve the research objectives of examining and evaluating community-based Restaurant Interventions to Promote Healthy Eating.

Fogg's behaviour model is just one example of a behavioural model that could be effective in certain situations. B.J. Fogg's behaviour model, also known as the Fogg Behaviour Model (FBM), is popular and widely used in the field of behaviour change. Fogg identifies three key factors that must co-occur to enact behaviour change (Fogg, 2009). These three factors include adequate motivation and ability, which are part of the qualitative section of this research, and practical triggers, which are part of the quantitative section of this thesis. The Fogg Behaviour Model (FBM) helps understand and promote factors that can encourage or deter the adoption of new behaviours. The Fogg Behaviour Model focuses on specific behaviours, and according to Mohr et al. (2014), it is most applicable to changing small, clearly defined behaviours. Mohr et al. (2014, p. 148) describe Fogg's model as "elegantly simple and very useful within the constraints"; however, the authors also criticise it for limitations when addressing more complex problems.

Conducting the study in a real-world setting facilitated the opportunity for a strong empirical research design. The research was conducted in the case study of a single fine dining restaurant located in Melbourne called the Zeppo, where consumer behaviour and their decision-making patterns were observed as a part of a social experiment. As such, the research used an

Experimental design to examine shifts in consumer behaviour in response to interventions in a controlled environment created in the case study.

The Nuffield Intervention Ladder, developed by the Nuffield Council on Bioethics, provided guidelines for developing interventions to test hypotheses in the first phase (Whittall, 2008). In the first phase of the research, the intervention ladder facilitated Randomised Controlled Trials for participants in both control and experimental groups. The groups were exposed to a series of interventions to test the hypothesis. In the second phase, research probed participants' opinions through interviews to investigate the factors influencing their decision-making in restaurant settings.

1.5 Significance of this research

This thesis makes both theoretical and empirical contributions to the literature on behavioural marketing, public health communication, and food choice in hospitality settings. Theoretically, it extends Fogg's Behaviour Model (FBM) by demonstrating how its motivation–ability–trigger components can be operationalised through integrated marketing communication (IMC) tools, such as menu semiotics, nutritional labelling, and in-store advertising, to influence real-time consumer decisions in naturalistic, full-service restaurant environments. This application of FBM advances behavioural theory by validating its predictive power beyond digital and technology-driven contexts (Fogg, 2009), addressing calls for ecological validity and real-world testing raised by scholars such as Glanz et al. (2012) and Cialdini & Goldstein (2004), who argued that the effectiveness of behavioural cues in food environments remains under-examined in field conditions. Empirically, this research

fills a long-noted gap in Australian hospitality studies by providing longitudinal, real-world evidence that restaurant-based marketing and advertising functions can meaningfully nudge consumers toward healthier choices—responding to the research agendas identified by Burton et al. (2006), Haws, Winterich, & Naylor (2014), and Wansink & Chandon (2014), who emphasised the need for experimental evidence linking marketing design to actual behavioural outcomes. Moreover, by quantifying the effect of "Light and Healthy" menu framing and advertising prompts on ordering behaviour, this study contributes to public health and policy discourse, reinforcing calls by Roberto et al. (2010), Crockett et al. (2018), and Baker et al. (2017) for industry–government collaboration in promoting environmental supports that make the healthy choice the easy choice. Collectively, these findings offer a conceptual bridge between behavioural theory, marketing strategy, and public health policy, demonstrating that restaurant-level IMC interventions can serve as scalable tools for obesity prevention and sustainable health promotion. By introducing policies that require restaurants and food establishments to provide clearly designated "light and healthy" menu options, and to promote them through in-store marketing and communication strategies actively, governments can create supportive environments that make healthier choices the easier, more visible, and more appealing option. Such measures would not only improve public health outcomes but also reduce long-term healthcare costs, aligning with broader national objectives of preventative health and community wellbeing (Baker et al., 2017; Soeters & Sobotka, 2012; Avsar, Ham & Tannous, 2017).

1.6 Why this research?

This PhD research was undertaken at Zeppo, a Mediterranean restaurant situated in Clyde, Victoria, Australia, which is located 48 km from Melbourne CBD. While global academic literature highlights the application of marketing concepts in hospitality, empirical evidence of their effectiveness in the Australian context remains limited, particularly regarding the persuasive power of marketing communication to encourage healthier food choices. The choice of Zeppo also carries contextual significance. Located in Clyde, a suburb undergoing rapid population growth and demographic diversification, the restaurant serves as a microcosm of broader shifts in Australia's dining landscape, particularly the growing demand for healthier menu options. Its Mediterranean offering is culturally relevant within Melbourne's renowned multicultural food scene, aligning the research with prevailing consumer trends in both local and national contexts. Collectively, these factors make Zeppo not only a practical but also a theoretically and methodologically robust case study site, positioning the research to generate insights of both academic and policy significance.

1.7 Outline of the Thesis

This PhD Thesis is divided into seven (7) chapters:

Chapter One of the thesis introduced the public health problem of diet-related diseases, highlighting the growing role of out-of-home eating in Australia and the dominance of the food service sector marketing that promotes unhealthy choices. It identified critical research gaps, including the lack of longitudinal, real-world Australian studies, limited evidence on health-promoting marketing strategies, and weak theoretical application to real-time decision-making. To address these gaps, the chapter outlined the research aim, questions, and objectives,

positioning the study as an original, mixed-method, longitudinal case study that evaluates the effectiveness of marketing and advertising functions in nudging healthier food choices while sustaining commercial outcomes.

Chapter Two looks to reconcile the academic literature and highlight the application of marketing and advertising functions in the restaurant industry in Australia. This chapter reviews relevant studies in order to develop the conceptual framework and hypotheses.

Chapter Three develops the conceptual framework that guides this research and discusses the hypothesis emerging from the literature.

Chapter Four discusses and justifies the research methodology applied in this study. These include the research paradigm, justification for the methodology, justification for conducting an actual experiment in a single case study design, and the appropriateness of the design to the research objectives.

Chapter Five presents the analysis of data and the results based on the stated research questions.

Chapter Six: Discussion of the findings in light of the literature review.

Chapter Seven provides a conclusion on this research, highlighting the significant findings that address the identified gaps in the literature. Recommendations are suggested for the hospitality industry, government, and policymakers to encourage consumers to shift their

ordering patterns towards healthier alternatives in restaurant settings. This chapter also identifies limitations of this research and offers suggestions for future studies.

1.8 Chapter Summary

This chapter presents the impetus for this hospitality marketing study and situates its relevance within the discipline. Research questions were delineated, stemming from existing academic literature, pertinent research gaps, and the problem space was described. Additionally, the practical and scholarly significance of this research was framed.

The next chapter will reconcile the academic literature and highlight the application of marketing and advertising functions in the Australian restaurant industry. It will examine the current applications of various marketing and advertising functions in Mediterranean-style dining venues and their ability to influence customer ordering patterns towards healthier alternatives.

1.8.1 Boundaries and Exclusions

1. **Exclusion of Home-based Food Consumption**

   This framework does not apply to grocery shopping or home-based food decisions because the research is limited to out-of-home dining environments, where consumers encounter real-time decision-making under environmental influences.

2. **Exclusion of Internal Business Factors**

   While marketing communication is a key variable, internal business operations, such

as staff training, food preparation logistics, or supply chain influences, are outside the scope of this framework.

3. **Focus on Consumer Response, Not Industry Compliance**

   The framework addresses the impact of marketing communication on consumer decision-making, rather than examining the extent of restaurant industry compliance with labelling regulations or CSR policies.

4. **Limited Cultural Generalisability**

   The study is contextually focused on the Australian restaurant industry. As such, cultural or policy-specific variations in other countries may limit the generalisability of the findings beyond similar regulatory and market environments.

In summary, this framework provides a targeted lens for examining the influence of strategic restaurant-based marketing on health-oriented consumer behaviour. It is bounded in scope to prioritise behavioural outcomes over organisational processes, focusing specifically on how marketing advertising functions can serve as triggers within the motivational and cognitive frameworks of consumers making meal selections outside the home.

Chapter 2: Literature Review

2.1 Introduction

The rising prevalence of diet-related chronic conditions such as obesity, type 2 diabetes, and cardiovascular disease has intensified global and national calls to improve dietary behaviour (Muonde et al., 2024). In Australia, where overweight and obesity rates are escalating, the trend of increased food consumption outside the home has become a central concern. Meals prepared outside the home account for a significant share of daily caloric intake, making restaurants, particularly full-service and quick-service venues, critical sites for public health interventions (Lin, Frazão, & Guthrie, 1999; Wellard-Cole, Davies, & Allman-Farinelli, 2022).

In response, various Marketing and Advertising Functions (MAFs), including nutritional labelling, calorie disclosure, descriptive menu language, persuasive menu design, and point-of-sale (POS) advertising, have been used to nudge consumers toward healthier choices at the point of decision. While public health advocates have embraced these approaches, the literature remains fragmented, with limited empirical evidence and theoretical clarity, especially in real-time decision-making contexts such as dine-in restaurants.

This review critiques traditional models, such as the Theory of Planned Behaviour (TPB) and Social Cognitive Theory (SCT), noting that while they explain long-term intentions and learning, they are less suited to explaining rapid, context-based decisions regarding dining.

A critical literature gap is identified: few frameworks capture the interplay between situational factors, motivation, environmental stimuli, and consumer action. This has constrained the development of effective, real-world interventions.

Further urgency is added by the rising obesity rates in Australia (Imes & Burke, 2014), nutritional risks associated with frequent out-of-home eating (Rosenheck, 2008), and mixed outcomes from policy strategies such as kilojoule labelling (Victorian Department of Health, 2024). Despite the growth of digital marketing studies (Singh, Singh & Dhir, 2024; Talukder, Kumar & Das, 2024), physical in-store advertising tools remain underexplored in real-time behavioural contexts.

The chapter addresses five core objectives:

Objective 1: To evaluate how visual semiotic design elements (e.g., green folders, health icons) act as *behavioural triggers* that alter customers' ordering decisions in real restaurant settings.

Objective 2: To examine how *evocative menu language* enhances *motivational components* within Fogg's Behaviour Model, influencing the uptake of healthier items.

Objective 3: To assess whether *nutritional information disclosure* improves customers' *ability* to identify and select healthier options when ordering.

Objective 4: To determine the extent to which *point-of-sale advertising posters* serve as *external behavioural prompts* that steer customers toward healthy selections

Objective 5: To evaluate the *combined and cumulative effects* of integrated marketing communication strategies on real-time behavioural change toward healthy ordering.

Broader barriers, including cost, appeal, and the availability of healthy food, are also explored (Drewnowski et al., 2020). The chapter reinforces calls for the introduction of government policies (Friel et al., 2015; Boddy, Booth, & Worsley, 2019) to align commercial practices with societal health goals.

However, challenges persist. Studies by Bleich et al. (2017) and Mete et al. (2019) demonstrate that menu labelling often yields inconsistent results, underscoring the need for contextually grounded, behaviourally informed strategies. In response, this thesis examines how traditional marketing tools, menu design, persuasive language, poster prompts, and nutritional transparency can influence healthier food choices in a real-world Australian restaurant setting. Although not focused on long-term health outcomes, it offers crucial insights into how marketing communications can be adapted to meet public health objectives at the moment of food selection.

In summary, the chapter identifies a theoretical and empirical gap in how traditional MAFs are used to promote health-oriented behaviour in restaurant environments. The study aims to bridge this gap by contributing to a more robust understanding of how marketing can both influence real-time consumer behaviour and advance public health and policy goals in the hospitality sector.

2.2 Background in Literature

Integrated Marketing Communication (IMC) is a strategic process that coordinates diverse promotional tools, such as advertising, public relations, direct marketing, personal selling, and point-of-sale displays, into a unified campaign to deliver a consistent and persuasive message (Kliatchko, 2008; Kitchen & Burgmann, 2015). Marketing advertising functions have been widely adopted across industries for their capacity to influence consumer behaviour through message consistency, timing, and reinforcement across touchpoints. In the hospitality industry, particularly within restaurant settings, marketing advertising functions

have the potential to shape food choices by aligning environmental cues with brand messaging and health-oriented communication.

Despite this potential, the application of marketing advertising functions in hospitality settings remains limited in scope and underdeveloped in the academic literature. Research on health-related food interventions in restaurants has primarily focused on isolated tactics, such as calorie labelling (Long et al., 2015), menu design (Ozdemir & Caliskan, 2015), and nutritional disclosures (Bleich et al., 2017), rather than on integrated strategies that leverage the cumulative influence of multiple communication elements. This piecemeal approach neglects the synergistic value of IMC, which lies in the orchestration of message formats across visual, verbal, and spatial dimensions to reinforce behavioural intent (Bruhn & Schnebelen, 2017). Furthermore, within hospitality marketing scholarship, attention has primarily been directed towards brand loyalty, service quality, and customer experience (Kandampully, Zhang & Jaakkola, 2018), with far less focus on how marketing communication strategies might support public health outcomes. While IMC has been explored in broader domains of health promotion, such as smoking cessation, alcohol moderation, and exercise campaigns (Noar, 2006), its adaptation for influencing healthy eating behaviour in restaurant environments has received scant empirical scrutiny.

This omission is particularly problematic given the increasing rate of meals consumed outside the home and the role of restaurants in contributing to caloric overconsumption (Rosenheck, 2008; Wellard-Cole, Davies, & Allman-Farinelli, 2022). In such environments, decisions are often made under time pressure and with limited cognitive processing (Godinho, Prada & Garrido, 2016). This means that strategically crafted marketing advertising functions, such as colour-coded health symbols, evocative food descriptions, nutrition-based advertising posters, and server verbal prompts, may be uniquely effective in influencing choices in real-time.

In summary, while marketing advertising functions present a robust theoretical and operational framework for shifting consumer food choices toward healthier options (Kraak, 2017; Bublitz & Peracchio, 2015), their application in restaurant-based interventions remains underdeveloped. Addressing this gap is crucial for developing empirically supported, contextually relevant, and commercially viable strategies that align with both business and public health objectives.

2.3 Gaps in the Literature: Application of Traditional Advertising Functions in Restaurants in Australia

Although traditional marketing strategies, such as menu design, point-of-sale (POS) promotions, and in-store advertising have long been employed in the restaurant industry to influence consumer choice, their academic evaluation, particularly in relation to public health objectives, remains limited and fragmented. Existing studies often lack real-world applicability, with much of the research conducted in artificial or simulated environments, thereby failing to capture authentic consumer behaviour in situ. Moreover, the absence of robust theoretical integration has led to a superficial understanding of the mechanisms through which these marketing functions exert their influence. Also, needed is a clear definition of what constitutes a healthy meal. According to the **Australian Dietary Guidelines**, developed by the National Health and Medical Research Council (NHMRC), a healthy meal is one that reflects the recommended dietary pattern for adults by: (1) being predominantly composed of foods from the five core food groups—vegetables and legumes/beans; fruit; grain (cereal) foods, mostly wholegrain and/or high cereal fibre varieties; lean meats and poultry, fish, eggs, tofu, nuts and seeds, and legumes/beans; and milk, yoghurt, cheese and/or alternatives (mostly reduced fat); and (2) limiting the inclusion of "discretionary foods," defined as items high in

saturated fat, added sugars, added salt, and/or alcohol and not necessary to meet nutrient requirements (NHMRC, 2013).

Operationally in this study, a "healthy meal" is defined as a menu item that (a) contains substantive components from at least three of the five core food groups, (b) prioritises vegetables and/or wholegrain options as primary ingredients, and (c) does not contain discretionary components as dominant ingredients (e.g., deep-fried items, sugar-sweetened sauces, processed meats high in saturated fat or sodium). Classification is determined through documented ingredient composition and nutritional profiling consistent with the Australian Dietary Guidelines framework (NHMRC, 2013).

Research tends to isolate individual interventions, overlook environmental and situational moderators, and rely heavily on self-reported behavioural intentions rather than objective sales data. Health-focused marketing elements, such as semiotics and evocative language, also remain underexplored, despite their relevance in influencing consumer choices. With this understanding, several literature reviews led to the identification of specific gaps that this research aims to close:

1. Lack of Empirical Evaluation of Traditional Marketing Advertising Functions in Real-World Restaurant Settings in Australia

Despite widespread use of menu design, POS displays, nutritional labelling, and descriptive language, most studies are based in artificial environments, not naturalistic restaurant settings (Bleich et al., 2017; Grunert & Wills, 2007). Self-reported data and simulations fail to reflect real-time consumer behaviour, limiting ecological validity (Burton et al., 2006; Roberto et al., 2010; Bucher et al., 2016). In Australia, few studies

examine the actual impacts of kilojoule labelling on ordering behaviour (Cecchini & Warin, 2016). Real-world field studies, such as those by Lopez et al. (2023), show promise but lack a longitudinal design or a focus on meat-based options.

2. Limited Integration with Behavioural Theories in the Australian Hospitality Industry

Hospitality marketing studies rarely anchor findings in behavioural theories like SCT or FBM, resulting in shallow mechanistic understanding (Krieger et al., 2013; Story et al., 2008). Traditional models emphasise intention-based decision-making (Ajzen, 1991; Bandura, 2004), which overlooks real-time cues. FBM (Fogg, 2009) offers a more suitable lens but is underutilised, especially in Australian studies (Morley et al., 2013; Wellard-Cole et al., 2019).

3. Neglect of Combined or Synergistic Effects of Marketing Advertising Functions in Restaurants in Australia

Most studies isolate individual interventions (e.g., calorie labelling) without exploring how visual design, language, and nutritional info interact holistically (Skov et al., 2013; Long et al., 2015). Research by Harnack & French (2008) and Bucher et al. (2016) suggests that multi-component approaches are more effective; however, such designs remain rare in Australian hospitality studies (Morley et al., 2013).

4. Insufficient Attention to Situational and Environmental Triggers in Restaurants in Australia

Real-world triggers, such as time pressure, menu positioning, and social context, are often overlooked in favour of static variables (Wansink & Love, 2014; Cohen & Babey,

2012). Behavioural economics is consistent that nudges such as lighting, descriptions, and spatial cues affect behaviour (Thaler & Sunstein, 2008; Wansink, 2010; Kleef et al., 2015). However, these factors are seldom operationalised in Australian settings (Morley et al., 2013).

5. Inconsistent Use of Health-Focused Marketing Language and Semiotics in Restaurants in Australia

Evocative language, colour cues, and iconography (semiotics) are effective in commercial contexts but underexplored in health promotion (Beardsworth et al., 2002; Wansink et al., 2005; Trudel-Guy et al., 2019). Visual semiotics such as green colour or health icons are inconsistently applied (Schuldt, 2013; van Kleef et al., 2015) and are not grounded in behavioural models like FBM (Wellard-Cole et al., 2019).

6. Overreliance on Self-Reported or Stated Preference Data in Australia

Studies often use surveys or interviews rather than tracking actual food orders, leading to biased outcomes (Harnack & French, 2008; Nikolaou et al., 2014; Sheeran & Webb, 2016). Intentions often do not align with actions (Burton et al., 2006; Downs et al., 2009). Sales-based studies offer more realistic insights (Sinclair et al., 2014; Long et al., 2015) but remain rare in Australian hospitality contexts (Morley et al., 2013).

7. Limited Exploration of Marketing's Role in Public Health within the Hospitality Industry in Australia

Most marketing research focuses on revenue generation, often neglecting its potential to advance public health (Cohen & Story, 2014; Harris et al., 2013). Strategies like

upselling and bundling promote unhealthy options (Freeman et al., 2014; Grier & Kumanyika, 2008). Few studies show how marketing can serve health goals and business viability simultaneously (Lachat et al., 2012; Wellard-Cole et al., 2018; Puhl & Heuer, 2010).

8. Underrepresentation of Full-Service Restaurants in Australia

Fast-food contexts dominate the literature due to standardised operations and policy visibility (Lillico et al., 2015; Long et al., 2015). Full-service venues, with richer experiential marketing (e.g., ambience, language, staff interaction), are largely ignored (Cohen & Babey, 2012; Euromonitor International, 2021; Morley et al., 2013). This limits the generalisability of findings.

9. Deficiency in Measuring Business Outcomes Alongside Health Goals in the Australian Hospitality Industry

Most health-focused research fails to assess commercial outcomes like revenue or customer satisfaction, limiting real-world relevance (Kiszko et al., 2014; Gittelsohn & Lee, 2013; Anzman-Frasca et al., 2015). Evidence from institutional settings (Thorndike et al., 2012) is not often replicated in commercial restaurants. Australian evaluations (Clarke, Swinburn & Sacks, 2019) largely omit economic impact data.

Overall, the literature reveals major deficiencies in empirical design, theoretical integration, and practical application. Most research on MAFs in hospitality lacks ecological validity, synergy, and dual-outcome evaluation. These gaps limit the effectiveness of interventions and hinder adoption in real-world restaurant settings—particularly within Australia's shifting dining landscape. Addressing these shortcomings is crucial for developing

evidence-based marketing strategies that align public health goals with hospitality profitability.

2.3.1 Consumers' perception and knowledge of healthy meals terminology and communication in restaurant settings

Consumers' existing nutrition knowledge significantly affects how they interpret, perceive, and respond to healthy eating cues in restaurant environments. Research by Kozup, Creyer, and Burton (2003) confirms that individuals with greater nutritional awareness are more capable of understanding menu-based health information and more likely to make healthier choices. Similarly, Roberto et al. (2010) found that such prior knowledge enhances the salience and impact of interventions, such as calorie labelling and menu descriptors.

However, nutrition literacy varies widely. Many consumers overestimate their understanding of dietary guidelines while underestimating the actual caloric content of restaurant meals (Burton, Howlett, & Tangari, 2009). This discrepancy contributes to the so-called "health halo" effect, where items perceived as healthy due to branding or superficial cues are selected, despite being nutritionally poor (Burton & Creyer, 2004). Beyond knowledge, taste, convenience, and value, nutritional considerations often take a backseat to other factors in dining-out decisions (Glanz et al., 1998; Hwang & Lorenzen, 2008). While interventions such as menu labelling can help, they are most effective among those with a baseline understanding of nutrition (Liu et al., 2012). Conversely, individuals with limited literacy may overlook or misread nutritional information, reducing the success of public health strategies (Bleich & Pollack, 2010).

Demographic factors also shape this dynamic. Driskell, Schake, and Detter (2008) and Story et al. (2008) found that younger, less educated, and lower socio-economic groups typically had lower nutrition knowledge and engaged less with healthy menu prompts.

Furthermore, Jones et al. (2009) reported that while Australians broadly understand the concept of healthy eating, they trust non-government organisations most to lead nutrition campaigns. Respondents emphasised the need for inter-sector collaboration among the media, the food industry, and health professionals for effective health promotion.

Watson et al. (2013) highlighted common misunderstandings of kilojoules and energy content, noting that some consumers associate high energy with better performance or health. This limits the effectiveness of energy-only labelling and calls for more precise, comprehensive data on daily intakes of salt, sugar, fat, and protein.

Consumers' prior nutrition knowledge acts as a cognitive filter for interpreting healthy menu cues. While those with higher literacy are more responsive to interventions, widespread misperceptions, especially around energy content, limit the impact of such strategies. Demographic disparities compound this issue, underscoring the need for multifaceted, educationally reinforced interventions. Collaborative efforts across sectors and continued research into communication design and policy are crucial to bridging these knowledge gaps and promoting healthier eating choices in restaurants.

2.3.2 Integrating Gaps: Bridging Marketing Practice and Consumer Nutrition Knowledge

To develop effective, evidence-based strategies for promoting healthier food choices in restaurant settings, it is essential to integrate two traditionally distinct yet interdependent domains:

1. The application of traditional marketing advertising functions (MAFs) in real-world hospitality contexts.

2. Consumers' prior nutrition knowledge, perceptions, and interpretations of health-related menu communication.

Research shows that marketing techniques such as semiotic cues (e.g., colour-coded menus), descriptive menu language, and point-of-sale (POS) advertising can significantly influence consumer decision-making (Wansink et al., 2005). However, these interventions are only effective when consumers possess the cognitive ability and motivation to recognise, interpret, and act on such cues (Grunert & Wills, 2007). In other words, the impact of MAFs is mediated by consumer nutrition literacy, which remains unevenly distributed across populations (Watson et al.).

Existing literature on marketing strategies within the hospitality sector has mainly been driven by commercial objectives, often lacking robust behavioural theory or public health grounding (Hwang & Lorenzen, 2008). Many studies focus on isolated, laboratory-based interventions with limited ecological validity (Liu et al., 2012). Conversely, literature on consumer nutrition knowledge highlights consistent gaps in comprehension, particularly in out-of-home dining contexts—where health information is often misunderstood, ignored, or overridden by convenience and taste factors (Burton, Howlett, & Tangari, 2009; Roberto et al., 2010).

By merging these perspectives, this study addresses a critical intersection in health-promoting marketing research: how hospitality-based advertising functions, when theoretically grounded in Fogg's Behaviour Model (FBM) and applied in ecologically valid restaurant settings, can be aligned with consumers' existing knowledge structures and simultaneously educate and nudge healthier choices.

This dual perspective supports a holistic model that acknowledges both environmental determinants and individual-level moderators, such as health consciousness, time pressure, and situational triggers—all of which were identified in the literature as relevant (Glanz et al., 1998; Driskell et al., 2008; Pulker et al., 2018). Such integration enhances the policy relevance and commercial viability of MAF interventions, especially in independent restaurant settings where public health initiatives often struggle to gain traction. Importantly, this research responds to growing calls for context-sensitive, scalable, and theory-based interventions within the Australian food service sector (Pitt et al., 2017; Landais et al., 2023). The outcome is not merely an assessment of what works, but a deeper understanding of why and under what conditions MAFs influence healthy meal selection, contributing to the advancement of both marketing theory and public health strategy.

2.4 Current Trends in the Restaurant Industry in Australia

2.4.1 Restaurant trends in offering healthy options

Restaurant marketing managers are primarily concerned with the number of people visiting venues and tourist destinations (Shoemaker & Lewis, 1999). They primarily focus on acquiring new customers, expanding their business, and cultivating long-term relationships with both current and prospective customers at the venue. As a result, several marketing textbooks written for the hospitality industry have gained popularity (Reid & Bojanic, 2009; Bowie et al., 2016), while universities are also offering courses and programs that focus solely on the importance of applying marketing and advertising functions in the hospitality industry. DiPietro (2017) notes the growth in both the quantity and quality of research articles on food service and restaurant management. These studies cover a wide range of topics, including

emerging segments of the food service industry, restaurant operations, service quality, food service marketing, food safety, and health-related aspects. However, there is a need for specific research that incorporates theories and principles of marketing and advertising functions, highlighting the connection between the restaurant industry and the application of service marketing and advertising functions (Ezeh, 2017; Hudson, 2008; Line & Runyan, 2012).

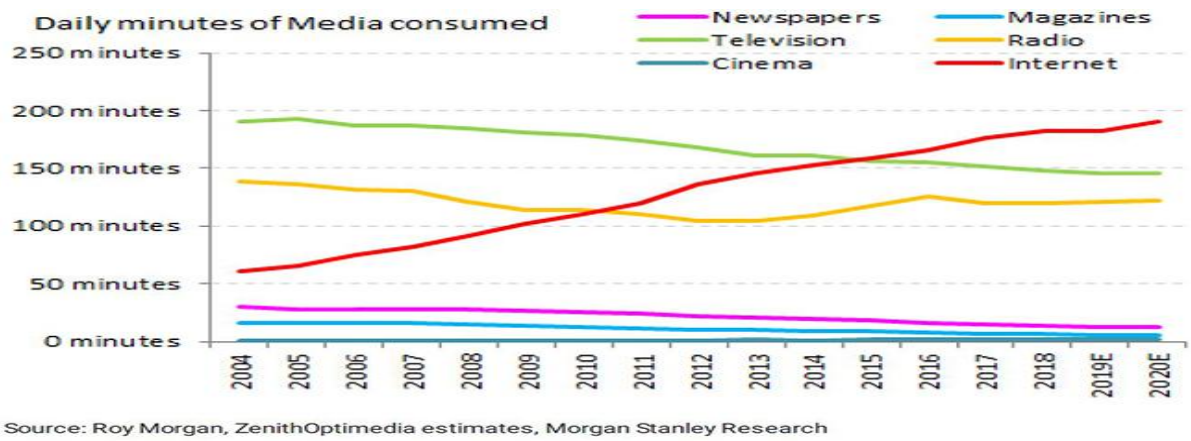
So-called “Healthy food” chains have entered the Australian market based on current demand (Top Juice, Sumo Salad, Zambrero, Grill'd, Mad Mex, Oliver's), and it is suggested that the trend will continue to dominate the market (Wellard et al., 2018). Chandon and Wansink (2007) suggested that when restaurants claim to be healthy, people were more likely to underestimate the calorie content of main dishes and select higher-calorie side dishes, drinks, or desserts, compared to when such claims were not made. However, restaurants aim to transform the simple communication process into "emotional bonding" by developing various advertising strategies to build brand loyalty among their target market (Mattila, 2001), which could lead diners to choose healthier options advertised by restaurants.

2.4.2 Application of Advertising in the Restaurant Industry

Marketing advertising functions have been a core component of communication in the hospitality and restaurant industry for over seven decades, evolving significantly since their early use (White, 1959; Pérez-Campdesuñer et al., 2020). As new communication platforms, particularly digital ones such as mobile phones, social media, and direct or guerrilla marketing have emerged, the number and complexity of these functions have expanded (Chiagouris & Mohr, 2004). This rapid evolution has diminished the relative effectiveness of traditional

advertising channels (e.g., television, radio, print), which are now less persuasive in capturing consumer attention and influencing behaviour in restaurant settings (Hebden et al., 2011; Kim et al., 2019).

Figure 2.1 Daily Media Consumption by different advertising



Source: Roy Morgan, ZenithOptimedia estimates, Morgan Stanley Research

Integrated Marketing Communication (IMC) theory highlights the importance of coordinating diverse marketing tools, advertising, personal selling, public relations, and positioning, to deliver consistent messages over time (Kliatchko, 2009; Porcu et al., 2012). However, this assumed uniformity is challenged by scholars who stress contextual tailoring, arguing that not all marketing functions are transferable or equally effective across industries (Grove, Carlson & Dorsch, 2002; Stammerjohan et al., 2005). Restaurant-focused research reinforces this view, demonstrating that hospitality settings often demand a selective and adapted use of marketing tools rather than wholesale adoption (Jung, 2016; Milimu, 2017; Fasana & Haseena, 2017). This raises an important gap: while IMC theory provides a strategic foundation, its empirical application in restaurants remains inconsistent and under-theorised.

Advertising emerges as central to shaping dining experiences and reinforcing brand positioning (Šerić, Gil-Saura & Ruiz-Molina, 2014). However, studies diverge on what form of advertising is most persuasive. Kim, Kim & Kim (2016) suggest that combined text and visuals are more

effective than text-only messages. Yet, this conclusion is mainly drawn from controlled settings, not real-time restaurant contexts where ordering decisions occur rapidly. Similarly, research has acknowledged the importance of in-store nudges, including verbal cues, posters, semiotics, and persuasive menu design (Senninger, 2015; Vandenbroele et al., 2020). These tools have rarely been systematically compared or combined in practice. This is particularly critical, given that waitstaff, who act as front-line communicators, require proper training to ensure consistent message delivery (Garavan, 1997; Pratten, 2003; Xiao, 2010). Yet, most studies overlook this operational dimension.

The synergy between semiotics and marketing positioning has been explored conceptually in broader service industries (Wang et al., 2012; Rindfleish & Adapa, n.d.; Todua & Vashakidze, 2018; Tresidder, 2010; Blankson & Kalafatis, 1999; Tang, Tzeng & Wang, 1999). Nonetheless, little empirical research has translated these insights into restaurant contexts, particularly in Australia. Importantly, no study has systematically tested the individual and combined effects of semiotics, evocative menu descriptions, and point-of-sale advertising on healthier consumer choices. This absence represents a substantial knowledge gap, as marketing functions may interact synergistically or even counterproductively; but the current literature treats them in isolation.

Evidence on point-of-sale (POS) advertising further highlights both potential and limitations. Posters have been shown to nudge consumers towards promoted items (Näränen, 2013; Spotts, Weinberger & Weinberger, 2020; Djupegot & Hansen, 2020), but these findings rarely address long-term behaviour change or health-specific outcomes. The challenge is compounded by declining investment in traditional advertising (Twenge, Martin & Spitzberg, 2019) which pressures restaurants to identify cost-effective tools that balance commercial returns with public health objectives. Although digital and social commerce are rising (Idrysheva et al.,

2019; Oklander & Oklander, 2017; Dabas, Sharma & Manaktola, 2021; Chung, Song & Lee, 2017), their effectiveness ultimately depends on an underlying understanding of how traditional in-store strategies function at the critical point of choice.

Design features and message framing are also subject to contestation. While context-aware strategies are most effective during idle times (Rukzio, Schmidt, & Hussmann, 2004), much of this research is technology-focused and not situated within the context of restaurant dining. Poster size, layout, and placement clearly matter (Lichtenthal et al., 2006), yet restaurants rarely optimise these design variables systematically. Transitioning from static to dynamic, immersive designs may enhance engagement (Ding & Jin, 2024), but such interventions are often resource-intensive and less feasible for smaller establishments. Similarly, emotional triggers such as familiarity and stimulation (Hyun et al., 2011) have proved effective; however, whether these align with healthier food promotion remains underexplored.

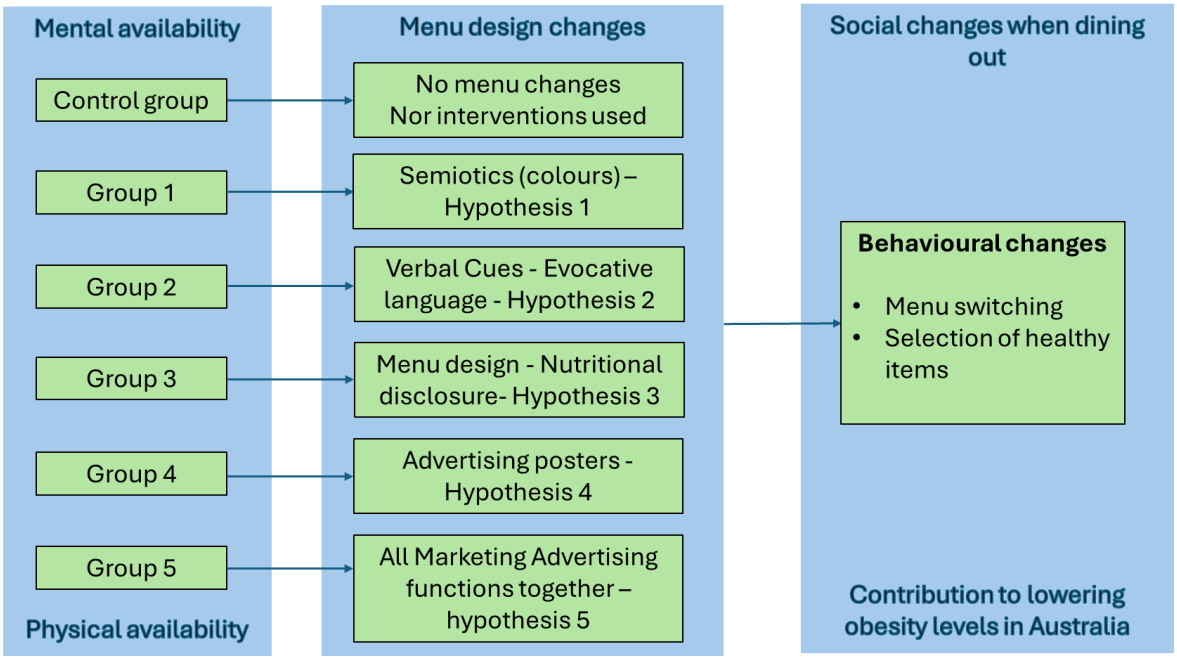
Content also matters. Studies recommend using authentic images, positive reinforcement, and motivational language to prompt unplanned purchases (Chandon et al., 2009; Inman, 2009; Street, 2004). Nevertheless, when applied to healthier meals, this requires careful balancing of egoistic and altruistic appeals to overcome risk perceptions (Shrum, 2012; Kareklas, Carlson & Muehling, 2014; Pechmann & Catlin, 2016; Yadav, 2016). Few studies, however, have tested these messaging strategies in real-world restaurant contexts where immediate decisions are often made. Moreover, while health promotion research has long recognised, the educational role of point-of-purchase interventions (Forster-Coull & Gillis, 1988; Allen et al., 2015; Chiciudean et al., 2019) in most evaluations have been tied to long-term campaigns. Their ability to influence on-the-spot, time-pressured choices in restaurants remains under-researched. Since the introduction of kilojoule labelling regulations in New South Wales (2011) and Victoria (2018), many restaurants have adopted nutritional disclosure and health-themed

promotions as part of their brand differentiation strategies (Australian Government Department of Health, 2020). However, research indicates that while these disclosures raise awareness, their influence on behaviour is limited without supportive promotional framing, such as persuasive language, visual emphasis, or motivational messaging (Dixon et al., 2015; Wellard-Cole et al., 2021). Consequently, the practical application of marketing advertising functions in this sector increasingly relies on integrating informational and emotional appeals. The challenge for industry and policymakers lies in designing integrated and context-specific advertising interventions that promote healthier selections without compromising the sensory and experiential value central to dining culture.

The literature underscores the promise of marketing advertising functions and in-store advertising but also reveals critical gaps—inconsistent adaptation of marketing advertising functions to hospitality in Australia, limited empirical work in restaurant contexts, neglect of synergistic effects, and underexplored health-related outcomes. This study addresses these gaps by testing the real-time influence of integrated marketing functions, posters, semiotics, evocative menu descriptions, and staff nudges within the natural dining environment. This approach extends both theoretical understanding and practical application of marketing advertising functions in the Food Service Sector in Australia.

The following figure provides a visual aspect of this thesis.

Figure 2.2 Conceptual Framework: IMC, In-store Advertising and Health Food Choices



The conceptual framework illustrates how marketing communication interventions influence consumers' healthy food choices through a series of interconnected constructs. The first construct, mental and physical availability, represents the consumer's awareness of and access to healthier menu alternatives. These two forms of availability underpin how effectively marketing stimuli are perceived and acted upon at the point of choice (Sharp, 2010).

The second construct, menu design changes, operationalises the key marketing advertising functions (MAFs) tested across five experimental groups. Each intervention, ranging from semiotic cues (colours and symbols) to evocative descriptions, nutritional disclosure, and advertising posters, represents a form of persuasive communication intended to modify consumer perceptions and prompt behavioural responses. When these functions are combined (Group 5), they represent an integrated marketing communication (IMC) approach expected to yield a more substantial cumulative effect (Kitchen & Burgmann, 2015).

The third construct, social changes when dining out, reflects how these interventions translate into behavioural changes, including menu switching and increased selection of healthy items. These social and behavioural responses demonstrate how environmental cues interact with psychological triggers, consistent with Fogg's Behaviour Model (2009), where motivation, ability, and contextual triggers jointly produce behavioural action.

Overall, the relationships among these constructs establish the theoretical basis for the study's hypotheses: that marketing advertising functions, acting as behavioural triggers, can increase healthy meal selection and thereby contribute to public health outcomes such as reducing obesity levels in Australia. The following sections elaborate on each construct in greater detail, linking them to relevant theory and empirical evidence.

2.5 Importance of Mental and Physical availability of healthy meals in restaurants

2.5.1 Mental availability of healthy meals

Mental availability (MA) reflects the likelihood that a brand or product will come to mind during the decision-making process, influencing its inclusion in the consumer's consideration set—a key determinant of purchasing behaviour (Terech, Bucklin, & Morrison, 2009). Horowitz and Louviere (1995) maintained that this set-formation is the first step in a two-stage process, followed by selection among the shortlisted options, while Hauser and Wernerfelt (1990) argued that the perceived utility of a product, based on its benefits minus the associated search costs, guides the formation of the consideration set.

Since purchasing decisions are often habitual and non-conscious (Steidl & Genco, 2015), marketers focus on embedding brand-related memory structures through relevant messaging and attribute associations. These cognitive shortcuts, or **heuristics**, are developed via reinforcement, and social, and evolutionary learning (Hutchinson & Gigerenzer, 2005). Gigerenzer (2008) defined heuristics as serving three core roles:

(1) the **adaptive toolbox**, which refers to the mental strategies people use in specific contexts.

(2) **ecological rationality**, which assesses the match between heuristics and environments (in this case, Australian dining contexts).

(3) **design**, which applies these insights to craft decision environments such as restaurant menus or advertisements, that guide healthier choices.

Sharp and Romaniuk (2016) describe mental availability as the buyer's likelihood of noticing or recalling a brand at the point of purchase, driven by the quality and quantity of memory associations. In this context, **brand salience**, defined as visual prominence (e.g., colours, movement, or sound), is critical. Guido and Guido (2001) identified such stimuli as fundamental to attracting consumer attention. When applied to health messaging in restaurants, these heuristics enable healthy meals to achieve salience, provided they are cognitively primed in consumers' minds.

Ullah, Jan, and Jan (2011) found that advertisement location and visual positioning strongly impacted brand recall—even minimal exposure (e.g., a single eye fixation) can trigger memory priming, affecting which brands or meals are considered. This has direct relevance in restaurant environments where point-of-sale displays and semiotic cues (e.g., colour or menu layout) can function as attention-grabbing nudges.

Australian consumers since the 1990s have become increasingly conscious of nutritional value when dining out (Yoon et al., 2020). Fullmer (1991) noted that early health-focused advertising (e.g., breakfast cereals) shaped consumer perceptions. Still, Worsley (2002) warned that nutritional knowledge alone is insufficient for behavioural change unless accompanied by improved marketing design and communication strategies. This aligns with the core premise of the thesis: that **nudging** via cognitive heuristics and visual design builds mental availability for healthy food choices.

Thus, this study leverages heuristics and brand salience principles to enhance the mental availability of nutritious meals at the point of decision-making in restaurants, especially for patrons who may not inherently prioritise health-related information but can nevertheless be nudged by simple promotional tools that increase the salience and visibility of healthier options (Downs, Loewenstein, & Wisdom, 2009; Romaniuk & Sharp, 2004; Wansink, 2004).

2.5.2 Physical availability of healthy meals

Physical availability (PA) refers to the ease with which consumers can locate, access, and purchase a product or service (Sharp & Romaniuk, 2016). In restaurant contexts, this concept translates to the visible and regular presence of healthy meals on menus and promotional materials. If nutritious options are absent from physical menus or poorly promoted consumers, regardless of their awareness, are unable to make informed choices. Therefore, PA is a foundational requirement for enabling behaviour change, making it a vital focus for policymakers, restaurateurs, and marketing researchers.

Sharp and Romaniuk (2016) argue that mental availability, or brand salience, is ineffective without corresponding physical access to the product. In hospitality settings, this underscores the importance of offering a broad and visible range of healthy meals to ensure consumers can act on their preferences or nudge intentions. This research supports the idea that combining nudging strategies with increased physical access can enhance both cognitive recognition and behavioural outcomes, thus shifting ordering patterns towards healthier alternatives.

Supporting this notion, Stockwell and Gruenewald (2004) found a strong relationship between increased physical availability and greater consumption of available products. Translating this to food choice, expanding the presence of healthier dishes may directly influence customer behaviour. However, the concept of diminishing marginal returns must also be considered. Adding more healthy options does not always result in a proportionally greater uptake. Future research should investigate at what threshold (in terms of the percentage of healthy items offered) additional menu items significantly cease to affect ordering patterns.

Overall, this section highlights that physical availability is a prerequisite for effective public health promotion in restaurants. Without it, marketing communication, nutritional labelling, and behavioural nudges cannot succeed in changing consumer behaviour. This reinforces the importance of system-level changes in menu design and policy implementation to ensure health-promoting options are not only mentally available but also readily accessible.

2.6 Point-of-Sales Functions

2.6.1 Use of Nudging Tools

Semiotics functions as a cognitive, affective, and behavioural nudge in advertising, aiming to subtly influence consumer food choices through strategic messaging (Bucher et al.,

2016; Cai, 2020). Nudging, as defined by Bucher et al. (2016), involves making minor adjustments to messaging and the environment to encourage specific behaviours without coercion. Cai (2020) frames this as the application of subtle psychological cues offering a cost-effective behavioural tool. Harrington & Lane (2013) highlight the advancements in persuasive message design, while Waughtal et al. (2021) stress the importance of tone, relevance, and language in determining message effectiveness.

Marketing functions that are informative in nature,such as nutritional labels, food positioning, and visibility enhancements,serve as nudges that promote healthier eating (Scrinis & Parker, 2016; Cadario & Chandon, 2020; Leng et al., 2017). As policy shifts increasingly target population-level dietary changes, marketing strategies within food environments have gained attention for their public health impact (Bucher et al., 2016; Hummel & Maedche, 2019). Policymakers are therefore urged to consider these techniques as viable interventions (Cadario & Chandon, 2020; Kersh, 2015).

In the Australian context, Kelly (2009) reports strong consumer support for front-of-pack nutritional information, particularly about saturated fat, sugar, sodium, and total fat. However, restaurants may sometimes use hyperbolic or misleading language in their promotional materials (Callister & Stern, 2007; Lee & Nguyen, 2013). However, this can also align with cultural trends, such as the use of "hipster" language, which can increase interest in healthy foods (Hairon et al., 2017). This study investigates whether evocative descriptions can positively influence consumers' choices of healthier meals.

Nudging or “choice architecture” operates in real-time dining scenarios where subtle interventions, such as posters or naming strategies, guide consumer choices without restricting freedom (Bucher et al., 2016; Kroese et al., 2015; Guthrie et al., 2015; Hanks et al., 2012; Keller et al., 2015; Wilson et al., 2016). Historical perspectives (Ehrenberg, 1774; Barnard &

Ehrenberg, 1997) support this approach, arguing that nudges can help consumers focus on a limited set of choices. While Thaler and Sunstein (2021) advocate for nudges that align with consumer interests, Sugden (2009) critiques this model, noting its normative biases that prioritise the nudger's view of well-being over that of the consumer. Bucher et al. (2016) call for high-quality research using clearly labelled nutritional nudges (e.g., grams of "good" or "bad" ingredients), and Thaler (2018) warns against "sludging", nudging for organisational gain rather than consumer benefit, a concern this study seeks to address.

This research focuses specifically on cognitive nudges relevant to the restaurant environment and emphasises their significance not only for marketing scholars but also for hospitality practitioners and policymakers. These findings highlight the potential of environmental design and behavioural nudging in hospitality settings to support broader public health goals, such as reducing obesity in Australia and other developed nations.

2.6.2 Semiotics (Heuristic shortcuts)

In the restaurant industry, colour operates as a powerful semiotic device, conveying meaning and shaping customer behaviour through subconscious cues (Barthes, 1961; Chandler, 2007). As a form of visual language, colour helps diners interpret the type of cuisine, pricing, ambience, and food quality. Its role is especially potent in nudging strategies, such as traffic light labelling—**green** for healthy, **amber** for moderate, and **red** for unhealthy choices (van Kleef et al., 2015). When embedded in marketing and environmental design, colour becomes a non-verbal communication tool, guiding consumer decisions with minimal cognitive effort.

This aligns with heuristic theory, which posits that consumers use mental shortcuts to simplify their decisions (Shah & Oppenheimer, 2008; Simon, 1990). In hospitality, colour serves as a heuristic that facilitates the rapid interpretation of stimuli (Weick, 1995; Weick & Sutcliffe, 2005), often aligning consumer meaning with marketers' intended messages (Mick et al., 2004; Neuhauser & Kreps, 2010; Andersen, 2001). However, as Wansink et al. (2005) and Spence et al. (2014) noted, empirical research isolating semiotic elements in real-world hospitality contexts remains limited.

Despite government and societal efforts to promote healthy eating (Joop de Boer, 2007; Jolly, 2011; Australian, 2017), many Australians still lack clear prompts to make informed dining decisions. Inman (2009) suggested that simplifying menus and emphasising healthier options could reduce confusion which this study addresses by leveraging semiotic colour interventions, such as green menu folders, to test their effectiveness in a live restaurant setting.

Several empirical studies support the use of semiotics and heuristics in influencing food choices. Martinez et al. (2015), drawing on NEMS (Glanz et al., 2007), demonstrated that increasing healthy options and promotional semiotics in rural settings enhanced restaurant environments. However, behaviour change was minimal (Martínez-Donate et al., 2015). Similarly, observational data from McDonald's restaurants revealed low uptake of healthy meals (Wellard, Glasson, & Chapman, 2012), and Atkinson and Palmer (2011) found that mass advertising had a limited behavioural impact, despite nutritional branding efforts.

In workplace cafeterias, meta-analyses by Hendren and Logomarsino (2017) revealed that interventions, including visual salience, successfully increased fruit and vegetable consumption in most cases. However, many studies rely on self-reported data, which this thesis avoids by examining actual consumer behaviour in real-time (Ericsson & Polson, 2014).

Research by Sonnenberg et al. (2013) showed that traffic light colour labelling positively influenced choices in a Boston cafeteria; however, the health-conscious employee sample may have skewed the results. Song et al. (2023) expanded semiotic theory via a cue–judgment–behaviour model, illustrating that typographic design can affect authenticity perceptions in restaurant menus.

The importance of heuristics in hospitality marketing is further supported by Kimes & Thompson (2005) and Fahimnia et al. (2013), who linked them to increased revenue and order volume. Vasiljevic, Pechey, and Marteau (2015) similarly supported making food labels more socially accessible through semiotics. Research by Gillon-Keren et al. (2020) and Schuldt (2013) highlights how green colour labelling influences perceived healthiness, while Ares et al. (2011) confirmed that consumers interpret colour-coded cues accurately. Even simple cues, like green jars (Sonnenberg, 2013) and colour-coded menus (Osman & Thornton, 2019), can subtly guide choices. Foundational advertising studies by Alexander et al. (1995), Zakia and Nadin (1987), and Domzal and Kernan (1992) all reinforce the importance of semiotic signals in driving cognitive and behavioural change. Forster-Coull (1988) and Anderson (1990) also noted that images and colour combinations, such as red for heart-healthy meals, help prompt better ordering decisions.

Madden et al. (2000) and Piqueras-Fiszman et al. (2012) found that colour meanings, especially **green**, were cross-culturally linked to health and freshness. Singh (2006) suggested that up to 90% of rapid purchase decisions may rely solely on colour cues.

However, not all findings are positive. Evans et al. (2016) found minimal behavioural shifts from menu labelling, especially among low-income consumers who prioritised price and taste over health. These mixed outcomes reveal the complexity of applying semiotics effectively and the importance of multi-pronged nudging strategies.

In conclusion, colour as a semiotic and heuristic device holds promise for influencing food choices in restaurant settings—particularly when integrated into broader marketing efforts. Despite mixed empirical outcomes, the literature suggests that strategically designed colour cues, such as green menus, can simplify nutrition information and subtly guide diners towards healthier choices. This thesis addresses a clear research gap by empirically testing these cues in a real-world setting, thereby contributing new insights for public health policy, hospitality marketing, and behavioural science.

2.6.3 Menu item positioning using evocative language in restaurants

Although research has highlighted the importance of menu item visibility and positioning in hospitality settings (Ozdemir & Caliskan, 2015; Noone & Cachia, 2020), few studies have examined these tactics in combination with marketing advertising tools. Positioning, appealing presentation, and informational cues act as cognitive nudges, effectively influencing consumer behaviour and food choices. This study aims to extend empirical understanding of such nudges within restaurant environments—an often-overlooked but culturally significant setting (Close et al., 2016).

Menu design and food description significantly influence customer behaviour. Evocative language in item descriptions can guide ordering decisions, as noted by Ozdemir and Caliskan (2015) and Bagna and Machetti (2012), while Hartwell and Edwards (2009) emphasise the interplay between verbal explanations and visual food presentation. This intersection of semiotics and menu curation supports what Chau (2014) refers to as “culinary subjectification”,

where evolving consumer tastes influence how menus and dishes are constructed and interpreted.

Menu selection involves more than rational elimination (Huffman & Houston, 1993); instead, consumers respond to emotive and sensory cues, often shaped by the halo effect created through appealing labels and ingredient descriptions (Jeong & Jang, 2020; Bacig & Young, 2019). Piqueras-Fiszman and Spence's (2015) literature review confirmed that pre-consumption visual or linguistic cues create specific expectations about taste, origin, preparation, and identity of a dish, shaping the entire dining experience.

Empirical studies (McCall & Lynn, 2008) demonstrate that evocative wording enhances item selection. In contrast, Din et al. (2012) caution that unmet expectations, resulting from food that fails to match its description, can lead to customer dissatisfaction. This study examines whether the use of pretentious and descriptive menu language alone can influence consumer ordering patterns toward healthier alternatives, independent of other variables. The literature further confirms that evocative descriptions enhance product visibility and cognitive recall, serving as semiotic cues to influence perceived value and healthiness (Ozdemir & Caliskan, 2015; Noone & Cachia, 2020). Such language-rich cues promote emotional connection and guide consumer decision-making (McCall & Lynn, 2008; Piqueras-Fiszman & Spence, 2015). Their impact is magnified when paired with transparent nutritional information, such as kilojoule disclosures or interpretive labels. Together, these components foster informed choices, build trust, and reinforce the persuasive power of strategic menu design in advancing health-promoting behavioural shifts.

2.6.4 Food Information disclosure on in-house menus regarding the nutritional value of meals

Extensive research has examined consumer motivation for dining out and food selection (Glanz et al., 1998; Leonard, 2008; Blundell, 2000; Dumanovsky et al., 2009; Pantelidis, 2010), but limited attention has been paid to the role of in-store advertising and Integrated Marketing Communication (IMC) functions in shaping *real-time* ordering behaviour in restaurant settings. Campaign evaluations, such as McDonald's Heart Foundation Tick initiative, demonstrated low uptake of promoted healthy options (Atkinson & Palmer, 2011), highlighting discrepancies between health promotion intentions and behavioural outcomes (National Heart Foundation, 2007).

The HELENA study (EUFIC, 2005) found that taste, price, and quality dominate consumer decisions, with only 32% prioritising health. In Australia, poor product awareness and limited nutritional transparency further hinder informed decisions (Hayne, Moran & Ford, 2004; Brownell et al., 2010). While McCluney (1989) initially proposed restaurant nutrition disclosure, Campos, Doxey, and Hammond (2011) validated its credibility but noted persistent issues with comprehension.

Though nutritional labelling correlates with healthier choices (Joop de Boer, 2007; Jolly, 2011), its practical effectiveness remains mixed. O'Dougherty et al. (2006) supported its perceptual impact but stressed methodological limitations. Meanwhile, Australian consumers are increasingly demanding transparency in nutrition (Kelly, 2009), although trust remains low with only 22% trusting nutrition panels and 44% distrusting packaging health claims (Riley et al., 2016). Similar issues were echoed in New Zealand (Mhurchu & Gorton, 2007).

Calorie labelling has shown modest effects. While some studies have demonstrated reduced caloric intake (Wisdom et al., 2010; Cranage et al., 2005), limitations include small sample sizes and confounding factors. Meta-analyses by Kiszko et al. (2014) and Schwartz et al. (2012) found only slight behavioural changes. Nutritional labels often lack educational framing (Brambila-Macias, 2011; Pavesic, 2005), prompting researchers such as Pratt et al. (2016) to advocate for graphical, simplified presentations, which have significantly improved caloric and protein intake outcomes.

Despite these findings, average calorie reductions reported by Pulos and Leng (2010), Bowen and Morris (1995), Liu et al. (2012), and others were statistically insignificant. Labelling also appears less effective for low-income consumers who prioritise price (Kim et al., 2013). Nonetheless, studies by Kozup et al. (2003) and Mills and Thomas (2008) reported positive consumer attitudes towards nutritional information. The effectiveness of menu labelling remains inconsistent (Albright, 1990; Swartz et al., 2011; Burton & Creyer, 2004). While point-of-sale labelling is endorsed (Harnack & French, 2008), Krieger et al. (2013) cautioned that its impact may be limited to specific demographics, particularly women.

In the Australian context, kilojoule labelling, the current standard, has been criticised for its lack of clarity, with research supporting a return to calorie-based units (Quiggin, 2013; Neale & Tapsell, 2022). In addition, inconsistent menu labelling policies across states (e.g. Tasmania, WA, NT) create a fragmented regulatory environment. International studies (Finkelstein et al., 2011; Cohn et al., 2012; Chu et al., 2009) similarly show marginal improvements in healthier ordering.

Although consumers desire nutritional information (Neale & Tapsell, 2022), Atkinson and Palmer (2001) found no behavioural shift from in-store advertising posters alone, questioning their efficacy as standalone interventions. This research addresses that gap by examining the

influence of strategically designed posters featuring nutrient information in grams, focusing on actual ordering behaviour.

Unlike previous studies reliant on *self-reported intentions*, this study employs a behavioural, field-based method to observe real-world effects of IMC strategies, visual prompts, and semiotic cues on healthier choices (Campos et al., 2011; Swartz et al., 2011; OPC, 2019). It aligns with Australian consumer preference for calorie-based labelling (Quiggin, 2013; Neale & Tapsell, 2022). By embedding menu labelling within broader IMC strategies, the research integrates behavioural heuristics and nudging principles to inform cost-effective interventions for restaurateurs, policymakers, and public health stakeholders—without relying on incentives or legislative mandates.

2.6.5 Advertising TV Posters in Restaurants

Advertising posters placed at the point of purchase have emerged as cost-effective tools for influencing consumer decision-making in fast-paced restaurant environments. They attract attention to healthier options, promote specials, and introduce new meals, offering long-term utility due to their low production costs and visual prominence.

Despite their widespread use, empirical research on their influence in restaurant settings remains sparse. Rexha et al. (2010) demonstrated that poster visibility and the availability of healthy food could shift preferences among schoolchildren, although the study's demographic limitations and lack of longitudinal scope reduced generalizability. Lytle et al. (2006) also found that repositioning fruit in school cafeterias improved healthy food selections, confirming the impact of nudging and visual salience, although the controlled nature of the environment influenced the results. This study builds on those foundations by investigating full-service

restaurant settings with diverse customer groups and unrestricted menu options. Michie et al. (2009) and Sallis (2003) affirmed the potential of menu item positioning and promotional messaging to influence consumer choices, supporting the current study's aim of assessing integrated advertising strategies—such as semiotic cues and nutritional content—as effective nudges in real-world contexts.

Social norm messaging adds another valuable layer. Thomas et al. (2017) demonstrated that posters with pro-social messages increased vegetable-based purchases in workplace cafeterias, although restaurant-specific applications have not been tested. Xu and Huang (2019) and Zimmerman and Shimoga (2014) noted that most behavioural interventions are confined to lab or student environments, limiting their external validity. This research addresses that gap by testing poster-based nudges in a live dining setting.

Importantly, food choices are also tied to social identity (McKittrick, 2014; Shrum, 2012). Posters that integrate both egoistic (personal benefit) and altruistic (social/environmental impact) messaging, as described by Kareklas, Carlson, and Muehling (2014), increase consumer engagement. Pechmann and Catlin (2016) and Yadav (2016) further noted that health messages are more persuasive when they are aligned with identity and personal benefits.

Accordingly, this study utilises in-house posters and digital displays with simplified nutritional information (e.g., grams of salt, fat, and sugar) alongside semiotic markers such as colour coding and health-related icons. This dual-format strategy aims to nudge real-time food decisions without limiting consumer autonomy.

In conclusion, while the literature (Rexha et al., 2010; Lytle et al., 2006; Thomas et al., 2017) provides early support for the effectiveness of advertising posters, it lacks generalisability, behavioural depth, and real-world diversity. This research fills that gap by evaluating the

behavioural influence of strategically designed nutritional posters in a full-service restaurant context. It integrates principles of behavioural science and social signalling to inform scalable, commercially viable interventions that align public health and hospitality performance.

The following section will examine how combining visual cues, semiotics, and transparent nutritional disclosures in posters can enhance health outcomes in out-of-home dining environments.

2.6.6 Point-of-Sales Advertising Posters with Nutritional Information in Restaurants

Governments and NGOs have long emphasised the public health importance of promoting healthy food consumption (Finkelstein et al., 2004; Jeffery et al., 2006), with Australian authorities increasingly concerned about the economic burden of obesity (McCormick et al., 2007; Swinburn et al., 2011). Simultaneously, consumers are expressing growing interest in having access to nutritional information to support informed food choices in dining settings (Barreiro-Hurlé, Gracia, & De-Magistris, 2010; Prathiraja & Ariyawardana, 2003; Silayoi & Speece, 2007). This joint awareness exerts subtle pressure on restaurants to offer and promote healthier meals (Jolly, 2011).

Internationally, Canada's Health Check initiative has shown that voluntary nutrition labelling can positively influence consumer behaviour by increasing attention to nutritional details during ordering (White et al., 2016). Similar effects have been reported for labelling systems like calorie counts and 'Traffic Light' schemes (Hammond et al., 2015; Sonnenberg et al., 2013), yet such strategies remain largely untested in Australian restaurant settings.

Australians are spending approximately $95 weekly on dining out (Brindal, 2010; Future Foods, 2018), with takeaways outpacing home-cooked meals (Elliot, 2012; Adams et al., 2015). Despite this trend, only 19% of food advertising promotes healthy options, accounting for just 6% of total advertising expenditure (Chapman et al., 2006). Outdoor advertising, including billboards and posters, has been shown to have a significant impact on consumer food choices (Kamal & Wilcox, 2014). Similarly, Glanz and Hoelscher (2004) noted some improvement in fruit and vegetable consumption through point-of-purchase (POP) strategies, although this improvement was not statistically significant.

Australians have expressed a preference for clear and standardised nutritional labelling, with particular concerns regarding sugar, sodium, saturated fat, and protein (Kelly et al., 2009). Evidence suggests that nutritional disclosure can shift consumer ordering behaviour toward healthier choices, including substitutions for side dishes (Cranage, Conklin, & Lambert, 2005; Wisdom et al., 2010). However, short-term studies have often failed to capture lasting effects. For instance, Fitzgerald et al. (2004) found no significant change in healthy meal sales after a two-week poster campaign. In contrast, the current longitudinal study aims to assess the sustained impact of in-store advertising and nutritional labelling over a longer period.

By gathering sales data before and after point-of-sale interventions, this research aims to quantify the relationship between IMC functions, such as advertising posters and menu-based nutritional information, and customer behaviour. In doing so, it contributes to understanding how marketing tools might support both healthier consumer choices and broader efforts to reduce obesity rates in Australia.

2.6.7 Simultaneous Use of Different Marketing Advertising Functions

This thesis investigates the combined impact of key marketing advertising functions (MAFs), including semiotics (e.g., green menu folders), nutritional information disclosure, point-of-sale (POS) advertising posters, and evocative menu language, on influencing healthier food choices in restaurant settings. Each intervention is examined both independently and synergistically to determine its role in nudging consumer behaviour towards more nutritious options.

The literature reveals strong associations between these interventions and increased healthy meal selections. However, the effectiveness of POS tools, particularly advertising posters and nutritional nudging, remains insufficiently studied. Specific contributors, such as visually salient materials and strategic language, are noted as critical to encouraging light and healthy meal choices (Cadario & Chandon, 2020; Michie et al., 2009).

Liberato, Bailie, and Brimblecombe (2014) concur, with their environmental modification framework highlighting the importance of mental and physical availability at the point of consumption. Their systematic review of 32 POS interventions revealed that short-term monetary incentives yielded the most promising results, while other approaches, like education and food positioning, require more robust evidence. They also noted a lack of clarity around the mechanisms driving behavioural outcomes, calling for more rigorous real-world studies.

This research responds to that call by applying and evaluating MAFs in full-service restaurant environments, thereby extending the work of Liberato et al. (2014) and addressing the limitations of earlier studies. It also contributes to the broader social marketing literature by

demonstrating how commercial marketing tools can be repurposed to facilitate voluntary, health-positive behaviour change in everyday dining contexts.

Despite growing scholarly interest in behavioural interventions designed to influence food choice, empirical research comparing multiple marketing communication strategies within restaurant environments remains limited. Much of the existing literature examines individual interventions in isolation rather than evaluating their relative effectiveness when implemented together. For example, studies on menu communication have demonstrated that descriptive menu labels can significantly increase sales of menu items by enhancing perceived quality and appeal (Wansink, Painter, & Van Ittersum, 2001). Other research has explored the impact of environmental and behavioural cues such as product visibility, placement, and promotional prompts within food service settings, showing that contextual signals can influence food selection (Hanks, Just, & Wansink, 2013). Similarly, broader behavioural economics research has compared several strategies designed to encourage healthier food choices, including informational disclosure, defaults, and environmental nudges (Downs, Loewenstein, & Wisdom, 2013). However, these studies typically focus on single interventions or limited comparisons, often conducted in laboratory or institutional settings such as cafeterias rather than commercial restaurants. As a result, little empirical evidence exists that systematically evaluates multiple integrated marketing communication (IMC) tools within the same restaurant environment or ranks their relative effectiveness in influencing real-time ordering behaviour. This gap is significant because restaurant menus and in-store promotional materials operate simultaneously as part of a broader communication ecosystem. Without comparative evidence, it remains unclear which marketing communication strategies produce the strongest behavioural responses when consumers make rapid food decisions. Consequently, there is a clear need for research that examines multiple marketing interventions within a single restaurant context and compares their relative effectiveness using real consumer purchase data.

The following section will expand on how these findings reinforce and extend current social marketing frameworks in hospitality and public health, examining consumers' current knowledge of dining out.

2.7 Consumers' knowledge and restaurant behavioural trends in Australia

The literature identifies two key consumer segments motivating restaurant visits: "Kitchen Challenged" diners and "Socially Bonded" diners, shaped by distinct push factors (Bose, 2022). The latter group is drawn to environments that foster social connection, such as events, group offers, and celebratory occasions (important for the qualitative section of this research). Restaurants function as extensions of the home, offering comfort through familiar menus and a hospitable ambience (Pettersson & Fjellström, 2007).

In the Australian context, health awareness is on the rise. IPSOS (2016) and Thatsugarmovement (2017) found significant consumer interest in eating more fruit and vegetables (40%), reducing portion sizes (31%), and decreasing sugar and fat intake. Still, information sources like online articles and social media have heavily influenced consumer health beliefs and spending ($13.6 billion in 2018 on healthy food) (Spicenews, 2018). While Fullmer (1991) noted a positive attitude towards healthy eating, gaps in consumer understanding persist, particularly across socio-economic classes. Nevertheless, health information has increasingly shaped dining decisions (Jones, 2009). Environmental and ethical concerns also influence behaviour. Schubert (2008) reported that consumers valued "**green**" practices and were willing to pay more at eco-friendly restaurants. As Yoon et al. (2020) noted,

consumer interest in nutritional awareness has grown since the early 1990s. This began with at-home evaluations of food marketing claims (Fullmer, 1991), where nutritional messaging was a differentiator, particularly in breakfast cereals.

However, Worsley (2002) cautioned that nutritional knowledge alone is insufficient to drive behavioural change. Instead, marketing strategies must facilitate more transparent display and interpretation of information. This aligns with Blaylock et al. (1999), who noted that a greater understanding of health benefits enhances consumer commitment to healthier meals. Lemmens et al. (2008) reinforced the importance of large-scale promotion in improving dietary behaviours, while Fitzpatrick et al. (1997) found that higher consumer satisfaction was associated with healthier options.

Consumer behaviour is also driven by habit, which can undermine healthy eating goals. Marketing incentives play a crucial role, particularly among consumers with poor dietary habits, resulting in measurable weight benefits. Kim et al. (2013) found that seniors are more influenced by the "lifestyle of health and sustainability" (LOHAS), showing greater trust and emotional loyalty to healthy eating efforts than younger diners.

This research investigates whether marketing communication, particularly that aimed at promoting healthier menu items, can be effective across diverse consumer demographics, including varying age and weight groups (Chan, Kwortnik, & Wansink, 2017). Traditional marketing has often overlooked the **mental and physical availability** of healthy choices, despite their centrality to changing behaviour.

Originating from Sharp's (2010) work on brand growth, these concepts—now used in food promotion—emphasise the need to make healthier options more visible, accessible, and cognitively salient. These findings lay the foundation for the next section, which links these

marketing strategies to Fogg's Behaviour Model (FBM), illustrating their conceptual and applied relevance in promoting healthy ordering patterns in restaurants.

2.8. Social Marketing - Rationale for the Theoretical Framework

2.8.1 Background to social marketing

Social marketing, as defined by the National Social Marketing Centre (NSMC, 2024), is a strategy designed to promote behaviour that benefits both individuals and society. Although the field has traditionally focused on individual behavioural change (Truong, 2014), it is evolving to include a broader range of methodologies, including mixed methods and qualitative approaches that assess the societal impact of such interventions.

Despite growth in social marketing research in Australia, literature explicitly targeting consumer behaviour in the food service sector —especially in dynamic contexts like restaurants and takeaways, which are more trend-sensitive than other parts of the hospitality industry— is sparse (Johns & Pine, 2002; Williams, 2012; Dixit, 2017). Understanding ordering motivation and the role of marketing communications is crucial in these settings (Astuti & Hanan, 2011; Parsa, Dutta & Njite, 2017; Izquierdo-Yusta et al., 2019; Ying-Yen, 2022).

This thesis uses Fogg's Behaviour Model (FBM) as the primary theoretical framework, due to its emphasis on real-time behavioural triggers (motivation, ability, and prompt). FBM is preferred over traditional cognitive and affective models (e.g., Theory of Planned Behaviour,

Social Cognitive Theory) for its direct applicability to observable consumer actions in situ, such as ordering in restaurants.

While cognitive models, such as the Extended Theory of Planned Behaviour (ETPB), focus on intention formation (Kim et al., 2013; Tommasetti et al., 2018), they often fall short in explaining irrational consumer choices, including the continued consumption of unhealthy foods despite health awareness. This limitation highlights the need for behaviourally informed approaches that incorporate heuristics, nudges, emotional triggers, and environmental cues (Chen & Girish, 2023).

The section also aligns with recent trends in social marketing which favour behavioural tools over rational appeals. For instance, Kang, Jun, and Arendt (2015) emphasised the impact of individual health values and hedonic expectations on behaviour. This research builds on such insights by integrating qualitative data to explore consumer values and validating these findings through quantitative measures after marketing interventions.

In summary, the findings of this thesis contribute to social marketing by demonstrating how traditional marketing tools, when reframed through behavioural science, can support public health goals in the Australian hospitality industry. It further argues that real-world restaurant interventions should move beyond cognitive models and instead utilise behavioural nudges and heuristics, making social marketing a suitable guiding framework for influencing consumer decisions in restaurant environments.

2.8.2 Rationale for Theoretical Frameworks for this research – Behavioural models

This research integrates multiple theoretical frameworks and behavioural, cognitive, and marketing communication models to examine how restaurant-based marketing and advertising functions influence consumer choices towards healthier meals. The use of diverse theories is justified by the complex, multifactorial nature of food decisions which involve both conscious reasoning and subconscious heuristics.

The Theory of Planned Behaviour (TPB) and its extension, the Extended Theory of Planned Behaviour (ETPB), offer foundational insights into how attitudes, norms, and perceived control shape behavioural intentions (Kim et al., 2013; Tommasetti et al., 2018). However, these models fall short in explaining irrational behaviour, such as knowingly selecting unhealthy meals, and they neglect the role of heuristics—an important factor in real-time dining decisions. Given this limitation, the current research does not focus on attitude formation, but rather on situational cues influencing ordering behaviour.

Social Cognitive Theory (SCT) contributes additional explanatory value by addressing observational learning, self-efficacy, and outcome expectations. It emphasises how consumers model healthy behaviour when exposed to peer actions or persuasive marketing, aligning well with social marketing interventions aimed at both internal beliefs and external stimuli.

The Fogg Behaviour Model (FBM) provides a targeted behavioural lens, asserting that behaviour change occurs when motivation, ability, and a prompt co-occur. This model is especially relevant in point-of-sale (POS) contexts where decisions are made quickly, often in response to environmental cues like posters or simplified nutrition labels.

This framework is further supported by social marketing principles (NSMC, 2024) which advocate the use of communication tools, including semiotics and nudging, to promote public health. Elements such as menu labelling, poster prompts, and health-related symbolism enhance both the mental and physical availability of healthy choices, guiding heuristic-driven decisions that align with societal benefits. In conclusion, integrating and analysing TPB, SCT, SAT, HBM, and FBM provides a comprehensive foundation for exploring how Integrated Marketing Communication (IMC) strategies in restaurants influence health-oriented food choices. This multifaceted approach allows the study to address both intentional and non-intentional behaviour, yielding practical insights for empirical application and policy development.

2.8.2.1 The Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) has been widely used in public health and behavioural science to explain decision-making, including food choices (Godin & Kok, 1996; Ajzen & Manstead, 2007). It centres on three main predictors of behavioural intention: attitudes, subjective norms, and perceived behavioural control (PBC) (Smelser & Baltes, 2001; Hagger et al., 2022). While these constructs offer a strong foundation for understanding health-related behaviour, TPB assumes rational, deliberate decision-making which may not align with spontaneous and emotionally driven choices in restaurant settings (Wilcock et al., 2004; Harnack & French, 2008; Kang, Jun, & Arendt, 2015).

Research indicates that attitude alone is often insufficient to predict actual ordering behaviour in dining contexts, where motivation such as taste expectations frequently overrides health considerations (Wilcock et al., 2004; Kang et al., 2015). TPB does not explicitly account for real-time triggers or environmental cues, such as menu design and point-of-sale marketing stimuli, that significantly influence in-the-moment choices. To address TPB's shortcomings, the Extended Theory of Planned Behaviour (ETPB) integrates additional constructs, such as perceived usefulness and curiosity, to better understand impulsive consumer behaviour in dining environments (Tommasetti et al., 2018). Studies by McDougall (1921), Chang et al. (2013), and Spielberger andStarr (2012) highlight curiosity as a strong predictor of behavioural intention. However, experimental designs to measure curiosity are complex, potentially biasing participant responses, especially when financial incentives or repeat visits are used.

However, there are several limitations of TPB in this research context:

1. Inadequate for Real-Time Triggers - TPB does not consider the impact of environmental prompts such as signage, semiotics, and advertising which are critical in influencing behaviour at the point of decision.
2. Rational Decision-Making Bias - The model assumes intentional and reasoned behaviour, whereas restaurant choices are often made under time pressure or emotional influence, making heuristics and nudges more relevant.
3. Neglect of Ability/Simplicity - Although PBC is included, TPB does not sufficiently address how ease of action (e.g. menu clarity, healthy item visibility) shapes behaviour. In contrast, Fogg's Behaviour Model (FBM) places ability, defined as simplicity, at the centre of behaviour change.
4. Lacks Interventional Mechanism - TPB offers no framework for understanding how external interventions (like marketing communications) modify the intention–behaviour link, a core focus of this research.

As a result, this thesis moves beyond TPB, adopting Fogg's Behaviour Model (FBM) to explore real-time behaviour change driven by motivation, ability, and prompts—elements more aligned with restaurant-based food decisions and the use of marketing communication interventions.

2.8.2.2 Social Cognitive Theory

Social Cognitive Theory (SCT) developed by Bandura (1986, 1997) is grounded in the principle of self-influence through self-monitoring, self-evaluation, and emotional self-reaction (Bandura, 1991). Its central determinants of behavioural change include knowledge, self-efficacy, outcome expectations, and perceived facilitators or barriers to change (Bandura, 2001). Among these, self-efficacy —the belief in one's ability to execute behaviour —is considered the most critical component of change (Bandura, 1986, 2001).

SCT has been widely applied in health-related marketing studies, particularly due to Bandura's health promotion model which is based on goal-driven behaviour (Bandura, 1998). However, this model assumes that individuals possess predefined health goals (e.g., eating better or reducing calorie intake), an assumption not applicable to this study's target group who may not have explicit dietary intentions.

Studies such as Anderson, Winett, and Wojcik (2007) suggest that while self-efficacy influences nutrition-related behaviour, self-regulation and social support play a more significant role in actual dietary changes. These findings highlight SCT's broader scope and

indirect application in environments such as restaurants, where impulse decisions predominate and not all behavioural outcomes can be directly observed (Bandura, 2004).

Given that this study does not measure knowledge, facilitators, or barriers, SCT becomes less suitable for explaining restaurant-based ordering behaviour influenced by real-time marketing functions.

However, there are several limitations of SCT in This Research Context (Bandura, 2001; Bandura, 2004; Rothman & Sheeran, 2021; Marteau, Hollands & Fletcher, 2012). These are:

1. Focus on Long-Term Behavioural Change - SCT excels at explaining habits formed over time through observation and reinforcement but lacks the granularity to assess immediate choices made in restaurant settings, such as those triggered by signage or menu presentation.

2. Inadequate for Real-Time Triggers - SCT does not explicitly address moment-specific environmental cues (e.g., visual semiotics or menu design), which are central to this thesis examining instantaneous behaviour change.

3. Limited Emphasis on Simplicity/Ability-While SCT includes behavioural capability, it does not prioritise the simplicity or ease of executing a behaviour, core tenets in Fogg's Behaviour Model (FBM) which emphasises ability as a critical component.

4. Unsuitable for Evaluating Marketing Advertising Functions - SCT is best suited for educational or modelling-based interventions. However, this study focuses on non-verbal marketing communication tools (e.g., menu layout, descriptive language, nutritional labels) for which SCT offers no clear conceptual framework.

Although SCT offers valuable insights into social learning, self-regulation, and self-efficacy, its broad orientation and focus on long-term behavioural change make it less effective for analysing immediate, trigger-based food decisions in restaurant contexts. In contrast, Fogg's Behaviour Model (FBM) is highly relevant to this research because it is explicitly designed to explain immediate behaviour in situational contexts. FBM conceptualises behaviour as the convergence of motivation, ability (simplicity), and triggers, providing a parsimonious framework for analysing how subtle marketing and advertising cues, such as menu design, semiotics, evocative descriptions, and nutritional labelling, can instantaneously influence consumer choices without requiring prior intention or conscious deliberation (Fogg, 2009). This trigger-based logic aligns closely with evidence from choice architecture and nudging research, which is consistent that environmental cues often override attitudes and intentions in high-cognitive-load settings such as food service environments (Hollands et al., 2017; Thaler & Sunstein, 2008; Bandura, 2001; Bandura, 2004; Rothman & Sheeran, 2021; Marteau, Hollands & Fletcher, 2012). For these reasons, FBM is adopted as the primary theoretical lens in this study.

2.8.3 Rationale for Theoretical Frameworks for this research – Emotional models

.8.3.1 Social Affective Theory (SAT)

Emotional engagement plays a role in influencing customer behaviour within restaurant environments. Tsaur, Luoh, and Syue (2015) found that *aesthetic labour* enhances *positive emotions* and *behavioural intentions*. However, when food quality, ambience, and service were controlled for, neither aesthetic labour nor positive emotions significantly impacted behavioural intentions. Likewise, Jang and Namkung (2009) demonstrated that while

atmospherics and *service* elicit *positive emotions*, *product quality* helps reduce *negative emotions*, and that positive emotions mediate the link between environmental stimuli and behavioural outcomes. These findings illustrate the complex interaction between perceived quality, emotional responses, and consumer behaviour in restaurants.

More broadly, affective models focus on emotional influences such as guilt, shame, worry, concern, positive psychology, and threat messaging (Brennan & Binney, 2010; Congard et al., 2020; Rundle-Thiele et al., 2019). These models explain how people anticipate emotional consequences of their actions (Brennan et al., 2010; Brennan et al., 2020) and are commonly used in social marketing to explore risk perception and behavioural response, particularly in health-related contexts (Brennan et al., 2014; Kiviniemi et al., 2007).

However, this research does not conceptualise behaviour as a response to perceived health risk, nor does it assume that emotional engagement is the driver of food choice. The emotional appeals typically leveraged in affective models—such as guilt, shame, or fear —were not utilised in this study's interventions. Instead, it explores behaviour as a function of external prompts and situational factors in restaurant settings.

However, there are limitations of Social Affective Theory (SAT) for this research:

1. Lacks Operational Structure for Intervention Design - SAT is *descriptive* rather than prescriptive, offering limited guidance for designing structured marketing interventions such as point-of-sale messaging or menu framing. This research requires a framework that explains consumer responses to marketing stimuli, which SAT does not offer (Zajonc, 1980).

2. Overemphasis on Internal States - Emotional models primarily focus on internal emotional processes, neglecting the influence of external cues like visual semiotics,

menu layout, or persuasive descriptions. This is misaligned with the present study which investigates how environmental marketing cues at the point of decision influence behaviour (Schwarz, 2000).

3. Inadequate for Triggered Behavioural Change - AT cannot effectively account for immediate, cue-driven behaviour, a central theme of this research. In contrast, Fogg's Behaviour Model (FBM) includes *triggers*, *motivation*, and *ability*—making it more suitable for evaluating behavioural change in real-time restaurant **settings**. (Baumeister, et. al., 2007).

4. Neglect of Simplicity and Accessibility - SAT does not address how ease of action or accessibility (e.g., simple menu design or visibility of healthy items) affects behaviour. FBM, by contrast, makes simplicity and ease of execution (ability) a core feature, directly aligning with the exploration of nudging and menu interventions in this thesis (Michie, Atkins, & West, 2014).

While Social Affective Theory offers insights into emotional factors influencing food choices, its lack of a structured, predictive framework, its emphasis on internal states, and its inability to account for environmental triggers render it unsuitable for this research. The study does not aim to emotionally engage customers through messaging that evokes guilt, shame, or health threats. Instead, it examines how marketing functions, like semiotics, nutritional labelling, and evocative descriptions, influence real-time decisions at the point of sale. Therefore, Fogg's Behaviour Model (FBM) offers a more robust and contextually relevant foundation for understanding and evaluating consumer behaviour in restaurant settings.

2.8.3.2. Health Belief Model (HBM)

The Health Belief Model (HBM) is a frequently applied affective model in social marketing and public health research. Jeong and Ham (2018) employed HBM constructs to investigate the use of menu labels among 335 restaurant customers. Their study revealed that perceived threats, benefits, and barriers had a significant influence on menu label use. Importantly, *cues to action* shaped perceived threat, which then indirectly influenced label use. These findings validated the relevance of HBM to consumer health behaviour in restaurant settings and offered practical guidance for restaurant operators and policymakers to increase menu label adoption.

Central to HBM is threat perception, which connects perceived danger (e.g., disease) to one's sense of vulnerability (Champion & Skinner, 2008; Green et al., 2020; Rosenstock, 2000). Health threats within the model include illnesses such as obesity, cancer, and hypertension. However, HBM is criticised for being incomplete; it overlooks social, motivational, and situational factors, and lacks clearly defined relationships between constructs (Barclay et al., 2007; Orji et al., 2012). This weakens the model's empirical robustness and theoretical clarity.

Lee (2013) applied both TPB and HBM to assess healthy eating behaviour in casual dining settings. The study found that attitudes and subjective norms were significant predictors of intentions, while perceived behavioural control was not. For actual behaviour, the main predictors were perceived threat, self-efficacy, and responses to nutritional information as cues to action. Interestingly, perceived benefits and barriers were not statistically significant, calling into question their utility in restaurant-focused research.

However, there are several limitations with the Health Belief Model (HBM) for this study.

1. Overemphasis on Risk Perception and Health Motivation - HBM is built on the assumption that consumers make decisions based on rational evaluations of health risks and benefits. In restaurant settings, however, choices are more often influenced by taste, price, convenience, and immediate cues rather than long-term health motivation (Sheeran, Harris, & Epton, 2014).

2. Limited Consideration of Environmental and Situational Cues - Although HBM includes *"cues to action"*, it lacks specificity on how and when these cues operate in commercial, time-sensitive environments such as restaurants. It fails to address external marketing functions like menu layout, colour cues, or signage, which are central to this thesis (Glanz, 2015; Sallis, Owen, & Fisher, 2015).

3. Inapplicability to Real-Time Behavioural Execution - HBM is primarily suited to planned, health-protective behaviour like exercise or disease screening. It does not account for spontaneous or habitual food decisions made in response to marketing interventions (e.g., semiotics, descriptive menu language, point-of-sale messaging) (Wood & Neal, 2009).

4. No Consideration of Simplicity or Executional Ability - HBM omits an evaluation of behavioural simplicity or friction, factors which are highly influential in restaurant environments. Elements such as menu clarity, visual salience, and verbal nudging directly affect behaviour but are not addressed in the HBM framework. In contrast, Fogg's Behaviour Model (FBM) integrates *ability* as a core construct (Michie, Atkins & West, 2014).

While the Health Belief Model offers valuable insights into health-oriented behavioural intentions, its focus on internal cognition and perceived risk makes it ill-suited for analysing

real-time food decisions in restaurant settings. Its limited engagement with environmental cues, simplicity, and immediacy further restricts its relevance to this study. In contrast, Fogg's Behaviour Model (FBM), which accounts for *motivation, ability, and prompt*, provides a more appropriate theoretical lens for evaluating how marketing communication strategies influence immediate consumer choice in commercial food environments.

2.8.2.4 Social Behavioural Models – Relevance to this research

Behavioural models focus on human behaviour rather than how individuals think or feel about certain stimuli. While they acknowledge that behaviour is part of an affective and cognitive process, their emphasis is firmly on human behaviour (Brennan et al., 2014, 2020). Specifically, behavioural models focus on human behaviour in each situation and setting. Most important to this research is the assumption that various types of interventions can be introduced to encourage consumers to behave differently (Murray et al., 2017; Ness et al., 2010). Behavioural models belong to the class of theoretical paradigms from the behavioural school of thought which was formed in response to the limitations of rational actor models. However, these theories do not assume that consumers will always make rational decisions and emphasise that perceived decisions are often reactions to stimuli, such as point-of-sale marketing advertising efforts. Both agency and self-efficacy are central components of behavioural models, as human behaviour can be directly linked to motivation and incentive. Importantly, behavioural models are driven by *choice*, not a complex decision-making process (Brennan et al., 2014; Murray et al., 2017; Parkinson et al., 2018).

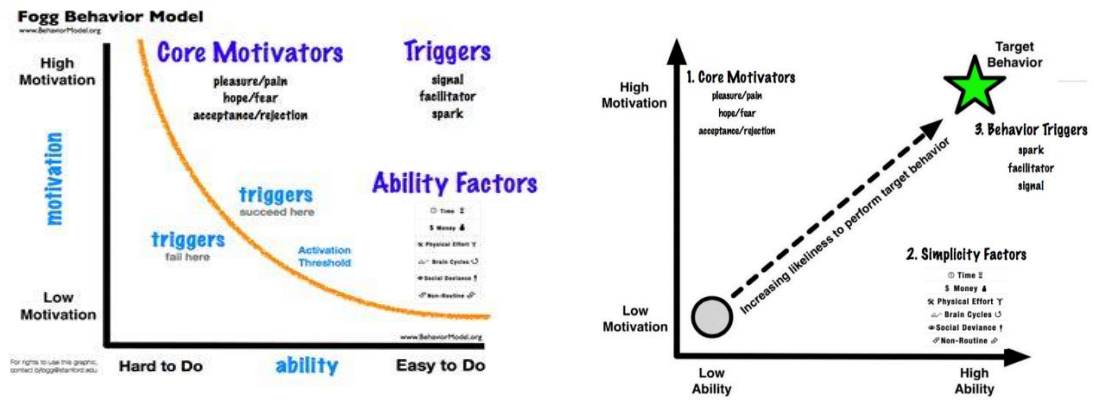
2.8.2.4.1 Fogg's Behavioural Model (FBM)

Fogg's Behaviour Model (FBM) posits that behaviour change occurs when motivation, ability, and a trigger converge at the same moment. Originally developed to study "captology", the use of persuasive technologies to change behaviour, FBM has been widely applied in digital environments to support behavioural goals (Cheek, Piercy & Grainger, 2015). For example, it has been adopted in health technology interventions to support sustained behavioural engagement, such as blood glucose testing (Dyer, 2013).

The model is especially effective for prompting small, specific behaviour and is widely used in product and intervention design due to its clarity and simplicity. Mohr et al. (2014) acknowledge its usefulness "within the constraints" of simple behavioural problems, while also highlighting that it may be less suitable for complex behavioural issues involving multiple variables and conditions.

Overall, FBM offers a practical and operational framework for understanding how real-time cues and individual capabilities interact with motivation to produce observable behavioural outcomes. This makes it particularly relevant for marketing communication strategies in fast-paced restaurant settings where behaviour is often triggered in response to point-of-sale interventions.

Figure 2.3 Fogg's Behaviour Model



Source: (BJ Fogg's Behaviour Model, 2017)

According to Fogg (2009), behaviour change is most likely when motivation, ability, and a trigger coincide. In restaurant settings, this can take the form of a point-of-sale (POS) stimulus promoting healthy meals. The model also allows for a trade-off between motivation and ability—when motivation is low, high simplicity (i.e., ease of action) can still facilitate behavioural change. For example, grouping healthy items in a dedicated menu with visible nutritional information enhances ability by simplifying decision-making.

To explore the impact of triggers, interventions such as POS advertising and personal selling can be tested for their relative effectiveness in persuasion, recall, and motivation.

In a related study, Konig and Renner (2019) applied FBM through a "just-in-time" ecological momentary intervention to promote healthy food selection. They found that simplifying complex dietary information into digestible formats improved behavioural outcomes. Rather than overhauling a person's entire diet, they focused on limiting the food context, a strategy this study replicates by targeting restaurant environments.

Further building on FBM, Fogg and Hreha (2010) developed a colour-coded behavioural framework known as the Behaviour Wizard. This matrix categorises behaviour using colours and temporal dimensions to help people more easily understand and articulate behavioural change goals. For instance:

- **Green** behaviour is new,
- **Blue** is familiar,
- **Purple** intensifies existing behaviour,
- **Grey** reduces behaviour,
- **Black** signifies behavioural cessation (e.g., quitting fried foods).

The model also incorporates three temporal types:

- Dot behaviour (one-time),
- Span behaviour (time-bound, e.g., 30 days),
- Path behaviour (long-term/lifestyle changes).

Fogg & Hreha (2010) found the Behaviour Wizard highly effective, with almost all participants able to understand and describe behavioural goals after interacting with the matrix—compared to less than half beforehand.

This study adopts a similar colour-coded approach to simplify decision-making and engage consumer cognition, reinforcing FBM's utility in designing practical, real-time interventions to nudge healthy food choices in restaurant settings.

Table 2.1 Behaviour Wizard

	GREEN BEHAVIOUR - do new, unfamiliar behaviour	**BLUE BEHAVIOUR** - do familiar behaviour	**PURPLE BEHAVIOUR** - increase behaviour intensity or duration	**GRAY BEHAVIOUR** - decrease behaviour intensity or duration	**BLACK BEHAVIOUR** - stop doing a behaviour
DOT BEHAVIOUR is done one-time	Try eating dried seaweed for a snack today	Eat vegetables at dinner tonight	Increase mindfulness at lunch today	Eat only half of a humburger tonight	Do not buy ice cream this time while shopping
SPAN BEHAVIOUR has a specific duration, such as 40 days	Sustitute quinoa for rice for one month	Drink water each morning this week	Eat more vegetables at dinner fro two months	Eat fewer carbohydrates for one week	Do not use sugar in coffee for two weeks
PATH BEHAVIOUR is done from now on, permanent change	Lead a vegan life from now on	Take daily vitamins from now on	Increase healthy eating options in home	Decrease fried foods in diet from now on	Stop eating fast food forever

Source: Fogg & Hreha (2010)

2.8.2.3.2.1 **Motivation** behind healthy eating

Fogg's Behaviour Model identifies motivation as one of three key components necessary for behavioural change (Fogg, 2009). Motivation, in this context, comprises three core pairs of drivers—pleasure/pain, hope/fear, and social acceptance/rejection (Villegas, Mejía & Velásquez, 2017). However, motivation alone is not sufficient, particularly due to the intention-behaviour gap—where individuals may want to change but are hindered by factors like dysfunctional beliefs or time constraints (Albus & Herrmann-Lingen, 2015).

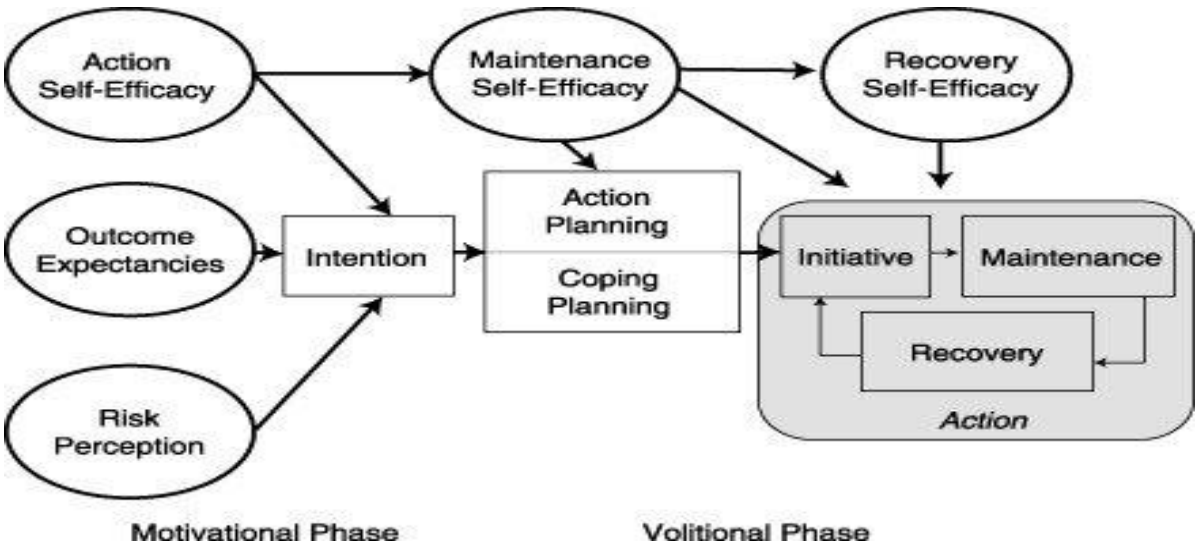
In real-world dining contexts, factors like taste (Goldberg & Gunasti, 2007), nutritional information (King et al., 2007), and minor menu adjustments (Newson et al., 2015) shape motivation. Motivational appeals in public health messaging are often grounded in risk avoidance (e.g., avoiding fatty foods), but this strategy may reinforce failure-prone attitudes (Ogden et al., 2007). Instead, compelling motivation may arise from social or ethical framing (Line & Hanks, 2016) and emphasising positive behavioural alternatives.

Importantly, Fogg (2009) cautions against relying solely on motivation for behavioural change, especially for non-urgent health issues. Simplicity and ease (ability) must complement motivation for behaviour to occur. As Brug (2008) notes, behaviour is influenced not just by internal factors like motivation and ability but also by external opportunities like menu design and dining context.

In restaurant settings, emotion and belonging can also serve as motivational drivers (Ha & Jang, 2013), while availability and promotion of healthy options can reinforce consumer motivation (Jimenez et al., 2020). Health cues, such as positive nutritional claims, can enhance attitudes and purchase intent (Kozup, Creyer, & Burton, 2003), while motivational triggers are stronger predictors of healthy choices than values alone (Claessens, Gillebaart, & de Ridder, 2023).

The cumulative evidence supports the idea that motivation is not static but can be shaped through environmental cues, surroundings, menu design, and marketing functions—providing a foundation for the interventions explored in this research.

Figure 2.4 *Generic Diagram of the Health Action Process Approach (HAPA)*



The Health Action Process Approach (HAPA) is highly relevant to Fogg's Behaviour Model (FBM) as both frameworks seek to explain the mechanisms through which intention translates into action, particularly in health-related behaviour. HAPA, developed by Schwarzer (1992), bridges the gap between **motivational** and **volitional** phases of behaviour change, outlining how individuals move from intention (motivation) to sustained action (ability and maintenance). Similarly, FBM (Fogg, 2009) posits that behaviour occurs when motivation, ability, and a trigger converge at the exact moment. The parallel lies in how both models conceptualise behaviour as a process rather than a single event—emphasising psychological readiness, perceived self-efficacy, and situational cues. HAPA's planning constructs (action and coping planning) complement FBM's "ability" and "prompt" components by operationalising how people prepare and sustain behaviour once motivation is present. In the context of restaurant-based health interventions, HAPA helps explain the cognitive and self-regulatory mechanisms (e.g., goal setting, confidence in choosing healthier meals) that precede and reinforce the behavioural triggers described by Fogg, such as menu cues or point-of-sale prompts. Thus, combining insights from HAPA and FBM provides a more comprehensive understanding of both what initiates and maintains healthy food choice behaviour in real-world dining contexts (Schwarzer et al., 2011; Fogg, 2009; Sniehotta et al., 2005).

2.8.2.3.2.2 **Ability**: Importance of Availability in the Australian Dining Context

As Australians increasingly dine out—over 54% of working Australians do so weekly (Miragenews, 2024)—the physical availability of healthy meals becomes a critical concern. This mirrors global patterns, including those in the USA (Mikkelsen, 2011) and the UK

(Statista, 2022), where a significant proportion of food is consumed outside the home. Lin and Morrison (2012) highlight that one-third of daily energy intake comes from restaurants, but research on the availability of nutritious meals in Australian dining environments is limited.

There are Limited Healthy Offerings and Observational Studies in Australia. Studies highlight this gap. Saelens et al. (2007) observed a lack of low-fat offerings in restaurants, while Duran et al. (2013) linked limited access to health disparities. International research supports this—Lundeen et al. (2017) in Guam and Pereira et al. (2014) in Minnesota both found scarce availability of healthy options and minimal nutritional information. This indicates global consistency in the barriers to healthy food access in restaurants.

According to Fogg's Ability Factors and Simplifying Decision-Making (2009), six elements influence ability—money, time, physical effort, brain cycles, social deviance, and non-routine. Interventions that reduce complexity, e.g., using green menus, nutrition labels, or heuristics like the words "low calorie" or "tasty", can make healthy choices more straightforward and routine. Staddon and Cerutti (2003) support this notion through the principle of operant conditioning, where repeated rewards strengthen future behaviour.

1. Financial Constraints and Food Cost Perception

Daniel (2020) identifies two cost dimensions in consumer decision-making:

1. **Absolute judgements**—whether the meal meets needs within a budget.
2. **Relative judgements**—how it compares to cheaper, less healthy alternatives.

Darmon and Drewnowski (2015) argue that socioeconomic disparities in diet quality stem from the higher cost of healthy food, underscoring the need for affordable, nutrient-rich options.

2. Time as a Barrier and the Role of Menu Design

Time constraints also reduce consumers' ability to make healthy choices. Jabs and Devine (2006) note the complexity of the time-food relationship, while Innovorder (2024) suggests that intuitive menu design, like categorised sections and simple visual flow, can reduce ordering time. This study supports these ideas by using Green and Healthy menus to group all nutritious meals, simplifying selection and promoting cognitive ease.

3. Behavioural Maintenance and Visual Triggers

Consumers tend to maintain behaviour based on previous experience unless provided with external prompts (Ackermann, Mugge & Schoormans, 2018). Such triggers (e.g., POS displays) can improve motivation and capability. Spence et al. (2016) add that visual cues, including menu images and colours, powerfully influence food selection and perception through neural and sensory pathways.

2.8.2.3.2.3 **Triggers** that Simplify the purchasing of healthy food

The third and final component of **Fogg's Behaviour Model (FBM)** is the *trigger*, also known as a prompt or cue, which initiates a behaviour when motivation and ability align (Fogg, 2009). There are three types of triggers—**sparks**, **facilitators**, and **signals**—each corresponding to different levels of motivation and ability.

1. Sparks – Triggers with Built-In Motivation

Sparks are designed to motivate when motivation is low, but ability is high. They often take the form of emotionally resonant or socially reinforced prompts:

- Goldberg and Gunasti (2007) emphasise *taste* as a powerful motivator; thus, framing healthy food as both tasty and beneficial can serve as an effective spark.

- Van Kleef, van den Broek, and van Trijp (2015) demonstrated that *verbal prompting* significantly boosted sales of healthy items—for example, orange juice increased from 20% to 35–42% of breakfast sales; fruit salad rose from 3% to 9%.

- Allman-Farinelli et al. (2019) reported that participants found kJ labelling helpful, but many struggled with interpreting kilojoules. They suggested alternative situational prompts, such as:

    - Physical activity equivalents
    - Ingredient lists
    - Cooking methods
    - Percentage of daily intake

These strategies were viewed as more intuitive for encouraging healthy choices.

2. Facilitators – When Ability Is Low, but Motivation Is High

Facilitators help when the consumer wants to act but lacks the ability due to complexity or confusion:

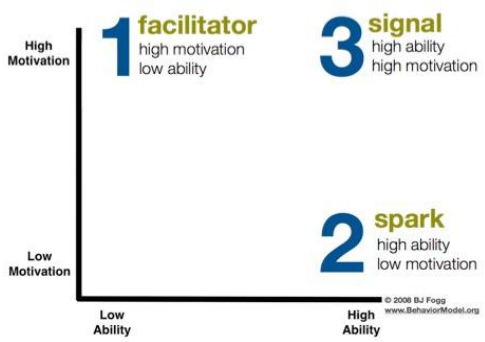
- Lytle et al. (2006) argued for increasing the visibility of healthy food through grouped, clearly labelled menus. This strategy supports consumers who are motivated, but unsure which items are healthiest.

3. Signals – Simple Reminders

Signals serve as reminders when both motivation and ability are already high:

- These do not aim to persuade or simplify, but prompt action at the right time. An example would be a well-placed label or visual reminder near the point of decision.

Figure 2.5: Trigger analyses



Graph 2: Fogg's Behavioural model

Source: BJ Fogg's Behaviour Model (2017)

Triggers used in this research

Facilitators:

- Healthy menu
- Nutritional information on menus

Spark:

- Advertisement with motivational cues (e.g. "start something new", "time for a change", "eat healthy, live longer"
- Taste positioning (changing item names and using visuals that convey taste)

Signal

- Any above

Triggers would be tested in isolation or combined for effectiveness

Visual cues are fundamental in shaping food choices and marketing outcomes. They attract attention, stimulate sensory engagement, and convey essential product or brand attributes (Sample, Hagtvedt & Brasel, 2020; McGill & Anand, 1989; McQuarrie, 2008). Since people visually evaluate food before consumption, expectations are often formed through appearance (Underwood et al., 2001). These visual elements become especially influential when they are prominent and easily accessible (Spence, 2016), supporting the idea that food decisions are often made automatically, guided by attention-grabbing visual stimuli rather than conscious deliberation (Cohen & Babey, 2012).

Fogg's Behaviour Model (FBM) serves as a comprehensive framework to analyse these influences. In this research, the use of colour and familiar language simplifies information processing, reducing cognitive demands and enabling more accessible decision-making at the point of purchase.

Social and environmental factors also contribute to non-routine behaviour in dining contexts. For instance, sharing meals or engaging in impulse ordering are influenced by dining companions, reference group influence, and personality traits (Gneezy, Haruvy & Yafe, 2004; Lu & Su, 2018). Gneezy et al. (2004) found that people consume more when bills are split, preferring to pay individually to avoid inefficiencies in cost-sharing, which may also influence food selection behaviour.

Group dynamics and social norms are powerful triggers. Lin (2022) demonstrated that reference group interactions significantly shape food choices, especially when healthy or sustainable options are promoted through membership-based appeals. Ding, Lin and Zhang (2020) further confirmed that both informative and normative social influences boost trust in healthy meals, thereby increasing trial intentions.

The dining environment, comprising social, design, and ambient elements, can also heighten situational motivation and impulsivity, leading to increased orders of healthy meals (Lu & Su, 2018). Together, these visual and social cues act as triggers within FBM, prompting behavioural change by reducing cognitive barriers, leveraging social influence, and creating a conducive atmosphere for healthy food selection.

2.8.2.4.2 Strengths of Fogg's Behaviour Model (FBM) for This Research

Fogg's Behaviour Model (FBM) offers a compelling and theoretically grounded framework for understanding and influencing real-time consumer decision-making in restaurant settings. Unlike traditional cognitive or intention-based models, FBM is specifically designed to explain spontaneous behaviour triggered by situational cues—making it uniquely suited for hospitality environments, where food choices are made impulsively and under the influence of immediate environmental and social conditions (Fogg, 2009).

1. Real-Time Behavioural Execution in Restaurant Settings

FBM's focus on behavioural execution in the moment rather than long-term intention aligns directly with restaurant-based decision-making, where patrons choose meals based on what is immediately visible, accessible, or emotionally appealing. Unlike the Health Belief Model or Theory of Planned Behaviour, FBM captures these fleeting, situational decisions more effectively.

2. Triadic Interaction: Motivation, Ability, and Trigger

The model's simplicity lies in its core premise: a behaviour will only occur when motivation, ability, and a trigger are all present simultaneously. This triadic structure maps seamlessly onto the restaurant context:

- **Motivation** arises from taste preferences, health consciousness, menu descriptions, and brand appeal.

- **Ability** is shaped by environmental simplicity, visual menu design, physical availability, and reduced time or effort to choose.

- **Triggers** include point-of-sale signage, colour-coded menu folders, nutritional labelling, or staff nudging.

This structure provides a clear operationalisation of marketing communication functions, enabling a systematic assessment of each variable's contribution.

3. Alignment with Marketing Communication Strategies

FBM aligns precisely with how marketing advertising functions (MAFs) work—particularly those examined in this thesis, such as:

- Menu labelling and nutrition disclosure,
- Point-of-sale promotional posters,
- Evocative or descriptive language for healthy meals, and
- Green-folder menu design.

These tools act as triggers that interact with existing consumer motivation and ability to generate behavioural shifts in meal selection.

4. Emphasis on Simplicity and Friction Reduction

Fogg's unique emphasis on reducing friction makes the model especially practical. Its "ability" dimension prioritises simplifying decision-making; for example, using heuristics such as green colour coding, nutritional icons, or intuitive menu layout, strategies directly employed in this

research. By lowering cognitive load, the likelihood of selecting a healthy item increases especially among those with low intrinsic motivation.

5. Practical Utility for Nudging and Behavioural Design

FBM was explicitly created as a design tool, not just a theory. It lends itself to nudge-based approaches and the implementation of small, non-coercive environmental changes that can drive healthier behaviour, ideal for restaurant-based interventions aiming to guide food selection without restricting consumer autonomy.

6. Suitability for Mixed-Methods Research

FBM also accommodates both quantitative and qualitative methodologies. In this thesis, statistical analyses track the effectiveness of specific triggers (e.g., posters or menu grouping), while qualitative interviews explore the subjective experience of motivation, ability, and environmental prompts—allowing for triangulation and deeper understanding.

7. High Ecological Validity

Finally, FBM has strong real-world relevance. It reflects how consumers behave in restaurants—choosing what is easiest, most appealing, and triggered in the moment, rather than what aligns with long-term health intentions.

In summary, Fogg's Behaviour Model (FBM) offers a robust, context-appropriate, and highly adaptable framework for this study. Its integration of real-time execution, simplicity, marketing alignment, and design practicality positions it as the most suitable model for evaluating how restaurant-based marketing interventions can shift consumer behaviour towards healthier food choices. This makes FBM not only a theoretical foundation but also a strategic tool for

academics, policymakers, and restaurant operators aiming to implement effective behavioural change mechanisms in hospitality settings.

Building on this theoretical foundation, the application of Fogg's Behaviour Model (FBM) in the thesis directly informs the research questions by framing how marketing advertising functions (MAFs) can act as triggers that interact with consumer motivation and ability to shape real-time meal choices. By examining interventions such as nutritional labelling, evocative menu language, semiotic cues (e.g., green folders), and point-of-sale posters, the study explores whether and how these tools shift ordering patterns towards healthier options in a restaurant environment. In doing so, the research questions focus on the extent to which each intervention independently influences behaviour, the synergistic effects when strategies are combined, and the situational factors that moderate their impact. Thus, FBM not only underpins the conceptual framework but also provides a direct pathway to operationalising and answering the core research questions of this thesis. Grounded in the theoretical gaps and empirical inconsistencies identified in the literature—particularly the limited ability of dominant health and cognitive models to explain real-time, marketing-triggered food choice—the research questions are derived to systematically examine how integrated marketing communication interventions influence immediate consumer behaviour in restaurant settings.

RQ1. How does introducing a Light and Healthy Menu (use of semiotics) change customers' ordering patterns in restaurants?

This question responds to Silayoi & Speece's (2007) and Barreiro-Hurlé et al.'s (2010) findings about the power of visual design and colour cues in shaping consumer perceptions. However, there is limited research on the application of semiotics (e.g., green

colour symbolism) in real-life restaurant menu presentations. RQ1 addresses this gap by assessing how a simple design-based cue can alter behaviour through heuristic processing.

RQ2. How does introducing a Light and Healthy Menu (use of semiotics and evocative food description - positioning) change customers' ordering patterns in restaurants

Previous literature (for example, Wansink et al., 2001; Jeong & Jang, 2020) has shown that descriptive labels and appealing language enhance the perceived quality and desirability of menu items. However, few studies have examined how these positioning strategies interact with visual semiotics. RQ2 builds on this literature by evaluating how the combination of persuasive language and symbolic cues drives healthier selection.

RQ3. How can introducing a Light and Healthy menu, along with nutritional information about each meal, steer customers' choices towards healthier alternatives in restaurant settings

While research supports the effectiveness of nutritional labelling (for example, Cranage et al., 2005; Kelly et al., 2009), existing studies often lack integration with menu design elements or are restricted to institutional or fast-food settings. Thus, RQ3 explores how nutritional disclosure, when presented with a symbolic and themed menu, influences decisions in a full-service restaurant context.

RQ4. How does introducing advertising posters with nutritional information change customers' ordering patterns in restaurant settings?

Point-of-sale advertising has been under-researched in hospitality marketing, particularly its role in nudging behaviour through nutritional cues (Fitzgerald et al., 2004; Kamal & Wilcox, 2014). RQ4 responds to this gap by examining the independent effect of

POS posters as a communication function within restaurant environments—something few studies have empirically tested using real-world sales data.

RQ5. How does a combination of a light and healthy menu in a green folder and point-of-sales advertising of nutritional information have an impact on consumers' ordering patterns in restaurants?

This question addresses the critical gap in the literature regarding the combined impact of multiple marketing communication functions (Finkelstein et al., 2004; Glanz & Hoelscher, 2004). While studies have explored interventions in isolation, there is little empirical evidence on the interactive and cumulative effects of IMC elements when used simultaneously. RQ5 is designed to test the synergistic impact of design, language, and environmental prompting on health-related ordering behaviour.

2.9. Importance of combining qualitative and quantitative components in the quasi-experimental design of this thesis

The inclusion of qualitative interviews in this study was essential to capture the situational and motivational dimensions underpinning behavioural change, as conceptualised in Fogg's Behaviour Model (FBM). While the quasi-experimental design and longitudinal POS data provided measurable evidence of behavioural outcomes, the qualitative component offered more profound insight into why and how these changes occurred within the real-world restaurant context. Interviews with patrons allowed exploration of motivation (e.g., perceptions of health value, taste expectations, and emotional appeal) and situational ability (e.g., menu visibility, cognitive ease, time pressure, or social influences) that shaped ordering decisions—factors that are often invisible in quantitative datasets (Fogg, 2009; Yin, 2018). This approach aligns with best practice in case studies which advocates multiple forms of data to enhance contextual understanding and construct validity (Stake, 1995; Baxter & Jack, 2008). Moreover, qualitative insights enriched the interpretation of FBM's trigger mechanism by revealing how semiotic cues, descriptive language, and in-store stimuli acted as behavioural prompts within situational constraints. Such integration of qualitative inquiry not only complemented the quasi-experimental findings but also strengthened the theoretical contribution of this thesis by connecting measurable behaviour with the psychological and contextual motivations driving those outcomes in authentic hospitality settings. Drawing on the existing qualitative studies and findings from the quantitative phase of this research, a qualitative study was designed to examine situational factors influencing food choices in the chosen case study of Zeppo Restaurant.

Existing studies focusing on exploring situational factors have uncovered several features influencing food selection in restaurants. They include the theme of 'eating out occasion', such as a romantic dinner (Longart, 2015), or the combination of ingredients of the dishes which is most important (Peters & Remaud, 2020). But Meiselman (1996) divided them into those that were important a long time ago and more recently, such as "social facilitation and physical variables of the eating situation". Marinkovic, Senic and Mimovic (2015) note that people tend to select the restaurant where they have a strong cultural understanding of the food and the menu provided. At the same time, Clemes, Gan and Sriwongrat (2013) maintain that even those culturally strong restaurants should have on the menu a selection of vegetarian, vegan and healthy meals. Kozup, Creyer and Burton (2003) suggested that when positive nutrition information or health claims are provided, consumers develop more favourable attitudes towards the product, exhibit better nutritional attitudes, and show increased purchase intentions. However, perceived health values of restaurant customers can positively influence both customer attitudes towards low-fat or low-calorie menu items and their behavioural intentions (Jun, Kang & Arendt, 2014), which aligns with previous studies by Reime et al. (2000), Tudoran et al. (2009), and Westcombe and Wardle (1997). Canadian research suggested that only around 24 per cent of customers were able to correctly state the recommended daily energy intake (calories in this research, not kilojoules, as a unit of measurement in Australia for energy intake) (McCrory et al., 2016). It found that 82% of respondents indicated that they took calories into account when choosing foods. This consideration was more common among females, those with higher incomes and more education, and those who perceived themselves as overweight and were actively trying to manage their weight (Puhl, Himmelstein & Quinn, 2018).

However, while several qualitative studies independently examined situational factors influencing customer choice in dine-in restaurants, fewer considered the role of marketing and advertising interventions in shaping customer behaviour and choices when evaluating these factors.

In this research, a quantitative phase involves the application of a series of five interventions and the analysis of real-time sales data recovered from Point of Sales systems. In the initial study, dine-in customers were presented with a standard menu. In the second study, dine-in customers were given the same standard menu in a green-coloured folder. In the third study, customers were given a revised menu with images of the food and evocative text describing it. The menu was presented in a labelled green coloured folder. The label was 'Light and Healthy'. In the fourth study, the menu was revised again to include Nutritional information and calorific values along with evocative descriptions. In this menu, information about calories and ingredients was displayed for every food item. The green folder had a new label, 'Nutritional Information', along with the 'Light and Healthy' Label imprinted on it. In the fifth study, posters of the new green menu were displayed at strategic points in the restaurant. The menu was also displayed digitally on large television monitors for better positioning and differentiation. In the sixth study, customers were treated with interventions from study four, combined with those from study five. They were given an updated new green menu with effective labelling about food description and nutritional information. Posters were also displayed on three televisions strategically positioned in the restaurant. Sales data for each study were collected separately and used for comparative analysis.

Keller, Markert and Bucher (2015) combined sales data with post-purchase interviews to understand how nutritional labels and menu framing influenced diners' motivation and perceptions. The qualitative interviews revealed that health motivation was often overridden by situational factors such as time, taste expectations, and peer influence—mirroring Fogg's (2009) "ability" and "trigger" components. Turnwald, Boles, and Crum (2017) tested descriptive menu labelling interventions and complemented quantitative ordering data with qualitative feedback on how language altered perceptions of taste and healthiness. Interviews were crucial to unpacking the motivational framing that made healthy dishes feel indulgent and satisfying. Wansink and Love (2014) conducted multiple restaurant-based interventions using quasi-experimental methods and qualitative interviews to explain how environmental nudges and menu design affected consumer decisions. The qualitative component revealed emotional and contextual triggers, particularly atmosphere, habit, and identity, that complemented observed behavioural shifts. In their mixed-methods restaurant study, Cohen and Babey (2012) used qualitative interviews to illuminate how situational barriers (cost, convenience, and peer influence) moderated the effects of menu labelling interventions—directly corresponding with FBM's "ability" construct. Meanwhile, Kothe and Mullan (2015), in an Australian food-choice context, integrated qualitative interviews with experimental data to explore motivation–ability interactions, demonstrating that situational cues and perceived effort mediated intention–behaviour gaps—an interpretation strongly aligned with FBM.

This thesis used interviews to explain the cognitive, emotional, and situational factors that quantitative sales data alone cannot reveal. Such an approach enhances both internal validity (by triangulating observed changes) and theoretical richness (by linking FBM constructs, such as motivation, ability, and triggers to lived consumer experience).

2.10. Literature review and its link to the hypothesis

This chapter evaluated several behavioural theories to understand how marketing advertising functions (MAFs), such as point-of-sale (POS) materials, nutritional labelling, and semiotic design, can influence consumer food choices in real-world restaurant settings. While multiple behavioural models offer valuable perspectives, only one emerged as optimally suited for real-time, context-driven decision-making: **Fogg's Behaviour Model (FBM)**.

The Theory of Planned Behaviour (TPB) provides a foundational understanding of how attitudes, social norms, and perceived behavioural control shape behavioural intentions. However, its reliance on rational and deliberate thought limits its utility in fast-paced hospitality environments where consumer decisions are often spontaneous and influenced by environmental stimuli (Barreiro-Hurlé, Gracia & De-Magistris, 2010; Prathiraja & Ariyawardana, 2003).

Similarly, Social Cognitive Theory (SCT) extends behavioural models by considering environmental and observational learning mechanisms such as self-efficacy and outcome expectations. Although SCT emphasises environmental influence (Jeffery et al., 2006), it does not fully account for the immediate cues and time-pressured decision-making that characterise restaurant behaviour (Jolly, 2011).

In contrast, FBM, which posits that behaviour results when *motivation*, *ability*, and a *prompt* coincide, offers a pragmatic, actionable, and real-time framework for understanding consumer behaviour in restaurant contexts (Fogg, 2009; Konig & Renner, 2019).

FBM's clear categorisation of triggers, as *sparks*, *facilitators*, or *signals,* further reinforces its relevance. Each type is reflected in a study's interventions, such as motivational messages, colour-coded menus, and personal selling or verbal prompts, all of which are designed to operate effectively under varying consumer motivation and ability levels (Fogg & Hreha, 2010).

Unlike other behavioural theories, FBM aligns seamlessly with integrated marketing communication (IMC) strategies. MAFs like nutritional disclosure, menu design, and POS posters operate as behavioural *prompts*, while visual salience and pricing strategies help simplify the consumer's decision process—central to FBM's concept of enhancing *ability* through friction reduction (Underwood et al., 2001; Sample et al., 2020; McQuarrie, 2008).

FBM is also compatible with heuristic-based nudging strategies, where consumers are guided subtly, rather than coerced, towards healthier choices via visual design, descriptive labelling, and food positioning (Ding, Lin & Zhang, 2020; Lin, 2022).

Despite decades of using marketing strategies in hospitality (Cheek, Piercy & Grainger, 2015), few empirical studies have measured their real-world, real-time influence on consumer ordering patterns, especially in Australian restaurant settings, bridging the current literature gap. Existing research highlights interest in nutritional labelling and health messaging but lacks robust evaluation of the effectiveness of MAFs under actual dining conditions (Saelens et al., 2007; Lundeen et al., 2017; Pereira et al., 2014).

FBM addresses this gap by offering a flexible framework applicable to both quantitative data (e.g., menu selections, sales analysis) and qualitative insights (e.g., interviews on cue recognition and menu perception). Its utility spans across design, implementation, and assessment phases of behaviourally informed marketing interventions.

In conclusion, while TPB and SCT offer useful conceptual foundations, Fogg's Behaviour Model stands out as the most suitable theoretical lens for this research. Its real-time orientation, structural simplicity, adaptability, and compatibility with marketing communication tools make it ideal for evaluating restaurant-based interventions. As the hospitality industry faces increasing pressure from governments and health-conscious consumers to offer healthier options, FBM provides a practical and theoretically robust path forward for designing and testing behavioural nudges within food service environments.

2.10.1. Linking Hypotheses to Previous Research and Quasi-studies

The rising global burden of diet-related chronic conditions, including obesity, diabetes, and cardiovascular disease (Ma et al., 2025), has intensified scholarly and policy interest in interventions that promote healthier eating within restaurant environments where dining out contributes substantially to excess caloric intake in high-income countries such as Australia. Responding to this challenge, the present study adopts a single-site field experiment case study design situated within an operational full-service restaurant (Zeppo), enabling the observation of real consumer behaviour in a natural dining context. This design is particularly appropriate for examining how marketing advertising functions (MAFs), including semiotic cues, evocative menu language, nutritional labelling, and point-of-sale poster advertising, operate as environmental stimuli that shape food choices at the point of decision.

Unlike laboratory-based experiments that prioritise experimental control at the expense of realism, the quasi-experimental approach employed in this study preserves ecological validity while maintaining analytical rigour through baseline measurement and control–intervention comparisons, consistent with Shadish, Cook, and Campbell's (2002) framework for causal inference in field settings. Drawing on prior restaurant-based quasi-experimental research (for

example, Petimar et al., 2019; Egnell et al., 2021), the study uses a time-series design to examine changes in healthy meal uptake across sequential intervention phases. This methodological structure directly informs the conceptual framework, which positions MAFs as exogenous environmental inputs that activate behavioural mechanisms, such as motivation, ability, and situational triggers, leading to observable changes in consumer choice.

Accordingly, the hypotheses (Hs) are derived from both the literature and the conceptual framework, proposing that individual marketing interventions will positively influence healthy meal selection, and that the cumulative layering of multiple MAFs will produce progressively stronger behavioural effects. By embedding hypothesis testing within a real-world restaurant environment, the study ensures that the conceptual framework is not only theoretically grounded but also empirically testable and generalisable to practical decision-making contexts within the Australian food service sector.

The study formulates the following hypotheses, grounded on quasi-experiments, consumer behaviour and behavioural economics literature:

Hypothesis 1 (Consumers presented with the *Light and Healthy* menu items in a green, semiotically coded folder (**treatment group**) will demonstrate a significantly higher proportion of healthy meal selections compared to consumers presented with the same items in the standard in-house menu (**control group**)

There is a difference in the number of healthy meals before (regular menu) and

after the intervention/introduction of the Light and Healthy green menu (semiotics)

- **Rationale:** Research by Silayoi and Speece (2007) demonstrated that visual design elements such as colour, imagery, and layout serve as *implicit communication cues* that shape perceptions of product healthiness and quality. In the restaurant context, using a

green menu folder symbolically communicates freshness, naturalness, and well-being, which increases *motivational appeal* consistent with FBM's "motivation" construct. Similarly, Wansink et al. (2001) found that subtle environmental cues, such as colours, symbols, and contextual priming, can subconsciously influence portion size perception and food selection, reinforcing the power of visual semiotics in shaping choice behaviour. More recently, Jeong and Jang (2020) empirically confirmed that menu design and aesthetic presentation influence diners' expectations and willingness to purchase healthy menu items, linking visual design to *self-efficacy* and *outcome expectancy* within the HAPA framework. Collectively, these studies validate the theoretical premise that semiotic cues enhance both motivation and ability by simplifying decision-making, and they highlight the need to test these effects in *real-world Australian hospitality environments*, which remain underexplored.

Hypothesis 2 (Positioning using evocative language - Consumers presented with *Light and Healthy* menu items described using evocative and persuasive language (**treatment group**) will demonstrate a significantly higher proportion of healthy meal selections compared to consumers presented with the same items described in standard, non-evocative language (**control group**)

There is a difference in the number of healthy meals before (regular menu) and after the intervention/introduction of the Light and Healthy green menu (semiotics) using evocative descriptions.

Rational: Wansink et al. (2001) demonstrated that descriptive, sensory-rich menu language (e.g., "succulent," "garden-fresh", or country or origin association) increases the perceived quality and taste of dishes, resulting in higher sales and satisfaction. This aligns with FBM's *motivation* component, where emotional resonance drives behavioural intention. Jeong and Jang (2020) extended this evidence by showing that

verbal framing and descriptive menu cues influence consumers' hedonic and health-related evaluations of food, supporting HAPA's *outcome expectancy* mechanism—that is,individuals' belief that healthier food can be enjoyable and rewarding. Moreover, Silayoi and Speece (2007) found that the integration of verbal and visual information enhances message persuasiveness, making healthy options both salient and appealing. These studies collectively justify the hypothesis that evocative language enhances motivational readiness by reframing healthy dishes as desirable and satisfying, bridging the *intention–action gap* identified in both FBM and HAPA.

Hypothesis 3 (Nutritional Labelling - Consumers presented with *Light and Healthy* menu items that include clear nutritional labelling (**treatment group**) will demonstrate a significantly higher proportion of healthy meal selections compared to consumers presented with an in-house menu with the same items without nutritional information (**control group**).

There is a significant difference in the number of healthy meals ordered before (regular menu) and after the intervention/introduction of a Light and Healthy menu with nutritional information about each meal.

Rationale: Cranage, Conklin, and Lambert (2005) found that providing calorie and fat information on restaurant menus increased consumers' likelihood of choosing lower-calorie items. Nutritional labelling therefore enhances the *ability* within FBM, as it reduces the cognitive effort needed to make a healthy decision. Similarly, Kelly et al. (2009) observed that mandatory kilojoule labelling in Australian quick-service outlets improved awareness and guided healthier choices among consumers who valued transparency. This directly corresponds with HAPA's *self-efficacy* construct, as individuals feel more confident acting on health intentions when equipped with relevant information.

Pratt et al. (2016) further demonstrated that simple and easily interpretable nutrition symbols (e.g., traffic-light systems) significantly improve comprehension and encourage lower-calorie selections. These findings support the design of a simplified, semiotic-informed nutritional labelling system which combines informational and visual elements to enhance both *ability* and *motivation*. Testing this in a full-service Australian restaurant extends previous research beyond fast-food or hypothetical contexts, addressing an important empirical gap.

Hypothesis 4 (POS Advertising Posters - Consumers exposed to *Light and Healthy* menu items promoted through point-of-sale advertising posters (**treatment group**) will demonstrate a significantly higher proportion of healthy meal selections compared to consumers not exposed to such promotional posters (**control group**).

There is a difference in the number of healthy dishes before (regular menu) and after the intervention/introduction of point-of-sale advertising posters with nutritional information.

- **Rationale:** Kamal and Wilcox (2014) found that targeted health-promoting messages displayed near the point of purchase serve as immediate behavioural *triggers*, significantly influencing spontaneous food selection decisions. Similarly, Fitzgerald et al. (2004) and Glanz and Hoelscher (2004) documented that in-store promotional signage (visual stimuli) can increase consumer awareness and perceived importance of healthy eating, especially when the cues are visually salient and contextually relevant. These findings reinforce FBM's *trigger* component, external prompts that convert motivation into action, and correspond with HAPA's *action planning* mechanism, as exposure to such cues facilitates the translation of intention into behaviour. By situating posters at the restaurant's decision point (ordering counter and table

service), this study replicates those findings in a real-world full-service environment where external advertising is limited, filling a critical contextual gap in Australian hospitality research.

Hypothesis 5 (**Cumulative Impact of All MAFs** - Consumers exposed simultaneously to all *Light and Healthy* marketing advertising functions—semiotic menu design, evocative language, nutritional labelling, and point-of-sale posters (**treatment group**)—will demonstrate a significantly higher proportion of healthy meal selections compared to consumers presented with the same items without these combined interventions (**control group**).

There is a difference in the number of healthy dishes before (regular menu) and after the intervention/introduction of point-of-sales advertising posters with the nutritional information.

- **Rationale:** Skov et al. (2013) demonstrated that multi-component interventions combining environmental cues, menu design, and labelling significantly increase the selection of healthier foods in canteen settings, highlighting the cumulative benefit of integrated approaches. Kraak et al. (2017) similarly emphasised that combining persuasive communication strategies with environmental support strengthens both motivation and ability, sustaining healthier choices over time. Finkelstein et al. (2004) showed that point-of-decision prompts are most effective when paired with complementary interventions (e.g., nutritional information or visual cues), reinforcing FBM's principle that behavioural triggers succeed only when motivation and ability are already sufficient. Finally, White et al. (2020) highlighted that comprehensive, context-specific interventions yield stronger and more durable behavioural outcomes than single-variable manipulations.

Together, these studies provide compelling evidence that the combined application of IMC functions can produce a synergistic effect, fully engaging FBM's triadic elements, motivation (evocative language), ability (availability of healthy dishes on the menus), and trigger (POS cues), while aligning with HAPA's motivational–volitional continuum food choices—an essential lens for understanding hospitality consumer behaviour.

Important to note that some prior literature suggests that purely numeric menu labelling—particularly the display of kilojoule or calorie counts in isolation—has produced modest or inconsistent behavioural effects. Meta-analytic reviews frequently conclude that numeric information alone has a limited impact because it assumes consumers possess the time, motivation, and nutritional literacy to interpret abstract energy values at the point of decision. In high-cognitive-load restaurant environments, raw kilojoule numbers may increase information availability without meaningfully increasing behavioural ability.

Importantly, the present research does not rely on numeric disclosure alone. While nutritional information is provided, it is intentionally interpretive and simplified, designed to reduce cognitive burden and enhance behavioural ability consistent with Fogg's Behaviour Model. Rather than presenting isolated kilojoule values, the intervention translates nutritional information into accessible, decision-ready cues embedded within menu design. These cues are framed using simplified indicators, positioning strategies, and semiotic reinforcement (e.g., "Light and Healthy" categorisation, visual prominence, concise health-oriented descriptors), thereby converting technical nutrition data into actionable guidance. In this sense, the intervention moves beyond information provision toward structured behavioural prompting.

This distinction is critical. Whereas prior mixed findings largely evaluate stand-alone numeric labelling, the current study examines integrated marketing communication cues, in which simplified nutritional information functions alongside motivational framing and contextual triggers at the precise moment of ordering. The behavioural effects observed in this research, therefore, cannot be equated with the limited impact reported in studies of numeric labelling alone; instead, they reflect the synergistic interaction of interpretive information, enhanced ability, and real-time prompts within the decision environment. In a specific, the following table puts the entire thesis in tabular form:

Table 2.2 MAF element → FBM component(s) → operationalisation in your study → hypothesis number.

Marketing Advertising Function (MAF)	FBM Component(s)	Operationalisation in This Study	Hypothesis
Menu Semiotics (Visual Cues)	Trigger; Ability	Healthy menu items were identified using visual semiotic cues on the menu to increase salience and reduce cognitive effort required to locate healthier choices.	H1
Descriptive Food Language (Positioning)	Motivation; Trigger	Healthy meals were framed using evocative and sensory-rich descriptions emphasising freshness, flavour, and quality to increase perceived attractiveness of healthier options.	H2
Nutritional Information Disclosure	Ability	Nutritional information was displayed on the menu to improve transparency and assist consumers in evaluating the healthfulness of menu items.	H3
Advertising Posters (Point-of-Sale Promotion)	Trigger; Motivation	Promotional posters highlighting healthy menu options were placed inside the restaurant to attract attention and reinforce healthy choices at the point of ordering.	H4
Personal Selling / Staff Communication	Motivation; Trigger	Staff actively recommended healthy menu options and highlighted their benefits during customer interactions.	H5

This chapter concludes by reinforcing the need for ecologically valid, behaviourally grounded, and marketing-informed research that examines how integrated advertising strategies can nudge restaurant patrons toward healthier choices. The next chapter (Chapter 3) presents the conceptual framework supporting this investigation and outlines the theoretical structure used to guide data collection, analysis, and interpretation.

Chapter 3 Conceptual Framework Development

3.0 Introduction

Building on the key findings from the literature review in Chapter 2, this chapter introduces the conceptual framework that underpins the current research. The literature highlighted that while various Marketing Advertising Functions, such as menu labelling, semiotic cues, descriptive menu language, and point-of-sale promotional materials are used to influence food selection, they are rarely examined in combination or within real-world full-service restaurant settings. It also revealed a lack of theory-driven approaches that consider how such functions interact with consumers' motivation, ability, and environmental triggers in real time.

Accordingly, this study employs Fogg's Behaviour Model (FBM) as the sole theoretical lens to structure and explain how these interventions can influence healthy food choices in restaurants. FBM offers a practical and behaviourally focused framework suited to the immediacy of food ordering contexts, asserting that behaviour occurs when motivation, ability, and a trigger converge at the exact moment (Fogg, 2009). This model provides a robust foundation for conceptualising how MAFs function as behavioural prompts and how consumer perceptions and contextual moderators may influence their impact.

3.1 Purpose and Scope of the Conceptual Framework

The purpose of this conceptual framework is to provide a structured basis for examining how marketing communication strategies influence consumers' real-time food

choices in Australian restaurant settings. Specifically, it aims to investigate how combinations of semiotics, descriptive menu naming, nutritional labelling, and POS advertisements act as triggers within FBM, while recognising that a consumer's motivation (e.g., health consciousness, dining occasion) and ability (e.g., simplicity, time constraints) are essential precursors to behavioural execution.

The framework also contextualises the study within broader public health and hospitality discourses, addressing concerns such as Australia's increasing obesity rates and the need for scalable, non-coercive interventions to encourage healthier eating when dining out. By aligning traditional marketing functions with FBM, the model connects industry-relevant practices with behavioural theory, offering both theoretical depth and practical application.

3.2 Justification for the Framework: Insights from the Literature Review

The conceptual framework is directly informed by several gaps and insights identified in Chapter 2:

1. Fragmented and artificial settings – Many previous studies were conducted in simulated environments or relied on self-reported intentions, limiting their ecological validity (Cecchini & Warin, 2016; Roberto et al., 2010). This framework addresses such limitations by anchoring behavioural outcomes in real-time sales data in a full-service restaurant setting.
2. Neglect of situational and environmental factors – The literature revealed that context (e.g., time pressure, dining companions, special occasion) plays a crucial role in food choices but is often overlooked in existing models (Wansink & Love, 2014). FBM's

inclusion of *ability* and *trigger* components enables the integration of these environmental constraints and facilitators.

3. Under-theorisation of marketing functions – While semiotics, descriptive language, and nutrition labelling are commonly used in industry, they have not been rigorously examined as structured behavioural triggers under a unifying theoretical framework. FBM bridges this gap by conceptualising these elements as specific *triggers* that can activate a behaviour when motivation and ability thresholds are met.
4. Lack of multi-component or synergistic analysis – Studies often examine interventions in isolation (Skov et al., 2013), ignoring how MAFs may reinforce one another. The framework in this thesis is holistic, examining the combined influence of multiple marketing cues on real-time decisions.
5. Uneven consumer nutrition knowledge – Literature shows that consumers vary widely in their understanding of health information (Burton et al., 2009; Watson et al., 2013), which shapes their receptivity to cues. This is captured in the model through *motivators* and *moderators* such as health consciousness and perceived usefulness.

Thus, the justification for this framework lies in its ability to address these interconnected gaps through a theoretically coherent, practically applicable, and empirically measurable structure.

3.3 Key Constructs and Framework Structure

3.3.1 Consumers' Nutrition Knowledge & Perceptions

The cross-cutting moderator of communication affects consumers' prior nutrition knowledge, which determines how they decode healthy-eating terminology and menu

communication in restaurants, thereby strengthening the effect of labels, descriptors, and signage (Kozup, Creyer, & Burton, 2003; Roberto et al., 2010; Liu et al., 2012). Misestimation of calories and "health-halo" biases undermine accuracy (Burton, Howlett, & Tangari, 2009; Burton & Creyer, 2004). Knowledge and engagement vary by age, education and SES (Driskell, Schake, & Detter, 2008; Story et al., 2008). In Australia, people endorse healthy eating and tend to trust NGOs, pointing to multi-sector collaboration opportunities (Jones et al., 2009). Confusion around kilojoules limits energy-only labels, suggesting clearer disclosure of salt, sugar, fat and protein (Watson et al., 2013; Pulker, Thornton, & Trapp, 2018).

Proposition: The effects of communication on healthy ordering strengthen as nutrition knowledge increases — aligns with the study's aim to understand how IMC strategies influence healthy food choices in restaurant settings. It specifically relates to the research question exploring moderating factors that shape consumers' responsiveness to communication interventions (e.g., posters, menu cues, or labels). This proposition suggests that individuals with greater nutritional knowledge are more likely to effectively interpret and act on such messages. In terms of the research objectives, it helps explain the mechanism of influence by identifying nutrition knowledge as a moderator that enhances both *motivation* and *ability* within Fogg's Behaviour Model (FBM), thereby strengthening the link between marketing communication and healthy ordering behaviour.

3.3.2 Marketing Advertising Functions (MAFs) as Choice-Architecture

Drivers/mechanisms at the point of decision, such as semiotics (colour/icons), evocative menu language and positioning, nutritional disclosure, and point-of-sale (POS) posters act as low-friction nudges that reallocate attention and shift choice (Wansink et al., 2005; Grunert & Wills, 2007; Kliatchko, 2009; Porcu et al., 2012; Šerić, Gil-Saura, & Ruiz-Molina, 2014; Kim, Kim, & Kim, 2016; Senninger, 2015; Vandenbroele et al., 2020). Despite decades of practice and media evolution, rigorous, theory-driven field tests in Australian restaurants remain limited (Hwang & Lorenzen, 2008; Liu et al., 2012; White, 1959; Pérez-Campdesuñer et al., 2020; Chiagouris & Mohr, 2004; Hebden et al., 2011; Kim et al., 2019; Grove, Carlson, & Dorsch, 2002; Stammerjohan et al., 2005; Jung, 2016; Milimu, 2017; Fasana & Haseena, 2017).

Proposition: Each marketing advertising function (MAF) individually produces small-to-moderate improvements in healthy choices; combined MAFs outperform any single tool — directly aligns with the study's central research question on the effectiveness of marketing advertising functions' (MAF) strategies in influencing healthy meal selections. It addresses how different communication tools, such as semiotic cues, evocative menu language, nutritional labelling, and point-of-sale posters, function both independently and synergistically. This proposition supports the research objective of assessing whether integrated interventions generate greater behavioural change than isolated tactics, consistent with IMC theory, which emphasises message consistency and cumulative impact. Within Fogg's Behaviour Model (FBM), the proposition also reinforces that multiple, coordinated triggers enhance the

likelihood of behaviour by simultaneously increasing motivation, ability, and prompting, thereby producing more substantial and sustained shifts towards healthier choices.

3.3.3 Semiotics (Colour & Symbols) as Heuristic Shortcuts

Mechanisms (processing ease, salience), such as colour and iconography, convey health meanings with minimal cognitive effort, increasing attention and perceived healthiness (Barthes, 1961; Chandler, 2007; Shah & Oppenheimer, 2008; Weick, 1995; Weick & Sutcliffe, 2005; Mick et al., 2004; Neuhauser & Kreps, 2010; Andersen, 2001). Traffic-light systems and green coding can cue "healthy," though real-world effects are mixed and under-tested in restaurants (van Kleef et al., 2015; Sonnenberg et al., 2013; Osman & Thornton, 2019; Wansink et al., 2005; Spence et al., 2014; Evans et al., 2016). Associations between green/fresh/healthy are widely observed (Madden et al., 2000; Piqueras-Fiszman et al., 2012; Singh, 2006; Ares et al., 2011; Gillon-Keren et al., 2020; Vasiljevic, Pechey, & Marteau, 2015).

Proposition: "Semiotic cues (e.g., green menu folders/icons) increase attention and selection of healthy items, net of price/taste" — connects directly to the research question examining how visual and symbolic communication influences healthy meal choices in restaurant settings. It tests the specific effectiveness of semiotic design elements, a key marketing advertising function, by isolating their impact from other decision drivers such as price or taste. In relation to the research objectives, this proposition supports the goal of identifying which individual IMC components most effectively shift consumer behaviour towards healthier options. Within Fogg's Behaviour Model (FBM), semiotic cues act as triggers that capture attention and prompt

behaviour when motivation and ability are present, thereby offering empirical insights into how subtle environmental signals can facilitate healthier ordering decisions.

3.3.4 Evocative Menu Language & Strategic Positioning

Mechanism (expectations, value, desirability), such as descriptive, sensory, even "pretentious" wording elevates expectations and perceived value, especially when aligned with delivered quality; advantageous layout/positioning enhances selection (Ozdemir & Caliskan, 2015; Noone & Cachia, 2020; McCall & Lynn, 2008; Piqueras-Fiszman & Spence, 2015; Bagna & Machetti, 2012; Hartwell & Edwards, 2009; Jeong & Jang, 2020; Bacig & Young, 2019; Din et al., 2012; Huffman & Houston, 1993; Chau, 2014).

Proposition: "Evocative descriptors and favourable positioning increase uptake of healthy items; effects amplify when paired with clear nutrition information" — directly relates to the research question on how persuasive language and message framing influence consumers' healthy meal selections. It examines the combined persuasive power of emotional appeal (evocative descriptions) and informational clarity (nutrition labels), aligning with the research objective of determining how specific IMC elements interact to enhance behavioural outcomes. This proposition also reflects the integrative nature of communication effects, consistent with the study's aim to test multiple marketing functions in tandem. Within Fogg's Behaviour Model (FBM), evocative language elevates motivation, while nutritional information enhances ability by reducing uncertainty—together strengthening the behavioural response when an external trigger (menu or poster) is present.

3.3.5 Nutritional Information Disclosure

Mechanism (informational trust, reduced uncertainty), such as nutritional disclosure, improves attitudes but behaviour effects are inconsistent due to comprehension burdens, competing utilities (taste/price), and low trust (Kozup et al., 2003; Mills & Thomas, 2008; Swartz et al., 2011; Riley et al., 2016; Harnack & French, 2008; Krieger et al., 2013; Kiszko et al., 2014; Schwartz et al., 2012; O'Dougherty et al., 2006; Pulos & Leng, 2010; Bowen & Morris, 1995; Liu et al., 2012; Cranage, Conklin, & Lambert, 2005; Wisdom et al., 2010; Finkelstein et al., 2011; Cohn et al., 2012; Chu et al., 2009; Mhurchu & Gorton, 2007; Albright, 1990; Burton & Creyer, 2004). Australian consumers favour simple, standardised formats; kilojoule-only labels are contested vs. calories/interpretive graphics (Kelly, 2009; Quiggin, 2013; Neale & Tapsell, 2022; Pratt et al., 2016).

Proposition: "Simple, graphically supported disclosure (e.g., calories/traffic light; grams of salt, sugar, fat, protein) produces small to moderate improvements in healthy choices" — aligns with the research question investigating how nutritional information disclosure influences consumer decision-making in restaurant settings. It tests the effectiveness of visual and simplified nutrition labelling as a marketing communication strategy to guide healthier selection. In relation to the research objectives, this proposition supports the aim of evaluating which specific IMC elements most effectively improve healthy ordering behaviour. Within the framework of Fogg's Behaviour Model (FBM), graphical nutrition cues enhance consumers' ability by simplifying complex information and reducing cognitive effort, while also reinforcing motivation through greater health awareness. This helps explain how clear, accessible disclosures can prompt small but meaningful behavioural shifts toward healthier meal choices.

3.3.6 Point-of-Sale Posters & In-Store Advertising

Mechanism, such as triggers posters can prompt switching towards featured healthy items when they integrate motivational (egoistic/altruistic) and clear informational cues, and follow design/placement principles at the moment of choice (Lichtenthal et al., 2006; Rukzio, Schmidt, & Hussmann, 2004; Chandon et al., 2009; Inman, 2009; Kareklas, Carlson, & Muehling, 2014; Pechmann & Catlin, 2016; Yadav, 2016; Näränen, 2013; Spotts, Weinberger, & Weinberger, 2020; Djupegot & Hansen, 2020). Prior studies support attention and education roles but often lack external validity/longitudinal scope (Forster-Coull & Gillis, 1988; Allen et al., 2015; Chiciudean et al., 2019; Rexha et al., 2010; Lytle et al., 2006; Thomas et al., 2017; Xu & Huang, 2019; Zimmerman & Shimoga, 2014; Atkinson & Palmer, 2001).

Proposition: "Posters combining simplified nutrient metrics with motivational framing outperform either element alone" — directly addresses the research question examining the combined effect of informational and motivational communication tools on healthy food choices. It aligns with the research objectives focused on identifying how integrated MAFs' strategies, rather than single interventions, can more effectively influence consumer behaviour in restaurant settings. This proposition reflects the study's goal of testing synergistic effects between cognitive (nutritional information) and affective (motivational framing) cues. Within Fogg's Behaviour Model (FBM), simplified nutrient metrics enhance ability by making information easy to process, while motivational framing strengthens motivation to act. When paired and presented through a visible trigger, such as a point-of-sale poster, they create optimal conditions for behavioural change.

3.3.7 Contextual Moderators & Constraints

Boundary conditions, such as taste, convenience, value and time pressure frequently override health goals (Glanz et al., 1998; Hwang & Lorenzen, 2008). Social identity and norms can be leveraged through message framing (McKittrick, 2014; Shrum, 2012; Thomas et al., 2017). Australian trends show rising health interest but uneven literacy/trust and media-shaped beliefs (Ipsos, 2016; Thatsugarmovement, 2017; Spicenews, 2018; Fullmer, 1991; Worsley, 2002; Blaylock et al., 1999; Lemmens et al., 2008; Fitzpatrick et al., 1997; Kim et al., 2013; Yoon et al., 2020; Schubert, 2008).

3.3.8 Integrative Theoretical Anchor: Fogg's Behaviour Model (FBM)

MAFs operate as **prompts/triggers**; semiotics and simplified disclosure increase **ability** (processing ease); evocative language and egoistic/altruistic framing increase **motivation**. FBM explains how integrated nudges convert intention into behaviour under real-world constraints while guarding against "sludge" (Bucher et al., 2016; Thaler & Sunstein, 2008, 2021; Cadario & Chandon, 2019; Kroese et al., 2015; Guthrie et al., 2015; Hanks et al., 2012; Keller et al., 2015; Wilson et al., 2016; Thaler, 2018; Sugden, 2009; Ehrenberg, 1774; Barnard & Ehrenberg, 1997).

3.3.9 Framework Structure

The conceptual framework guiding this research is structured around the principles of Fogg's Behaviour Model (FBM) which posits that a behaviour occurs when motivation, ability, and an appropriate trigger converge simultaneously (Fogg, 2009). It integrates behavioural theory with integrated marketing communication (IMC) functions to explain how restaurant-based advertising interventions influence real-time consumer food choices and is organised into four core components: inputs, mechanisms, moderators, and outcomes.

3.3.9.1 Inputs (Marketing Advertising Functions)

The primary inputs are the marketing advertising functions (MAFs) implemented within the restaurant setting—these include semiotic cues (e.g., green menu folders or icons), evocative language and item positioning, nutritional labelling, and point-of-sale (POS) posters. Each input represents a specific communication tool designed to engage consumers at the moment of decision-making. These inputs are hypothesised to activate behavioural change by influencing motivation, enhancing ability, and acting as triggers within the FBM framework (Silayoi & Speece, 2007; Wansink & Chandon, 2014).

3.3.9.2 Mechanisms (Behavioural Processes)

The behavioural processes, or mechanisms, operate through FBM's three determinants: motivation, ability, and triggers. Motivation is shaped by perceived health usefulness, anticipated taste enjoyment, and personal health orientation (Ajzen, 1991; Bandura, 2001). Ability is determined by the consumer's perceived ease of choosing healthier items which can be improved by simplified layouts and visual clarity (Fogg, 2020). The triggers are environmental cues—such as posters or icons—that prompt action at the point of choice. Collectively, these mechanisms explain how communication interventions convert consumer intentions into real-time healthy ordering behaviour.

3.3.9.3 Moderators (Individual and Contextual Factors)

The framework recognises that the strength of these effects varies according to individual and situational moderators. The key moderator is nutritional knowledge which enhances consumers' understanding and responsiveness to communication cues (Worsley, 2002; Miller & Cassady, 2015). Additional contextual moderators include social and environmental factors, such as dining companions, restaurant ambience, and time pressure, which can amplify or inhibit behavioural responses (Sniehotta et al., 2005; Kahneman, 2011).

3.3.9.4 Outcomes (Behavioural Response)

The expected outcome is a measurable increase in the selection of healthy menu items when communication interventions are present, both individually and cumulatively. The framework predicts that single interventions (e.g., labels or posters) produce small-to-moderate improvements, while combined MAFs yield stronger behavioural outcomes due to the synergistic integration of motivational, informational, and environmental stimuli.

In summary, this framework integrates psychological, informational, and contextual elements into a coherent structure. The inputs (communication tools) influence behaviour through the mechanisms of motivation, ability, and triggers, moderated by nutritional knowledge and situational factors, ultimately leading to healthier ordering behaviour. This structure provides a robust theoretical basis for empirical testing and interpretation of results within the complex, real-world context of restaurant dining.

3.3.9.5 Synergy Expectation from model

Multi-cue, integrated deployments (semiotics + evocative language + simplified disclosure + posters) outperform isolated tools (Cadario & Chandon, 2020; Liberato, Bailie, & Brimblecombe, 2014; Michie et al., 2009).

Table 3.1. Synergy Table

Sample Participant Cluster	Posttest Group Nomenclature	Intervention	Treatment (FBM Component)	Marketing and Advertising Strategy (Trigger)	
1	Dine-in customers (Week 1–2)	Group A – Baseline	No intervention	No trigger applied	Control group (Pre-intervention baseline)
2	Dine-in customers (Week 3–4)	Group B	Light Green Menu Folder	Trigger only	**Semiotics** – Green colour signalling health
3	Dine-in customers (Week 5–6)	Group C	Descriptive Menu Naming	Trigger + Motivation	**Positioning** – Evocative language increasing perceived taste/appeal
4	Dine-in customers (Week 7–8)	Group D	Nutritional Labelling	Trigger + Ability	**Informational cue** – kJ counts to increase decision-making ability
5	Dine-in customers (Week 9–10)	Group E	POS Poster Display	Trigger + Reinforcement	**Point-of-sale nudging** – Visual posters prompting healthier choice
6	Dine-in customers (Week 11–12)	Group F	All interventions combined	Full FBM application (Motivation + Ability + Trigger)	**Integrated Marketing Communication (IMC)** – synergistic strategy combining semiotics, evocative language, nutritional info, and POS signage

3.5 Theoretical Contribution and Novelty

This conceptual framework advances marketing theory in several ways. It:

- Applies FBM in a novel context: Although FBM has been applied to digital or app-based interventions, this study is among the first to systematically apply it to physical restaurant environments, bridging the gap between consumer behaviour theory and hospitality marketing.
- Elevates traditional marketing functions to the status of behavioural triggers, demonstrating that commercial strategies (e.g., colour, naming, POS materials) can be ethically repurposed to support public health goals.

- Integrates environmental moderators (e.g., time pressure, dining dynamics) into a single model, improving ecological validity and real-world relevance—elements often missing from previous intention-based frameworks.
- Demonstrates a holistic IMC approach, where multiple interventions are tested in a layered sequence to evaluate synergistic effects rather than isolated outcomes.
- Provides policy-relevant insights for restaurant operators and public health stakeholders by showing how behavioural principles can inform effective, low-cost nudges in commercial hospitality environments.

3.6 Theoretical Framework for this research

The literature review established that while traditional marketing advertising functions (MAFs), including semiotic cues, evocative menu language, nutritional labelling, and point-of-sale (POS) posters have been widely applied in hospitality contexts to influence consumer behaviour, their effectiveness remains under-evaluated in real-world restaurant settings, particularly within the Australian context (Espino, de Faria, & Chou, 2015; Fuster, Burrows, Collins, & Cayetano, 2021). Previous interventions have often relied on self-reported outcomes or laboratory-based simulations, limiting ecological validity and generalisability (Roberto, Larsen, Agnew, Baik, & Brownell, 2010; Van Kleef, Otten, & Trijp, 2015). Moreover, many studies assessed single interventions in isolation, rather than accounting for the combined or synergistic effects of multiple marketing cues, despite evidence suggesting that consumer decision-making in dining environments is dynamic, situational, and influenced by multiple simultaneous factors (Hollands et al., 2013; Kwon, Lee, Lee, & Weatherspoon, 2020). Compounding these methodological limitations, research has consistently shown that consumer nutrition knowledge is uneven, with many patrons relying on heuristics and

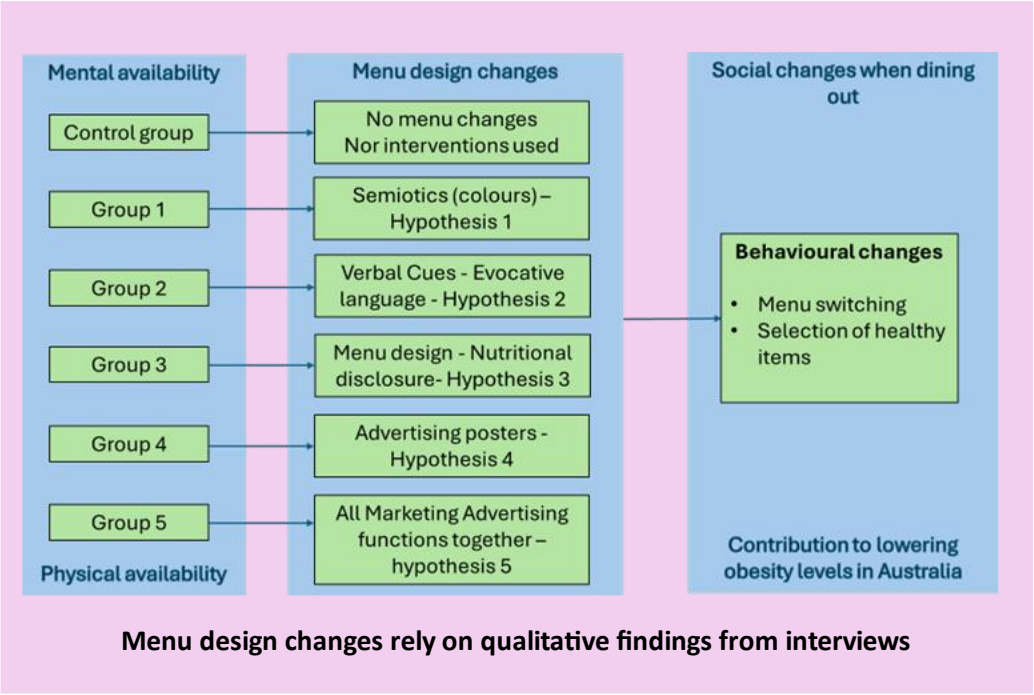
environmental signals, such as health halos or descriptive framing, rather than deliberate health-based reasoning when ordering meals (Kozup, Creyer, & Burton, 2003; Burton, Howlett, & Tangari, 2009).

In response to these gaps, this study employs Fogg's Behaviour Model (FBM) as its sole theoretical framework. FBM is uniquely suited to the restaurant context because it conceptualises behaviour as occurring only when motivation, ability, and a trigger converge at a single moment (Fogg, 2009). Unlike intention-based theories such as the Theory of Planned Behaviour, which assume rational, planned action, FBM acknowledges that restaurant ordering decisions are frequently **spontaneous, socially influenced, and environmentally cued** (Sharp & Romaniuk, 2016). These conditions align directly with the mechanisms through which MAFs operate in practice.

Each MAF investigated in this study maps onto FBM's triadic structure. Semiotics (e.g., colour-coded menus) and evocative menu language serve to enhance **motivation** by reframing healthy options as attractive and indulgent rather than restrictive (Vandenbroele, Slabbinck, Van Kerckhove, & Vermeir, 2020). Nutritional labelling strengthens **ability** by reducing cognitive effort and providing accessible health information at the point of decision-making (Harnack & French, 2008; Roberto et al., 2010). POS posters operate as **triggers**, prompting consumers to act at the exact moment they are finalising choices (Lee-Kwan, Bleich, Kim, Colantuoni, & Gittelsohn, 2015; Ayala et al., 2017). Importantly, FBM's applicability to low-effort, high-frequency behaviour, such as meal selection in restaurants, offers a compelling rationale for its adoption, since small environmental adjustments can yield measurable behavioural shifts (Hollands et al., 2013). The model also accommodates contextual moderators such as time pressure, dining companions, and occasion, all of which have been identified in the literature as influential but understudied determinants of ordering behaviour (Jostock, Haen, & Simons, 2022).

By grounding this research exclusively in FBM, the study advances a theoretically coherent lens for analysing how MAFs can be strategically aligned with the mechanics of real-time consumer behaviour. This not only addresses conceptual limitations in existing restaurant marketing scholarship but also generates practical insights for hospitality operators and policymakers seeking to implement scalable, low-cost interventions that nudge healthier food choices while maintaining commercial outcomes.

Figure 3.1. Conceptual Framework: IMC, In-store Advertising and Health Food Choices



This model illustrates how different menu design interventions can influence consumer behaviour in restaurant settings, ultimately contributing to public health goals such as reducing obesity levels in Australia.

Explanation of the Model:

- **Mental and Physical Availability (Left Panel):**

  Building on Sharp and Romaniuk's (2016) concept, the model begins with both

mental availability (awareness, salience) and physical availability (access to healthier options). These are crucial prerequisites for behavioural change, as healthy meals must be both **noticeable** and **accessible** before consumers can act on their intentions.

- **Menu Design Changes (Middle Panel):**

  Five experimental groups test sequential **marketing and advertising functions (MAFs)** applied to menus:

  - **Control Group:** No changes, baseline for comparison.
  - **Group 1: Semiotics (colours)**—leveraging visual cues to nudge healthier choices (Wansink & Chandon, 2014).
  - **Group 2: Verbal cues / evocative language**—using descriptive terms to enhance appeal and motivation (Krishna, Cian, & Sokolova, 2016).
  - **Group 3: Nutritional disclosure**—adding kilojoule and nutrient information to enable informed choices (Burton, Howlett, & Tangari, 2009; Roberto et al., 2010).
  - **Group 4: Advertising posters**—reinforcing menu cues at point-of-sale (Dayan & Bar-Hillel, 2011).
  - **Group 5: Integrated intervention**—all MAFs combined to test cumulative effect (consistent with Fogg's Behaviour Model which stresses simultaneous motivation, ability, and triggers; Fogg, 2009).

- **Social Changes when Dining Out (Right Panel):**

  Interventions are expected to lead to **behavioural changes**, particularly:

  - **Menu switching** (shifting from unhealthy to healthier alternatives).
  - **Selection of healthy items** (greater uptake of "Light & Healthy" options).

- **Contribution to Public Health (Right Panel):**

  These behaviour changes support broader **public health objectives** by nudging

consumers towards lower-calorie, nutritionally balanced meals, thereby helping address obesity concerns in Australia (Sacks et al., 2015).

In short, the model tests how different integrated marketing communication strategies, from semiotics and evocative language to nutritional labelling and advertising posters, affect real-time consumer choices in restaurants. Grounded in Fogg's Behaviour Model (2009), it demonstrates how triggers, motivation, and ability converge to shift dietary behaviour, ultimately contributing to reducing obesity levels in Australia.

3.6.1 Fogg's Behaviour Model (FBM)

Fogg's Behaviour Model posits that a behaviour will occur when three elements converge at the exact moment: Motivation, Ability, and a Prompt. This triadic relationship is beneficial for understanding health-related choices in restaurant environments, where decisions are often made quickly, under cognitive load, and with limited deliberation.

- **Motivation:** Refers to the internal drive to perform a behaviour. In this study, motivation is linked to constructs such as health consciousness, taste expectations, and perceived usefulness of information. Marketing strategies that enhance perceived benefits of healthy options (e.g., appealing descriptors or calorie disclosure cues) can elevate motivation.
- **Ability:** Indicates the ease with which a consumer can perform the behaviour. In the restaurant context, menu labelling and simplified visual cues (e.g., use of green menu folder, which is generally associated with healthy options) can lower cognitive effort

and enhance decision-making ability, particularly under time constraints. It also links to the physical and mental availability of the healthy options on the restaurant menu.

- **Triggers:** A cue that prompts and changes the consumer's behaviour in restaurant settings. In this framework, point-of-sale advertising, verbal prompts (such as evocative meal descriptions), the use of semiotics and heuristic clues, and strategically placed healthy item highlights function as prompts. These are most effective when consumers are already motivated and able to act (order the healthy options).

The strength of FBM lies in its emphasis on situational triggers and immediate action, making it especially relevant in environments where behavioural nudges can shape split-second decisions.

3.6.2 Integration hypothesis for this research into the Conceptual Framework

The conceptual framework developed for this study, grounded in Fogg's Behaviour Model (FBM), illustrates how the interaction of marketing advertising functions (MAFs) with core motivational and ability/simplicity variables influences healthy meal selection in real-time restaurant settings. The model serves as the theoretical basis for the development of the following hypotheses, which are directly mapped to the behavioural components of FBM: Motivation, Ability, and Trigger.

1. Triggers in the form of MAFs, such as semiotics, evocative language, nutritional labelling, and advertising posters, are operationalised as intervention tools designed to prompt healthier consumer behaviour at the point of decision.

2. Motivators, including special dining occasions, prior knowledge of healthy foods, group dynamics (e.g., number of diners), and the perceived availability of healthy menu items, are proposed to enhance the salience and appeal of these interventions.
3. Ability/Simplicity factors, such as time constraints, social dynamics, physical effort, and monetary concerns, moderate the feasibility of the intended behaviour. According to FBM, even when motivation and a trigger are present, if the behaviour is too complex (i.e., lacks simplicity), it is unlikely to occur.

These conceptual elements underpin the study's hypotheses as follows:

- **H1:** There is a difference in the number of healthy meals before (regular menu) and after the intervention/introduction of the Light and Healthy light green menu (semiotics), using semiotics as prompts to encourage healthier consumer behaviour at the point of decision.

- **H2:** There is a difference in the number of healthy meals before (regular menu) and after intervention/introduction of Light and Healthy light green menu (semiotics) using evocative descriptions as prompts to encourage healthier consumer behaviour at the point of decision.

- **H3:** There is a difference in the number of healthy meals ordered before (regular menu) and after the intervention/introduction of a Light and Healthy menu with nutritional information about each meal as prompts to encourage healthier consumer behaviour at the point of decision.

- **H4:** There is a difference in the number of healthy dishes before (regular menu) and after the intervention/introduction of point-of-sales advertising posters with the nutritional information as prompts to encourage healthier consumer behaviour at the point of decision.

- **H5:** There is a difference in the number of healthy meals ordered with the use of semiotics, evocative language, nutritional information disclosure and advertising posters in a restaurant, all at once as prompts to encourage healthier consumer behaviour at the point of decision.

Together, these hypotheses align with the core mechanisms of FBM, asserting that effective behaviour change in restaurant settings requires not only the presence of motivating content and timely triggers, but also conditions that make the healthy choice simple and accessible. The model thus forms the basis for empirically testing how marketing communication can ethically and effectively influence consumer choices in the hospitality industry.

3.7 Fogg's Behavioural Model use in literature

Fogg's Behaviour Model (FBM) is increasingly recognised in academic literature as a robust theoretical framework for understanding and influencing human behaviour, particularly in real-time decision-making contexts such as health promotion, digital persuasion, and consumer choice environments. FBM posits that a specific behaviour occurs when three conditions converge: Motivation, Ability, and a Prompt (Fogg, 2009). This triadic model has

gained empirical support across various domains, demonstrating its flexibility and explanatory power.

Fogg's original work has been foundational in the field of persuasive technology, where behavioural interventions are designed to influence users without coercion. Oinas-Kukkonen and Harjumaa (2009) build on FBM to propose the Persuasive Systems Design (PSD) model, which applies Fogg's logic to digital health systems, showing that the alignment of motivation, ability, and timely cues significantly improves behavioural adherence in technology-mediated interventions.

In behavioural health contexts, FBM has been applied to digital nudging and health communication strategies. Kelders et al. (2012) conducted a systematic review of web-based health interventions. They confirmed that adherence improved when interventions incorporated persuasive elements consistent with FBM, especially when user motivation was high and cognitive barriers were low. This underscores the relevance of FBM in contexts where individuals make rapid, emotionally influenced decisions, such as ordering meals in restaurants.

Further supporting the model's relevance, Rothman and Sheeran (2021) highlighted the critical role of timely behavioural prompts in health nudging. Their findings resonate with Fogg's emphasis on the importance of well-timed cues, reinforcing the idea that behaviour can be positively influenced when interventions are introduced at the moment of decision, assuming baseline motivation and ability are present.

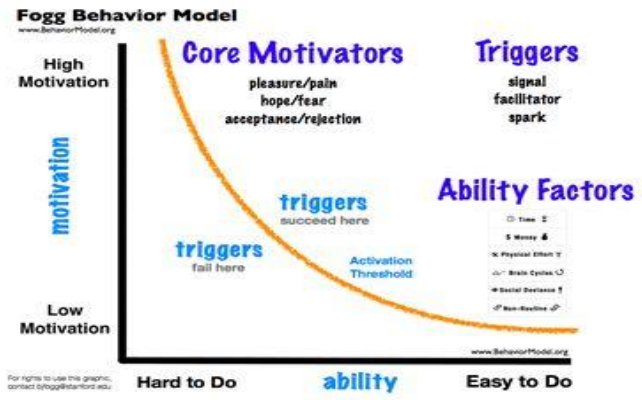
Fogg's framework is also increasingly referenced in consumer behaviour literature. Eyal (2014), although writing for a broader audience, applies FBM to the formation of habitual

behaviours in product consumption, demonstrating how recurring prompts can reinforce behavioural patterns. This is especially pertinent in the restaurant setting, where habitual choices often dominate food selection.

Finally, Davis et al. (2015), in a comprehensive review of behavioural theories, place FBM within a broader taxonomy of models used in health psychology. While more established models like the Theory of Planned Behaviour and Social Cognitive Theory explain intention and social influences, FBM offers a unique advantage by focusing on action initiation—a crucial stage in spontaneous, low-effort decision environments like fast-paced restaurant ordering. Together, these scholarly sources affirm that Fogg's Behaviour Model is not only theoretically sound but also empirically supported across behavioural science disciplines in marketing. Its integration into this research provides a rigorous and action-oriented lens through which to examine how restaurant-based marketing advertising functions can prompt healthier consumer choice selection in restaurant settings.

3.8 Visual representation of the applied Fogg's Behavioural Model in this research (relationship between components of Fogg's model)

Figure 3.2. Application of Fogg's model in this thesis



Fogg's Behaviour Model (FBM) proposes that three core elements—Motivation, Ability, and a Prompt—must converge simultaneously to elicit a target behaviour. In the context of this research, the target behaviour is the consumer's selection of a healthier meal in a restaurant environment once exposed to various marketing strategies. Each linkage within this triadic model is theoretically grounded and supported by empirical literature relevant to consumer behaviour, health psychology, and persuasive communication.

3.8.1. Motivation link to triggers

Motivation represents the internal drive to perform a behaviour and is influenced by factors such as health goals, perceived benefits, taste expectations, and emotional relevance. When consumers are intrinsically or extrinsically motivated, such as by a desire to improve health or trust in a restaurant's advertising messaging, they are more likely to respond positively to different triggers used in restaurant settings. Fogg (2009) emphasises that prompts only succeed when the individual is sufficiently motivated. This is echoed in Rothman and Sheeran's (2021) work which highlights that nudging strategies are effective primarily when aligned with existing motivation. Similarly, Piqueras-Fiszman and Spence (2015) demonstrate that motivational constructs like taste anticipation can significantly shape food-related choices, making prompts more persuasive when motivation is already present.

3.8.2. Ability link to triggers

Ability refers to the consumer's capacity to carry out the behaviour with minimal effort. In a restaurant setting, reducing cognitive load through simplified menu labelling or visually

intuitive health icons enhances ability. When consumers find it easy to identify, interpret, and select healthy options, prompts become more actionable. Fogg (2009) argues that even highly motivated individuals will not act if the behaviour feels difficult or inaccessible. In food choice contexts, Feteira-Santos et al., (2020) demonstrate that graphical signposting (advertising posters throughout the venue) improves information processing and supports healthier decision-making under time constraints, indicating increased ability.

3.8.3. Triggers link to Behaviour

Triggers are external cues that prompt action during the decision-making process. In this framework, triggers include elements like point-of-sale displays, verbal nudges, or health-related descriptors placed directly on the menu. A trigger is only effective if both motivation and ability thresholds are met, as it acts as the immediate prompt for behaviour change and execution. The original FBM posits that without a prompt, no action occurs—even when motivation and ability are high (Fogg, 2009). Verbal prompting studies (e.g., van Kleef, van den Broek & van Trijp, 2015) have shown significant increases in healthy item selection when prompts are contextually embedded at the point of decision. Similarly, Allman-Farinelli et al. (2019) highlight the role of labelling as a behavioural cue that nudges consumers when aligned with their knowledge and expectations.

3.8.4 Motivation, Ability and Triggers coming together

Behavioural change is most likely when all three conditions align. In this study, the selection of healthier menu items is not merely a result of information provision or intention. It requires the synergistic effect of a consumer's motivation (e.g., health orientation), ability

(e.g., simplified decision-making environment), and a timely prompt (e.g., POS advertising). Fogg's (2009) model provides a parsimonious yet powerful explanation for real-time behavioural triggers. In restaurant settings, studies such as those by Kang, Jun and Arendt (2015) and Burton and Creyer (2004) confirm that both internal (motivation, knowledge) and external (prompts, menu design) conditions must align to facilitate healthier consumer choices.

This narrative justifies each theoretical linkage within Fogg's Behaviour Model using a combination of behavioural science theory and empirical evidence from the food and hospitality marketing domains. The model is particularly relevant for environments where consumer decisions are made rapidly, under bounded rationality, and in response to subtle environmental cues such as restaurants and dining out venues. Its integration into this research offers a coherent, evidence-based lens for analysing the effects of marketing advertising functions on consumer behaviour and food choices in restaurant settings.

3.9 Alignment with research questions and hypotheses

Table 3.2 Hypotheses

Intervention name	**Hypothesis (comparison in number of healthy dishes before and after the marketing advertising function)**	**Research Question**
Use of Semiotics in the form of a green menu-folder)	**H1:** There is a positive difference in the number of healthy meals before (regular menu) and after intervention/introduction of Light and Healthy light green menu (semiotics) evocative descriptions)	**RQ1.** *How does introducing a Light and Healthy Menu (use of semiotics) change customers' ordering patterns in restaurants?*
Use of evocatively described menu items and ingredients used in their preparations	**H2:** There is a positive difference in the number of healthy meals before (regular menu) and after intervention/introduction of Light and Healthy light green menu (semiotics) using evocative descriptions	**RQ2.** *How does introducing a Light and Healthy Menu (use of semiotics and evocative food description - positioning) change customers' ordering patterns in restaurants*

Use of Nutritional information disclosure on the menus	H3: There is a positive difference in the number of healthy meals ordered before (regular menu) and after the intervention/introduction of a Light and Healthy menu with nutritional information about each meal	**RQ3.** *How can introducing a Light and Healthy menu, along with nutritional information about each meal steer customers' choices towards healthier alternatives in restaurant settings?*
Use of advertising posters in a restaurant with nutritional information of each menu item	H4: There is a positive difference in the number of healthy dishes before (regular menu) and after the intervention/introduction of point-of-sales advertising posters with the nutritional information.	**RQ4.** *How does introducing advertising posters with nutritional information change customers' ordering patterns in restaurant settings?*
Use of semiotics, evocative language, nutritional information disclosure and advertising posters in a restaurant – all at once.	H5: There is a positive difference in the number of healthy meals ordered with the use of Light and healthy menus in the green folder and in-store advertising posters with nutritional information, all at once	**RQ5.** *How does a combination of a light and healthy menu in a green folder, and point-of-sales advertising of nutritional information have an impact on consumers' ordering patterns in restaurants?*
Use of semiotics, evocative language, nutritional information disclosure and advertising posters in a restaurant – all at once - test which of the interventions are more effective in nudging effect	H6: The effectiveness of Marketing Advertising Functions (MAFs) in increasing healthy meal selection differs significantly across interventions, indicating that certain communication strategies generate stronger behavioural responses than others.	**RQ6.** *Which one of the MAFs produces the greatest results in changing consumers' ordering patterns in the restaurant settings?*

3.9.1. Theoretical and Practical Relevance

By aligning theoretical constructs with applied communication strategies used in restaurants, the framework meets the dual objectives of theoretical contribution (to behavioural science and marketing theory) and practical application (for restaurant operators and policymakers aiming to improve public health outcomes through menu interventions).

In summary, the conceptual framework not only reflects the theoretical underpinnings of the study but also provides a logical and structured basis for addressing the research questions. Its integration of motivational, cognitive, and contextual variables ensures that the research findings are both academically robust and practically actionable.

3.9.2. Scope of the Conceptual Framework

This conceptual framework is designed to guide the investigation of how marketing communication strategies influence consumer behaviour in restaurant settings, with a specific focus on promoting healthier food choices. The framework applies key principles from behavioural science and persuasive communication to real-world hospitality environments, aligning with the broader goals of both public health promotion and marketing effectiveness.

1. **Industry Focus – Restaurant and Hospitality Sector**

   The framework is developed explicitly for full-service, where marketing advertising functions such as menu labelling, promotional signage, and venue positioning messaging are commonly applied. The setting reflects everyday food choice environments where consumers face time-sensitive decisions and a wide range of nutritional options.

2. **Behavioural Outcome – Healthier Meal Selection**

   The core behavioural outcome of interest is the consumer's selection of healthier menu items, defined by established public health criteria (e.g., low in saturated fat, sodium, and added sugars; high in fibre or protein).

3. **Marketing Advertising Functions**

   The framework focuses on three primary marketing interventions:

- Menu labelling (numeric and interpretive),
- Point-of-sale advertising and visual prompts,
- Descriptive menu language and meal positioning-related messaging.

4. **Theoretical Basis**

   The framework is underpinned by Fogg's Behaviour Model (FBM), supplemented by constructs from the Theory of Planned Behaviour (TPB) and Social Cognitive Theory (SCT). These models explain how motivation, ability, and prompts interact to influence behaviour at the moment of decision-making.

5. **Consumer-Level Psychological Constructs**

   The framework integrates consumer perceptions, including health consciousness, perceived usefulness, taste expectations, and trust in the restaurant, which are recognised as mediators or moderators of marketing effectiveness.

The following table shows the whole chain of this research including the construct, the FBM component, the hypothesis, and the references used to build this Conceptual framework section.

Table 3.3 Conceptual Framework: Mapping Constructs, Hypotheses, Theories, and References

Construct (MAF)	FBM Element	Hypothesis	Theoretical Basis	Supporting References
Semiotic cues (e.g., colour-coded menus, green menu design)	Motivation	**H1:** There is a difference in the number of healthy meals before (regular menu) and after intervention/introduction of Light and Healthy light green menu (semiotics) evocative descriptions)	FBM (motivation); Nudge Theory; Mental Availability Framework	Fogg (2009); Thaler & Sunstein (2008); Sharp & Romaniuk (2016); French et al. (2001); Roberto et al. (2010)
Evocative/descriptive menu language (appealing framing of healthy items)	Motivation	**H1:** There is a difference in the number of healthy meals before (regular menu) and after intervention/introduction of Light and Healthy light green menu (semiotics) using evocative descriptions	FBM (motivation); Cue Utilisation Theory; Nudge Theory	Fogg (2009); Kozup, Creyer, & Burton (2003); Burton, Howlett, & Tangari (2009); Vandenbroele et al. (2020)
Nutritional labelling (calorie counts, health indicators)	Ability	**H1:** There is a significant difference in the number of healthy meals ordered before (regular menu) and after the intervention/introduction of a Light and Healthy menu with nutritional information about each meal	FBM (ability); Cue Utilisation Theory; Information Processing	Fogg (2009); Harnack & French (2008); Roberto et al. (2010); Van Kleef, Otten, & Trijp (2015)
Point-of-sale (POS) posters (visual prompts at ordering point)	Trigger	**H4:** There is a difference in the number of healthy dishes before (regular menu) and after the intervention/introduction of point-of-sales advertising posters with the nutritional information.	FBM (triggers); Nudge Theory	Fogg (2009); Lee-Kwan, Bleich, Kim, Colantuoni, & Gittelsohn (2015); Ayala et al. (2017); Nikolaou, Lean, & Hankey (2014)
Integrated approach (semiotics + menu language + labelling + POS posters combined)	Motivation + Ability + Trigger (synergy)	**H5:** There is no difference in the number of healthy meals ordered with the use of Light and healthy menus in the green folder and in-store advertising posters with nutritional information, all at once	FBM (convergence); Systems Thinking; Intervention Synergy	Fogg (2009); Hollands et al. (2013); Kwon, Lee, Lee, & Weatherspoon (2020); Espino, de Faria, & Chou (2015); Jostock, Haen, & Simons (2022)

3.10 Theoretical Assumptions Underpinning the Framework

The theoretical assumptions underpinning this study are grounded in established behavioural science and consumer psychology frameworks. The first assumption—that behaviour occurs only when motivation, ability, and triggers align—is directly drawn from Fogg (2009, 2020), whose model has been widely validated in digital persuasion and behavioural intervention research. The second assumption, that marketing advertising functions (MAFs) can act as effective behavioural triggers, builds on evidence from Wansink and Chandon (2014) and Silayoi and Speece (2007) showing that visual, linguistic, and environmental cues (e.g., packaging, menu design, signage) can prompt real-time behavioural responses at the point of decision. The assumption that motivation is influenced by perceived usefulness and health orientation aligns with Ajzen's (1991) TPB (attitudes, norms, perceived control) and Bandura's (2001) SCT (self-efficacy and outcome expectations). The fourth assumption—that ability can be enhanced through ease of choice and menu design—is

supported by Fogg's (2009) concept of "simplicity factors" which reduce friction in behavioural performance. The assumption that environmental and social cues shape intentions and actions is drawn from Sniehotta et al. (2005) and Schwarzer et al. (2011), who emphasise context and planning in behavioural change. Finally, assumptions regarding heuristics and context specificity are supported by Kahneman's (2011) dual-process theory and Wansink's (2006) findings on mindless eating, illustrating that most food decisions are situational and automatic. Collectively, these theoretical bases justify the integrated framework for examining how IMC strategies influence real-time healthy food choices in restaurant settings.

3.11 Contribution to Knowledge

3.11.1 Originality - Contribution to Theoretical Advancement and Research Gap

The conceptual framework developed in this thesis significantly contributes to theoretical advancement by integrating behavioural science with marketing communication. It addresses a well-recognised gap in the literature: the lack of a unified, action-oriented model that explains how consumers make health-conscious food choices in restaurant settings.

1. Bridging Theory and Practice in Food Choice Behaviour

By adopting Fogg's Behaviour Model (FBM) as the central theoretical framework, this study shifts the focus towards the actual moment of behaviour execution—where motivation, ability, and prompt must align. This practical orientation fills a critical gap in the behavioural literature

by capturing real-time decision-making that is often overlooked in more intention-focused models.

2. Expanding the Use of FBM in Public Health and Hospitality Marketing

Although FBM has been applied in digital health, persuasive technology, and habit formation studies, its application in hospitality marketing and public health communication remains underexplored. This research extends FBM into a restaurant context, providing a novel and empirically grounded framework to understand how menu-based and in-venue marketing interventions can influence health-related choices.

This theoretical expansion helps validate FBM in real-world, non-digital environments, offering a new lens for both academics and practitioners seeking to influence food-related behaviour in commercial settings.

3. Integrating Psychological and Environmental Variables

The framework contributes conceptually by synthesising internal psychological factors (e.g., taste expectations, perceived usefulness, trust, and health consciousness) with external marketing stimuli (e.g., menu labelling, CSR messaging, descriptive naming). This integration reflects a holistic understanding of consumer behaviour, where choices are shaped by both cognitive processing and environmental cues.

Such integration addresses a key shortcoming in the current literature where many models either overemphasise rational decision-making or ignore the contextual nature of consumer food choice behaviour in situ.

4. Addressing the Evidence Gap in Restaurant-Based Behavioural Interventions

Despite growing policy interest in nutritional labelling and behavioural nudging, academic evidence on the combined impact of multiple marketing communication functions in restaurant settings remains limited. This framework provides a foundation for empirical research that evaluates not only individual effects (e.g., menu labelling) but also the interactive and cumulative impact of different communication strategies on consumer choice.

In doing so, it fills a methodological and theoretical gap by offering a multi-variable, interdisciplinary model capable of generating insights that are both academically rigorous and practically actionable.

5. Advancing Mixed-Methods Research in Marketing Behaviour

The framework is designed to accommodate both qualitative and quantitative inquiry, making it suitable for mixed-methods research. It contributes to the methodological advancement of behavioural marketing studies by facilitating the integration of statistical data (e.g., sales and ordering patterns) with qualitative insights (e.g., perceptions, attitudes, and narrative reasoning). As such, it promotes a richer understanding of how marketing functions influence behaviour across different consumer segments.

3.11.2 Practical Implications

The findings and conceptual framework presented in this research offer several practical implications for key stakeholders that aim to encourage healthier food choices in out-of-home dining environments. These implications are particularly relevant to public health policymakers, hospitality marketers, and restaurant operators who play a vital role in shaping consumer decision-making through strategic communication and menu design.

1. For Policymakers: Enhancing Regulatory and Health Promotion Strategies

- Mandate Clear and Interpretive Menu Labelling:

  Governments and health authorities should consider extending menu-labelling policies beyond numeric kilojoule counts to include interpretive and graphical labelling systems (e.g., traffic light labels, star ratings). These make information more accessible, particularly in time-constrained dining decisions.

- Promote Standardisation Across Food Venues in Australia and develop societal responsibilities within the hospitality industry

  Regulatory bodies can enhance consumer trust and reduce cognitive effort by standardising menu labelling formats and health symbols across the industry, making it easier for consumers to identify healthy options regardless of the dining venue.

- Support Public–Private Collaboration:

  Partnering with restaurant groups to develop health-promoting CSR messaging campaigns can amplify public health outcomes, particularly when such campaigns are aligned with national dietary guidelines.

2. For Marketers: Designing More Effective Communication Strategies

- Leverage Behavioural Prompts at the Point of Sale:

  Marketing teams should implement timely and visually engaging prompts at the decision point (e.g., counter signage, digital displays) that direct attention to healthy meals. These cues are most effective when the consumer is already motivated and perceives the healthier option as accessible.

- Use Descriptive Language to Reframe Healthy Options:

  Healthy menu items can be repositioned using evocative and indulgent

descriptors (e.g., “grilled garlic-infused salmon” vs. “low-fat salmon”), increasing taste expectations and motivation without compromising the health message.

- Segment effective marketing advertising functions based on health consciousness:

  Marketers should tailor their messaging strategies based on consumer health consciousness levels, targeting more health-aware diners with nutrient-based appeals and others with taste- or value-based messaging.

3. For Restaurant Owners and Operators: Creating a Supportive Dining Environment

- Re-design Menus to Reduce Friction in Healthy Choices:

  Restaurants can improve choice architecture by positioning healthy items at the top or in highlighted sections of the menu, using visuals and concise labels that minimise decision fatigue.

- Implement Staff Training for Verbal Nudging:

  Equipping front-line staff with training on verbal prompts (e.g., “Would you like to try our heart-healthy option today?”) can enhance the effectiveness of written communications and reinforce the restaurant’s health-conscious brand image.

- Align restaurant identity with social health responsibility and current lifestyle choices:

  Embracing a health-oriented identity and venue positioning (e.g., reduced saturated fat, reduced sodium, reduced carbohydrates, and enhanced protein) can build consumer trust and strengthen brand equity, particularly among increasingly health-aware consumers in Australia and the developed world.

These recommendations will be further discussed and specifically explained in Chapter 6 of this thesis.

3.12. Theoretical Positioning of the Conceptual Framework

The development of the conceptual framework in this study was directly informed by several critical findings from the literature review which exposed key limitations in existing marketing and behavioural research applied to restaurant settings. These findings include:

- A lack of real-world, longitudinal studies assessing how traditional marketing advertising functions (MAFs), such as menu design, nutritional labelling, semiotic cues, and point-of-sale (POS) promotions, affect actual consumer behaviour, rather than intentions or attitudes.
- An overreliance on intention-based models such as the Theory of Planned Behaviour (TPB) which assume deliberative and rational choice processes that do not fully capture the real-time, environmental, and heuristic nature of food decisions in restaurant settings.
- A fragmented treatment of interventions, with most prior studies focusing on isolated marketing cues without considering their interactive or synergistic effects, nor how consumers interpret them with prior knowledge, social context, or motivation.
- A limited theoretical integration of behavioural models with practical marketing communication strategies, leaving a gap in the literature on how commercially viable marketing tactics can align with public health outcomes.
- Neglect of contextual and situational factors (e.g., time pressure, dining occasion, group influence), despite substantial evidence from behavioural economics and psychology that such variables heavily influence real-time food choices.

3.13. Conclusion on Chapter 3

By uniting theories from psychology, marketing, and health behaviour under a cohesive, context-specific model, this conceptual framework advances not only theoretical knowledge but also addresses critical gaps in how we understand and influence consumer decision-making in restaurant settings. It offers a robust foundation for future research, public policy formulation, and strategic marketing interventions aimed at encouraging healthier eating habits in out-of-home dining environments. This research demonstrates that when restaurant-based marketing communication strategies are aligned with behavioural theory, they can serve as powerful tools to encourage healthier consumer behaviour and lifestyle. By applying insights from this framework, policymakers can strengthen public health initiatives, marketers can design more persuasive interventions, and restaurant operators can create supportive environments that make healthier choices easier, more appealing, and more likely.

Chapter 4: Research Methodology

4.1. Introduction

The first chapter provided an overview of this research, and from existing literature gaps developed the research purpose, aim, broader research question and objectives. The second chapter reviewed existing literature focusing on marketing functions in the hospitality sector in the context of public health. The first and second chapters also identified gaps in the areas of theory, methodology and application of marketing and advertising strategies. These gaps in hospitality research have implications for exploring the hospitality sector's potential to contribute to public health. The third chapter built on the second chapter to develop a null hypothesis that marketing and advertising functions in the food service sector did not influence consumers' choices towards healthier diets. It addressed a theoretical gap by designing a conceptual framework to guide this study. Chapter four explains the methodology used to conduct this research. It discusses the research design, choice of research paradigm, the use of an actual experiment in a single case study, the appropriateness of a sequential mixed methods methodology, and data collection through interventions and interviews. It then discusses data analysis techniques applied to the study and integration of findings from two methods for further analysis and discussion.

4.2. Research Paradigm and Justification for Methodology

A research paradigm is a framework of beliefs and assumptions that guides the conduct of research, influencing the choice of methods and the interpretation of results (Rehman &

Alharthi, 2016). This research chose to observe the phenomenon of consumer behaviour and its change in a real-time dining environment. Many studies have examined consumer behaviour and their ordering patterns in outdoor dining environments.

Research indicates that consumers generally have difficulty making a choice of dishes in the restaurant setting (Grunert, 2002, Kang, Jun & Arendt, 2015) they are planning to order (from a healthy perspective), mainly due to lack of information about each dish (Bray et. al., 2019, Musiker & Kesa, 2014). Kivunja and Kuyini (2017) suggest there are four basic types of paradigms: the positive paradigm, the interpretivist paradigm/constructivist paradigm, the critical paradigm/transformative paradigm, and the pragmatic paradigm. This research applies a pragmatic paradigm approach where the application of mixed methods aims to achieve research objectives and address the research questions. The word "pragma" means action, which is the main aspect of this research (Kaushik & Walsh, 2019). A pragmatic paradigm promotes a relational epistemology where research relationships are determined by what the researcher deems appropriate for each study, a non-singular reality ontology, acknowledging that there is no single reality and that individuals have their own unique interpretations of reality.

The pragmatic paradigm was chosen because it provides insight into situational factors (what consumers believe plays a significant role in selecting dishes from the restaurant menu), as well as offering statistical evidence of the influence of marketing and advertising functions on changing consumers' ordering patterns once they are presented to them. Implications of this paradigm are that it provides a broader conclusive finding regarding the ability of the marketing advertising function to change a consumer's ordering pattern. Several strengths of the pragmatic paradigm are important for this research (Fishman, 1991):

1. The result of this research is the value that can be added to a real-life situation. It examines the practical outcomes of applying different marketing functions and their relevance in influencing consumer patterns towards healthier menu options.

2. It is also flexible in its findings, as the importance of the application of different marketing functions can change over time, depending on different cuisines and popularity of different venues (Oosthuizen & Du Toit, 2012).

3. This paradigm focuses on experimental analysis and observation which leads to better decision-making in the future. The research aims to provide policymakers and governments with specific recommendations on how the hospitality industry can contribute to addressing the obesity level in Australia, currently at 67% (AIHW, 2023) and affecting approximately 12.5 million adults.

4. This approach is also suitable for future research and changes in circumstances (climate, application of the festive season) on consumers' ordering patterns. In other words, a similar approach can be replicated and different changing factors can be applied to the model.

5. Importantly, these findings can inform future education and policy by providing evidence on which marketing and advertising tools are most effective in addressing the growing obesity challenge within the hospitality industry, thereby contributing to improved public health outcomes and reduced obesity-related costs in the Australian economy.

This paradigm also has several weaknesses that impact this research (Hall, 2013), including:

1. The focus could be on favourable marketing and advertising functions, rather than examining the complete picture of all advertising functions and their relevance in shifting consumers' ordering patterns towards healthier options on the menus.

2. This pragmatic approach can be regarded as subjective, as the common ground of the hospitality industry is extensive, but it is used explicitly in the hospitality industry (restaurants). Therefore, government departments and policymakers must consider ethical considerations.

This paradigm also aligns with the objectives of the research, which is to evaluate the effectiveness of different marketing and advertising functions in pursuit of healthier eating in restaurant settings. It is used because the research is conducted in a real-world restaurant to observe changes in consumer behaviour towards healthier options when participants are subjected to marketing and advertising interventions designed to target them. The paradigm provides rigour to the findings of this research which is a behavioural study aimed at unpacking the relationship between food consumption in restaurants and public health, to mitigate the risks of overweight and obesity in the Australian population. This research is conducted using an actual experimental research design applied in a single-case study restaurant, as discussed in the following sections.

The research is grounded in the pragmatic paradigm (Creswell & Clark, 2017; Morgan, 2007), which prioritises practical outcomes and the use of appropriate methods to appropriately answer the research question. Pragmatism is particularly well-suited to real-world problem-solving in complex environments such as full-service restaurants, where a confluence of contextual, social, and psychological variables influences consumer behaviour.

The pragmatic approach supports the integration of both quantitative and qualitative data to understand not only *what* behaviour changes occurred (e.g., changes in healthy meal selection), but also *how* and *why* these changes took place. This paradigm aligns with the behavioural orientation of the conceptual framework based on Fogg's Behaviour Model (FBM). FBM focuses on real-time behavioural outcomes driven by the convergence of motivation, ability, and triggers, thus making pragmatism a fitting foundation for this research design.

4.2.1. Justification for the True Experiment in a Single Case Study Design

This research employed a true experimental design embedded within a single case study—a full-service restaurant named Zeppo.

Casler (2015) described an Experiment as "a planned and organised inquiry designed to test a hypothesis, answer a question, or discover new facts" (p. 215) and Treatment as a procedure or system whose effect on the experimental material is to be measured or observed. Experimental designs are described as research designs that facilitate "the process of planning a study to test a hypothesis, where variables are manipulated to observe their effects on outcomes" (Hassan, 2024, p.).

Gribbons and Herman (1996) observed that experimental designs were "especially useful in addressing evaluation questions about the effectiveness and impact of Programs (p.). They emphasised that in using "comparative data as context for interpreting findings, experimental designs increased the confidence that observed outcomes are the result of a given program or innovation instead of a function of extraneous variables or events" (Gribbons & Herman, 1996,

p.), and are therefore especially useful in addressing evaluation questions about the effectiveness and impact of programs.

Experimental designs emphasise the use of comparative data as context for interpreting findings. Two broad categories are (1) True Experimental design, also referred to as Authentic or Actual experiment and (2) quasi-experimental design. True Experiment and quasi-experiment research designs examine whether there is a causal relationship between independent and dependent variables, where the independent variable influences the dependent variable (Rogers & Revesz, 2019). Quasi-experiments are situations where the investigator cannot manipulate behaviour, and participant selection is not random. In contrast, Actual or True experiments allow the investigator to manipulate behaviour either by or without coercion. True experiments require 'more than one purposively created group, random assignment and common measured outcomes'(Gribbons & Herman, 1996).

Quasi-experimental designs are less rigorous than an actual experimental design (Loewen & Plonsky, 2017). Authentic experiment designs involve the manipulation of one or more independent variables, and dependent variables are carefully measured through pre- and post-testing. True experiments utilise interventions or treatments to manipulate and observe independent and dependent variables under study.

The research chose a true experiment design to observe the phenomena of consumer behavioural change in response to marketing and advertising functions applied as menu-based interventions in a restaurant. Consumer behaviour changes and their choices in response to external stimuli were recorded and measured at point-of-sale counters. This study satisfied the design criteria of an actual experiment by designing a real-time experiment using (1) both a control group and multiple experimental groups; (2) random selection of participants for the

experiment, (3) examining the causal relationship between independent and dependent variables, and (4) interventions or treatments for manipulating and observing independent and dependent variables. The justification for this methodological choice is threefold.

4.2.2.1 Control and Manipulation of Variables (True Experiment)

A single-site field experiment requires manipulating independent variables (e.g., marketing and advertising functions) and observing their impact on a dependent variable (e.g., healthy meal selection). In this study, interventions such as semiotics, evocative menu language, nutritional labelling, and POS posters were introduced in controlled, sequential phases, which allowed for causal inference, as changes in customer ordering behaviour could be directly attributed to specific MAF interventions.

1. Ecological Validity and Real-World Application (Case Study)

By embedding the experiment in a real-world setting, this research overcomes the limitations of many previous studies conducted in laboratory or hypothetical environments. The single case study enables a naturalistic observation of behaviour under genuine dining conditions, where decisions are made under time pressure, influenced by social factors, and subject to the restaurant's physical environment. This enhances the ecological validity of the findings.

2. Access and Depth of Insight

The researcher's role as investigator, with access to the venue, presented a rare and valuable opportunity to implement interventions with complete operational control while maintaining ethical oversight. This unique position enabled longitudinal data collection, consistent implementation of interventions, and immediate access to quantitative sales records and qualitative customer insights, which are often difficult to obtain in hospitality research.

4.2.3 Appropriateness of the Design to the Research Objectives

The combination of a true experiment with a case study design is methodologically appropriate for addressing the research objectives derived from the conceptual framework, particularly:

- To evaluate the causal impact of marketing communication strategies on consumer food choices.
- To explore the mediating and moderating factors (e.g., health consciousness, time pressure) that influence how and when behavioural change occurs.
- To investigate consumer motivation and ability within the specific operational dynamics of a full-service restaurant.
- To ensure practical relevance and transferability of findings to both academic and industry audiences.

By using this design, the research provides credible, real-world evidence of how Fogg's Behaviour Model can be operationalised in a restaurant context, contributing to both behavioural theory and marketing practice in the hospitality sector.

4.3 Case Study Approach

As discussed in Chapter 1, in response to the gaps identified in the literature, this study developed three main research questions. It aimed to investigate the application of MAF in a real-time dining environment, evaluating its empirical implications on consumer choices and restaurant sales in a full-service restaurant in Melbourne. This research therefore adopted a broader case study approach and an actual experimental research design to achieve the aim and answer the research questions.

Yin (1981) described a case study as an empirical inquiry that "investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used" (p. 13). Case study research is a detailed investigation of complex social phenomena within the bounds of a specific context and or location (Hartley, 2004). It can be described as an in-depth, detailed examination of a particular case within a real-world context. It allows for the study of a phenomenon and data collection over a more extended period of time, facilitating longitudinal observation (Cassell & Symon, 2004).

Yin described three types of case studies based on the purpose of the research, viz., exploratory case studies, descriptive case studies, and explanatory case studies (Yin, 1981). He discussed three conditions and five strategy choices for use of the three case studies: (1) type

of research question posed, (2) the extent of control an investigator has over actual behavioural events, and (3) the degree of focus on contemporary as opposed to historical events (Yin, 1989a). Concerning the first condition, 'who, what, where, how, why' formed basic categories of types of questions mapping to the exploratory, descriptive or explanatory nature of research. While 'What' questions are exploratory, 'How' and 'Why' questions are more explanatory and likely to use experiments as research strategies and may require tracing operational links over time (Yin, 1989). In relation to the second and third conditions, histories, case studies, and experiments are three strategies for conducting research. Histories are "preferred strategies where there is no access or control" and are applicable when investigating past events with no living person available to report. Case studies are preferred in investigating contemporary events, but in those situations where relevant behaviours cannot be affected (Yin, 1989b). Experiments are preferred when the investigator can manipulate behaviour directly, precisely and systematically. Experiments can be designed for either laboratory or field settings in real-time. Experiments in field settings are suitable for behavioural studies and social experiments (Yin, 1989b).

In this study, the larger research questions developed are (1) 'Can the food service sector marketing advertising functions (MAF) instigate consumers' behaviour change towards healthier choices? (2) What is the impact of the MAF application on consumers' choices and restaurant sales? (3) What are the factors influencing consumer ordering patterns towards healthy food choices?

The first research question is a 'How' question and is answered by testing hypotheses generated in Chapter Three. The second question is a supplementary question answered through an empirical examination of interventions and their outcomes, testing the hypotheses. The third question is a 'What' question and probes more deeply to gain insights from consumer

perceptions about the factors that guided their choices when they were presented with marketing and advertising functions.

This research aims to investigate the application of MAF in a real-time dining environment and evaluate its empirical implications for consumer choices and restaurant sales. The objective of the research was to study consumer behaviour in response to marketing and advertising function-based interventions. Research used the Experiment strategy described by (Yin, 1989b) to answer the research question and achieve the aim of this study. The experiment was conducted as a single-case study.

Yin discussed single-case studies and multiple-case studies as two basic types of designs for case studies based on where data collection would take place to address the research questions. Three rationales make Single case studies more appropriate than multi-case studies designs when, (a) conducting a single experiment; or when testing a well-formulated theory; (b) representing an extreme or unique case; (c) the case is revelatory – when an investigator has an opportunity to observe and analyse a phenomenon previously inaccessible to scientific investigation (Yin, 1981, 1989a). This research satisfied the use of a single case study design to experiment as (a) all the data was being collected from a single location, (2) this study was a representation of a unique case created through a combination of conceptual and methodological theories and frameworks from hospitality, marketing and public health sectors, and (c) the investigator had the opportunity to observe the phenomena in a way previously unobserved. Furthermore, studies have found that single-case research design is suitable for developing and evaluating health-related advertising interventions to measure effectiveness in altering human behaviour (Kazdin, 2011; Kratochwill et al., 2013). Hence, this research was conducted through an experiment in a single case study of a restaurant in Melbourne, Australia,

named ‘Zeppo’. The following sections first introduce Zeppo restaurant and elaborate on the posttest-only Control Group design used to conduct the experiment.

4.4 Zeppo Restaurant in Melbourne, Australia.

This research chose Zeppo restaurant for applying MAF strategies and interventions and collecting data over a period of nearly six months from the exact location. The underlying reason for selecting this restaurant as a single case study for the research was to address some of the research gaps identified in Chapter One. Several existing studies were predominantly conducted in simulated dining environments, and were short-duration with small sample sizes. Some studies found that venue owners were reluctant to provide access to their sales data and therefore lacked rigour and empirical strength (Fuster et al., 2021). Empirical research focuses on theoretical and practical concepts in controlled environments (e.g., hospitals, school canteens) (Elbel et al., 2013; Tapper et al., 2014) and that customers had very little agency in choosing the food they ordered. Therefore, behaviour change towards healthy diets could hardly be measured. Consequently, studies conducted in simulated and/or controlled environments provided limited insights into the application and effectiveness of different marketing and advertising functions in restaurants where consumers make decisions. Moreover, in cases where research did not adequately represent a larger population or effectively analyse the impact on sales, their findings could hardly inform policy or practice in real-time restaurants and other food service sector enterprises. This study chose an experiment in an authentic restaurant, thereby addressing both theoretical and practical gaps identified in the existing literature.

Restaurants are busy establishments where it is often challenging for researchers to conduct long-term studies and access confidential/private data. Consequently, researchers often find it

difficult to conduct long-term research in third-party-owned restaurants. In the Zeppo restaurant case study, the research candidate was willing to apply health-promoting marketing and advertising strategies to explore and examine changes in consumer behaviour and ordering patterns. He conducted a long-term research experiment, applied various marketing and advertising interventions, continuously observed consumer behaviour over many months of the study, and collected real-time data from point-of-sale and other restaurant departments. Conducting the research in a single case study of a restaurant had distinct advantages for the research candidate and the research in terms of flexibility and opportunity, as explained in Chapter 1. Zeppo is in Clyde North, 48 kilometres south east of Melbourne's CBD in the state of Victoria, Australia.

The Zeppo restaurant is an à la carte venue, offering a predominantly Italian cuisine (including pizza and pasta) as well as fish, beef, chicken, and salads. It has been operating for six years and is a well-established venue in the area. There are 100 seats and on average the restaurant itself receives between 7,000 and 8,000 meal orders each month which includes both takeaway and dine-in dishes. For this research, the researcher will focus solely on dine-in sales figures, for several reasons:

- The application of the marketing and advertising functions is solely used for dine-in customers. The use of semiotics, positioning on healthy attributes, in-store advertising, and all these advertising functions together are applied in-store, not for takeaway or pick-up customers.
- Uber Eats drivers commonly pick up takeaway meals, and therefore the real customers are not subject to the influence of different marketing and advertising functions used in this research.

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Image 4.1 Image of the venue

Image 4.2 Image of the venue

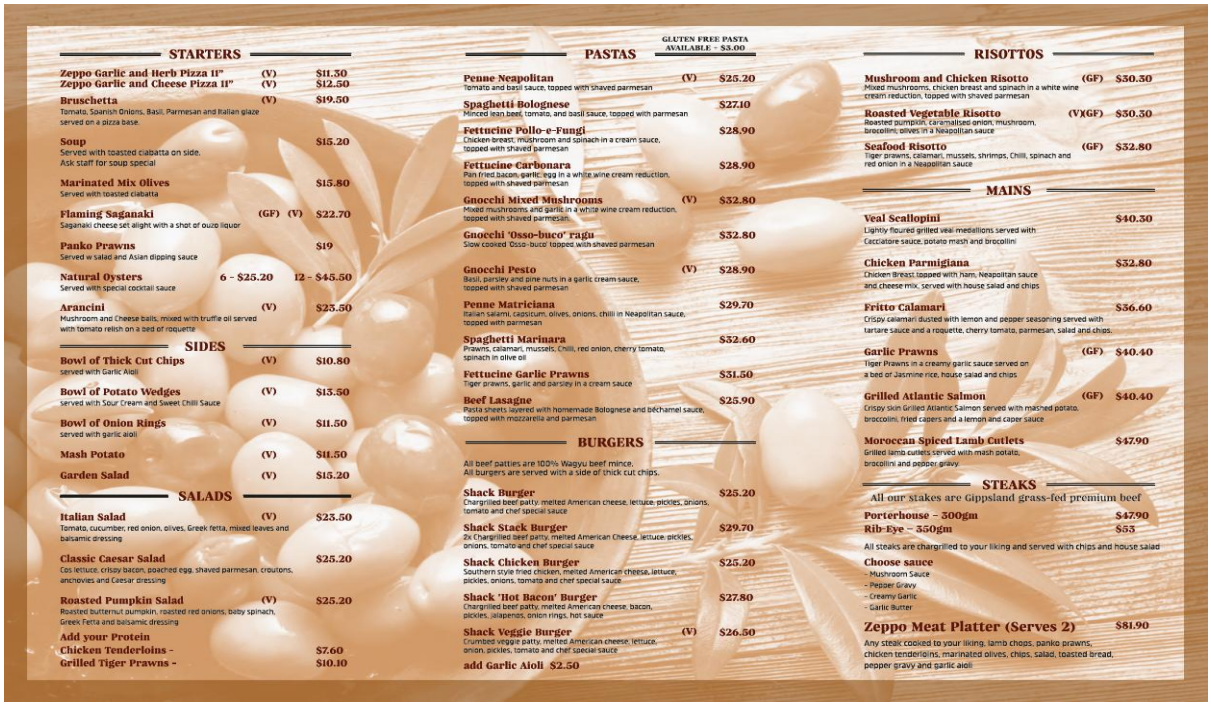
Image 4.3 Image of the venue

Image 4.4 Image of the venue

The menu with all the meals is presented in the following figures; that is, the in-house menu that covers all the meals used in this research.

Image 4.5 Image of the in-house menu

Images 4.6 Image of the in-house menu



The following sections discuss in detail the methodology used to conduct a True experiment at Zeppo restaurant.

4.5 Mixed-Methods Methodology

The study employed an explanatory sequential mixed-methods methodology, as outlined by Onwuegbuzie, Jiao and Collins (2007), to achieve its objectives. Schoonenboom and Johnson (2017, p.1) define 'mixed methods research as the type of research in which a researcher or team of researchers … combines elements of qualitative and quantitative research approaches (e. g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration'. Alavi et. al. (2018) suggest that mixed-methods research helps connect insights from quantitative and qualitative types of studies and deepens understanding of the research issue.

Bowen, Rose, and Pilkington (2017) proposed that integrating sequential quantitative and qualitative data within one study combines two unique information sets, leading to deeper understanding and insight into the research subjects than could be obtained by analysing the data separately. The mixed-methods methodology facilitated data triangulation and increased the validity of the findings, providing a more robust understanding of the research problem (Oranga, 2025).

In the context of restaurant studies, mixed-methods methodology combines both quantitative and qualitative research methods to gain a comprehensive understanding of how a combination of different marketing and advertising functions has an impact on consumers' healthy ordering patterns in restaurants (Mathe-Soulek, Slevitch, & Dallinger, 2015). Explanatory Sequential Mixed Methods comprises first collecting and analysing quantitative data, finding changing trends after the applications of interventions, followed by qualitative data that provide a deeper understanding of the quantitative findings (Bowen, Rose & Pilkington, 2017; Maforah, & Leburu-Masigo, 2018; Lai, 2019).

This research aimed not only to obtain quantified empirical evidence of customer responses to marketing interventions, but also to collect qualitative evidence to probe situational factors influencing the behavioural change. As such, a supplementary qualitative study was conducted to draw conclusions from the experiment. Design of the quantitative research and its results informed the design of the qualitative study. A semi-structured interview method was used to develop research questions to probe and understand the underlying reasons influencing consumers' choices and diets. The interview method examined consumer perceptions and opinions to understand how they responded to the interventions, why they responded the way they did, and what factors influenced their choices. Development of interviews was guided by the conceptual framework and informed by the findings of the earlier quantitative phase. Qualitative data were thematically analysed to discover the situational factors influencing consumers' choices of healthy diet in restaurants.

The quantitative and qualitative data were analysed separately and then combined to gain a comprehensive understanding of how a combination of different marketing and advertising functions had an impact on consumers' healthy ordering patterns in restaurants. Thus, mixed-methods methodology helps cross-validate research findings, increases validity, and provides conclusive evidence on the strength of marketing advertising in changing consumers' ordering patterns towards healthier options in restaurants.

The following sections unpack the study in two phases. The first phase presents the quantitative study and the second phase details the qualitative phase. The research aimed to measure consumers' responses to the interventions and changes in their ordering patterns through point-of-sale statistics. The final sample size, comprising samples from both the quantitative phase and the qualitative phase, was obtained from two sequential phases.

4.6 First Phase: Quantitative study – Ethics Application ID: HRE22-170

In this research, the experiment began with a quantitative study, followed by the development of a qualitative study. The primary objective of the quantitative phase was to test the hypotheses and answer research questions one and two (discussed in Chapter 1).

It emerged from the literature reviewed in Chapter One that food marketing advertising induces customers towards unhealthy food choices (Harris & Graff, 2012). Based on these findings, this research developed an H1 hypothesis that Marketing and Advertising functions, when applied to food products in restaurant settings, do change consumer behaviour to choose healthy foods and diets.

The conceptual framework discussed in Chapter 3 guided the study. Menu-based marketing and advertisement interventions were developed to test the hypotheses. Zeppo Restaurant's menu served as the research instrument used to develop these interventions.

Fewer hospitality studies indicate that interventions helped investigate whether marketing advertising functions can influence consumers' ordering patterns towards healthier meals (Fetters, Curry & Creswell, 2013, p. 2). However, such studies highlighted an acute scarcity of research that identifies opportunities to increase the impact of marketing advertising functions on consumer behaviour and their decision-making process at the point of purchase in restaurant settings (Mihart, 2012). Other studies called for separate interventions for small restaurants, higher-quality Randomised Control Trials (RCT), and measures of sales and behaviour outcomes (Wall et al., 2006). To address the identified research gap and strengthen the empirical robustness of behavioural interventions in restaurant settings, this study designed and implemented five distinct field experiments. They were not conducted simultaneously, each

corresponding to a distinct Marketing Advertising Function (MAF) embedded within the restaurant's integrated marketing communication strategy. Each intervention was applied to five different participant clusters, enabling the study to examine how specific communication strategies influence customers' willingness to order healthier menu alternatives. The intervention design was informed by the nudging approach outlined by Kraak et al. (2017), which highlights the role of subtle environmental and communication cues in shaping consumer food choices. Previous nudging interventions, such as modifying ambience, applying pricing strategies, and positioning healthier foods at eye level, have demonstrated limited progress in shifting ordering behaviour toward healthier options (Kraak et al., 2017). Building on this foundation, the present research implemented five distinct menu-based marketing communication interventions to examine how different promotional mechanisms influence real-time food choices in a fine-dining restaurant environment. These interventions allowed the study to evaluate how consumers respond to different marketing communication cues in their day-to-day ordering decisions, thereby providing insights into their willingness to select healthier alternatives from the menu. A summary of the quantitative intervention design and the corresponding participant clusters is presented in the table below. The study employed a relatively simple experimental design consisting of one field experiment with five treatment conditions and a control condition. However, as the research was conducted in a real-world restaurant environment, several contextual factors, such as customer variability, time-of-day effects, and operational conditions, were less controllable than in laboratory settings and should therefore be acknowledged and discussed as potential influences on the results.

Table 4.1: Summary of Quantitative Study

Study / Intervention Cluster	Objective	Theoretical and Empirical Foundations	Marketing Advertising Function (MAF)	Menu / Intervention Type	Behavioural Mechanism (FBM)	Research Question
Intervention 1 – Baseline (Control Condition)	Establish the baseline proportion of healthy versus standard meal selections in the absence of marketing communication interventions.	Consumer decision-making in restaurant environments is often habitual and guided by convenience rather than health considerations (Wansink, 2004; Roberto et al., 2010).	No intervention (control condition)	Standard restaurant menu	Baseline behaviour without motivational or ability triggers	What proportion of restaurant customers select healthier menu items when no marketing or informational intervention is present?
Intervention 2 – Promotional Advertising Intervention	Examine whether advertising prompts encouraging healthier choices influence consumer ordering behaviour in a real-world restaurant setting.	Food advertising traditionally promotes energy-dense products and may discourage healthier choices (Harris, Bargh, & Brownell, 2009; Cairns et al., 2013). However, promotional cues can also redirect attention toward healthier options.	Point-of-sale promotional posters highlighting healthier meals	Standard menu with healthy-choice promotional posters	**Motivation trigger** – persuasive messaging increases salience and desirability of healthier options	Do advertising prompts promoting healthier menu items increase the likelihood that customers select healthier meals?
Intervention 3 – Menu Design and Semiotics Intervention	Assess whether visual cues and semiotic signals embedded in menu design influence the visibility and perceived attractiveness of healthier menu items.	Menu engineering and visual attention research show that design cues can guide consumer attention and influence selection (Wansink, Payne, & North, 2007; Dayan & Bar-Hillel, 2011).	Menu semiotics (icons, highlights, positioning, visual framing)	Redesigned menu emphasising healthy items	**Ability trigger** – simplifying identification and evaluation of healthier options	Does the use of semiotic cues within menu design increase the probability of selecting healthier menu items?
Intervention 4 – Nutritional Information Disclosure	Evaluate whether the disclosure of nutritional information influences ordering behaviour and encourages healthier choices.	Nutritional labelling policies aim to improve consumer awareness and enable more informed decision-making (Roberto et al., 2010; Sinclair, Cooper, & Mansfield, 2014).	Nutritional information disclosure (e.g., calorie or kilojoule information)	Menu displaying nutritional values	**Ability trigger** – increased informational transparency facilitates healthier decisions	Does the provision of nutritional information influence customers' likelihood of choosing healthier menu options?
Intervention 5 – Integrated Marketing Communication Intervention	Examine whether combining multiple marketing communication cues produces a stronger behavioural effect than single interventions.	Integrated marketing communication strategies reinforce behavioural cues through multiple stimuli and increase message effectiveness (Schultz, Patti, & Kitchen, 2013).	Integrated strategy combining posters, menu semiotics, and nutritional information	Integrated intervention menu	**Motivation + Ability + Trigger** synergy	Do integrated marketing communication interventions produce a stronger increase in healthy menu selections compared with individual interventions?

It is important to note that this study employed a field experimental design consisting of five treatment conditions and one control condition. Each treatment condition corresponded to a different Marketing Advertising Function (MAF) intervention aimed at influencing customers' willingness to select healthier menu alternatives. The interventions were implemented sequentially across different participant clusters within the restaurant environment, allowing the study to compare behavioural responses across multiple marketing communication strategies.

As this research was conducted in a real-world restaurant setting, it is important to acknowledge that field experiments inherently involve less control over external variables than laboratory-based experiments. Factors such as daily fluctuations in customer traffic, group dining dynamics, time constraints, menu familiarity, and individual preferences may influence ordering behaviour. However, conducting the experiment in a natural dining environment also provides a significant advantage: it captures authentic consumer decision-making processes in real time, thereby increasing the ecological validity of the findings. By observing actual

ordering behaviour rather than hypothetical choices, the study offers a more realistic assessment of how different marketing communication interventions influence consumers' selection of healthier menu items.

The following sub-section elaborates on sampling and participant recruitment, the specific experimental design, intervention development and application, data collection and analysis.

4.6.1 Sampling and participant recruitment for quantitative study

As discussed in the first chapter, the experiment was conducted at Zeppo restaurant and a convenience sampling technique was selected for the case study. The researcher opted to conduct this study at Zeppo due to the advantages it offered over other restaurants. However, the approach to sampling and participant recruitment remained the same as it would if any other restaurant or case study were chosen and participants were recruited. This research employed probability sampling in the quantitative phase and non-probability sampling in the qualitative phase for participant recruitment.

Sampling is the 'process of selecting a subset of a population to make inferences about the whole population' (Webster, n.d.). It enables research to be conducted more efficiently and at a lower cost than studying the entire population. Sample size is a critical aspect of research, as conclusions drawn from a sample are used to make inferences about the larger population. An inappropriate sample size can have bearings for the validity and generalisability of results. Two major categories of sampling methods are Probability sampling methods and non-probability sampling.

Probability sampling or random sampling is a sampling technique where each unit in the population has a known, non-zero probability of being selected. It relies on random selection, ensuring a representative sample for making inferences about the larger population. Random selection, known selection probability, representativeness, generalisability, and reduced bias are some of the advantages of probability sampling (Gobo, 2004). Common types include: (1) simple random sampling, (2) systematic sampling, (3) stratified sampling, and (4) cluster sampling (Sedgwick, 2013).

In simple random sampling, every member of the population has an equal chance of selection. In systematic sampling, selection is made at regular intervals from a list, while in stratified sampling the population is divided into subgroups and random samples are drawn from each subgroup, also known as a stratum. In cluster sampling, clusters as a whole are selected as samples; that is, all participants in the clusters are selected rather than a random selection of individual units in the cluster (Jawale, 2012).

Whereas simple random sampling and systematic sampling are more suitable for studying smaller samples and may be cumbersome for researching population studies reviewing large samples, stratified sampling and cluster sampling techniques are advantageous when research is conducted with large sample sizes and the outcome is based on comparison of findings from different subgroups or clusters (Ahmed, 2024). They are favoured for studies where the population as a whole is the sample. In the context of a restaurant, probability sampling involves randomly selecting customers from the entire customer base (the population) or selecting the entire customer base to participate in a survey or study. This ensures that each customer has a known, equal chance of being chosen, making the sample more representative of the restaurant's overall customer experience.

In the first phase, the study used probability sampling and a multi-cluster sampling method to recruit participants for the quantitative experiment. Every visitor who visited Zeppo's restaurant

during the experiment had an equal chance of participating in the study. The cluster sampling technique facilitated the recruitment of all diners to the experiment. This approach enabled the researcher to gather more reliable and generalizable insights about customer order patterns, preferences, satisfaction, and other relevant topics (TGM Research, 2025). This research considered all Zeppo customers as the larger population and divided them into smaller clusters for participation in a hypothesis-testing study. Diners were categorised into six clusters of participants based on the days of their visit to the restaurant. Each cluster was generated through mass selection of participants over a period of seven days or one week. Every table that came on the day would be receiving the relevant menus. A summation of samples from six clusters was the grand sample for the quantitative phase of the study. This research employed a Post-test only control group design, a type of true experiment, for conceptualising and developing the quantitative phase of the study.

4.6.2 Post-test-only Control Group design

A post-test-only control-group design within the True experiment was chosen to test the hypotheses derived in Chapters One and Three and to achieve the research objectives, as shown in Table 1.

Actual experiments consist of two groups of participants, a control group and an experimental group, also called the treatment group. The control group are the group of participants who are not exposed to or do not receive any intervention or treatment. On the other hand, the experimental group, or treatment group, is a group of participants who are exposed to or receive an intervention or treatment. Control groups are used to establish a baseline against which results from treatment groups are compared to measure the effectiveness of interventions/treatments, assess changes in participants' responses, and evaluate

interventions/treatments (Ross et al., 2015). The unit of assignment was the week, meaning that all patrons visiting the restaurant during a given week were exposed to the same intervention condition. The design also specifies whether intervention weeks alternated with non-intervention (control) weeks in order to reduce potential external shocks or temporal effects that could influence ordering behaviour.

A further consideration relates to the unit of assignment used in the experimental design. In this study, the unit of assignment was the week, meaning that all restaurant patrons dining within a given week were exposed to the same intervention condition. Each weekly period, therefore, represented a distinct participant cluster receiving a specific Marketing Advertising Function (MAF). This approach enabled the interventions to be implemented consistently and in a practical manner within a real restaurant environment. To mitigate potential time-related shocks, such as fluctuations in customer behaviour due to external events, seasonal patterns, or temporary contextual factors, the study alternated weeks with and without interventions, incorporating baseline (control) periods between treatment weeks. This alternating structure helped reduce the likelihood that short-term environmental changes systematically biased the observed outcomes.

Because the research was conducted in a natural field setting and participant anonymity was maintained, individual customers were not tracked across visits. Consequently, it is possible that some loyal patrons returned to the restaurant across multiple weeks and were therefore exposed to more than one intervention. This creates the potential for a learning or familiarity effect resulting from incremental exposure to different marketing communication strategies. However, the use of week-level clustering, alternating intervention and non-intervention periods, and the presence of a continually changing customer base helped minimise the likelihood that repeated exposure by the same individuals substantially influenced the aggregate results. Rather than analysing individual behaviour, the study therefore captures the

overall behavioural response of restaurant patrons to different marketing interventions at the population level, which aligns with the real-world dynamics of restaurant decision environments.

Three common types of True experimental designs are described based on how interventions are applied and measured to assess impact. They are (1) the pretest/post-test control group design, (2) the Posttest-only control group design, and (3) the Solomon four-group design (DeCarlo, Cummings, & Agnelli, n.d.). A pretest/Post-test control group design is a type of experimental design in which measurements are taken before and after the intervention to assess its effectiveness. A posttest-only control group design is an experimental design that measures the dependent variable only after an intervention or treatment has been applied, without a pretest to assess baseline conditions. Solomon's four-group design is more complex than the Pretest-Posttest and Posttest-only designs, as it uses four groups to assess the effectiveness of an intervention while also investigating the influence of pretesting on Posttest results. This study uses an experimental rather than a quasi-experimental design, applying function-based marketing and advertising interventions to observe manipulations in consumer behaviour and their ordering patterns in response to the innovations; uses random assignment through the random selection of participants; and measures the outcomes of interventions using comparative data.

The study used cluster sampling to identify six clusters for the experiment, of which the first cluster was chosen as a control group to which no treatments were applied and whose responses would be established as the baseline. The intent of conceptualising a control group of participants was to compare customer responses to various interventions with a baseline. This study did not aim to collect customer responses for each cluster before an intervention was applied. It was only interested in customer responses to the interventions to determine the influence of the interventions on dependent variables as a variation from the baseline and for

each individual intervention. Therefore, this study employed a Posttest-only control group design for conducting the experiment and implicit interventions were conceptualised by applying menu engineering techniques as follows.

To minimise potential confounding effects, several contextual factors that could influence customer ordering behaviour were considered during the study design and data collection process. First, the unit of assignment was the week, meaning that all patrons dining during a given week were exposed to the same intervention condition. To account for day-of-week variation, transaction data were monitored across the full Monday–Sunday operating cycle in each experimental period, ensuring that weekday and weekend dining patterns were consistently represented within each cluster. Second, seasonality effects were minimised because the entire data collection period was conducted within a single season—summer—thereby reducing the influence of seasonal changes in dining preferences or menu demand. Third, the restaurant's promotional environment remained constant throughout the study period. No additional specials, discounts, or menu promotions were introduced or altered while the interventions were implemented, ensuring that customer choices were not influenced by concurrent promotional incentives. Together, these controls helped ensure that any observed changes in ordering behaviour were more likely attributable to the marketing advertising functions (MAFs) implemented in the experiment rather than to external contextual factors such as seasonal shifts, promotional activity, or uneven day-of-week customer composition.

4.6.3 Intervention Design and Development: Menu engineering

In research, an intervention refers to a deliberate action or treatment applied to a group or individuals to observe its impact on a specific outcome, typically a disease, condition, or

behaviour. It is a planned and targeted operation designed to change something, such as improving health, preventing disease, or altering behaviour (Ross, Smith, & Morrow, 2015). In medical science and healthcare-related studies, two broad categories of interventions discussed are (1) preventive interventions and (2) therapeutic interventions (Ross et al., 2015). Preventive interventions are those that prevent disease from occurring, thereby reducing the incidence (new cases) of disease. Therapeutic interventions are described as those that "treat, mitigate, or postpone the effects of disease, once it is underway, and thus reduce the case fatality rate or reduce the disability or morbidity associated with a disease'" (Ross et al., 2015, p.). In the context of restaurants, several studies focusing on promoting healthy eating have used interventions as a quantitative method to investigate consumer behaviour patterns (Bleich et al., 2017; Espino et al., 2015). Furthermore, behavioural studies in the hospitality sector have investigated the potential of implicit and explicit interventions as affordable and accessible tools to promote healthier eating (Gynell, Kemps & Prichard, 2022). Explicit interventions are direct and conscious, involving clear instructions and explanations, while implicit interventions are indirect, allowing learning to happen unconsciously through exposure and natural processes (Fordyce, 2014; Walls et al., 2011), such as marketing campaigns and community-based education programs; for example, using a menu with explicit ingredient descriptions and nutritional information. Implicit interventions are described as unconscious and subtle influences that shape behaviour without deliberate awareness, typically by modifying environmental cues or the surrounding social setting. (Junghans, Cheung & De Ridder, 2015) and include, but are not limited to, placement, priming/cueing, defaults, naming, ratios, and signage (Kraak, et al., 2017; Gynell, Kemps, & Prichard, 2022). Placement interventions typically involve placing healthy items in optimal locations to increase the popularity of these items by maximising their visibility, thereby improving salience (Nathan, et al., 2011). Priming/cueing interventions often work by activating healthy-eating goals or

associations, prompting individuals to favour healthy foods when they are offered subconsciously. Priming/cueing interventions engage by using descriptive or appealing names for healthy items. Signage interventions involve tactics such as increasing the size of menu signs displaying healthy options (e.g., Olstad et al. 2014) to make these options more noticeable. It used the Menu of the Zeppo restaurant to design a series of implicit marketing and advertising interventions, including placement, priming, and signage interventions through menu engineering or menu modification, as well as conventional marketing strategies.

As discussed in Chapter 3, a conceptual framework based on FOGG's behaviour Model guided the development of hypotheses. Interventions facilitated the examination of the effect of independent variables, such as Semiotics (colour coding, evocative language), Heuristic Cues, Descriptive Menu Naming, Nutritional information disclosure, and Point-of-Sale Advertising, on the dependent variable consumer ordering and purchase patterns when presented with healthier food options.

4.6.4 Intervention Application for Quantitative Data Collection and Hypothesis Testing.

The Nuffield Intervention Ladder, a tool developed by the Nuffield Council on Bioethics, provided guidelines for conceptualising population-level interventions and sequencing them to test hypotheses (Whittall, 2008; Garnett & Pechey, 2025). It sets out a series of options for public health interventions. These options gradually increase in intrusiveness, with doing nothing at the bottom and removing choice altogether at the top. In this research, interventions in the lower rung were designed to begin from a baseline, followed by a single and straightforward marketing advertising strategy to transform/revise the menu, and in the higher

rungs of the ladder became more complex with multiple marketing and advertising strategies applied in combination to transform/revise the menu (Jostock, et al., 2025).

For this experiment, seven food items from the Zeppo menu were classified as healthy meal choices. These included: (1) Caesar salad, (2) Roasted Pumpkin salad, (3) Smoked Salmon salad, (4) Warm Chicken salad, (5) Bruschetta, (6) Salmon Fillet, and (7) Mediterranean salad. This study aimed to investigate the potential of marketing and advertising functions to draw Zeppo diners' attention to these seven healthier choices and influence customers' purchasing decisions. Thus, Zeppo's menu was used as the research instrument to develop interventions by applying different marketing and advertising functions. Five interventions were developed through revision of menu design and using images of the seven food items to create poster advertisements as follows:

1. **Baseline**: Standard Menu used as Control Menu.
2. **Intervention 1:** Unlabelled Green Folder and Green Menu.
3. **Intervention 2:** Labelled Green Folder and New Green Menu with evocative descriptions of food items.
4. **Intervention 3:** Labelled Green Folder and New Green Menu with evocative description of food items and Nutritional Information disclosure.
5. **Intervention 4:** Large advertisement Poster with images from the Menu displayed on three large High-Definition Televisions.
6. **Intervention 5:** Labelled Green Menu, Revised Menu to include Food description and Nutritional Information, Large advertisement Poster with images from the Menu displayed on large High-Definition Televisions.

The following subsections discuss intervention design in detail.

4.6.4.1 Baseline: Standard Menu as Control Menu

Image 4.7 Standard Menu

In a food design experiment, a control menu is a standard, neutral version of a menu used as a baseline for comparison with an intervention menu (Bergman et al., 2021). It contains no experimental changes, ensuring that any observed differences in customer behaviour are due to the specific intervention (such as special labelling or layout) and not to any other menu elements. In this experiment, Zeppo's standard menu served as the control menu, with no new marketing or advertising, to measure customers' preferences. The quantitative study established a baseline against which customer responses to other interventions were measured. The first cluster of participants was presented with the control menu. Their food choices were confirmed and recorded at the Point-of-Sale counter, and the baseline values were stored.

4.6.4.2 Intervention 1: Green Folder and Green Menu

Marketing and Advertising strategies applied the theory of Semiotics to design interventions. The Zeppo Menu was revised for each intervention and used as a research instrument to observe participant reaction.

Image 4.8 Unlabelled Green Folder and Green Menu

The first intervention introduced a Green coloured folder with information about Zeppo restaurant and included the Green Menu. The content remained the same as that of the control menu except for the colour. This intervention was created by using Colour as a Semiotic resource. Semiotics is described as the study of signs and symbols and how they are interpreted (Chandler, 1994). Several studies have examined the importance of the application of semiotics in the form of cognitive shortcuts or heuristics in changing a consumer's ordering pattern in a restaurant setting (Stano, 2015; Li, 2019; Tyson, 2012). The purpose of this intervention was to examine customers' interpretation of colour used in the design and whether colour alone could motivate customers to choose differently. Green was chosen based on the guidelines of colour theory and implications of different colours on human emotions and psychology (Jonauskaite, & Mohr, 2025). Across most popular cultures, green colour is associated with "nature, health and balance" (Arora & Warsi, 2024). As this study aimed to promote healthy foods and diets to consumers and design interventions to influence consumer behaviour, it used Green as the primary colour for intervention design to draw customer attention to healthier options on revised menus. This intervention sought to answer the question, 'Can introducing

an unlabelled green coloured folder with Standard Menu (use of semiotics in the form of Colour) change customers' ordering patterns in restaurants?' and responded to objective 3. The study measured the impact of colour on consumer behaviour and choices, changes in ordering patterns, and sales of healthier dishes on the menu. The second cluster of participants was exposed to this intervention.

4.6.4.3 Intervention 2: Labelled Green Folder and New Green Menu with evocative description of food items

Image 4.9 Labelled Green Folder and New Menu with Food Description

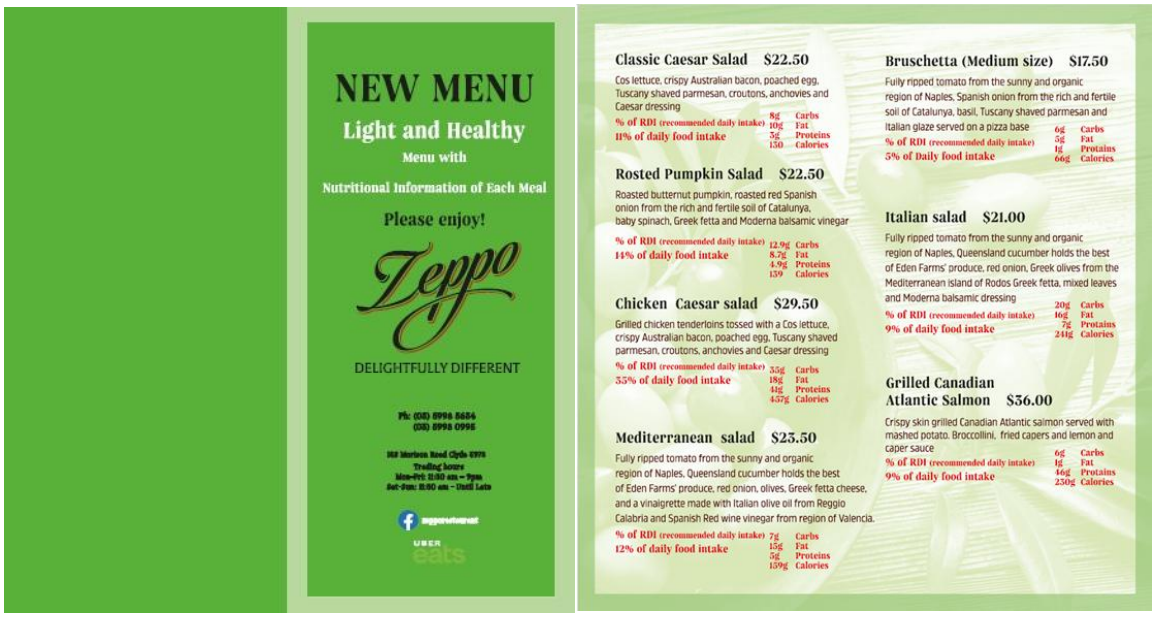
The second intervention introduced a New Green folder and a New Menu to a new cluster of participants. A Green folder with a new label 'Light and Healthy' in white coloured font was generated for this intervention. Evocative text in the form of descriptive labels, for example, "sundried tomato from rich and fertile soil of Naples" was included for each food item on the menu. In this intervention, Typography and Text were used as semiotic resources.

Typography—that is, the style and appearance of printed matter on the green cover and the menu—was used as a Semiotic resource to design this intervention (Reference). Since Fell and Lukianova (2015) started examining the importance of semiotics in gastronomy, there have been several studies looking at the importance of the application of semiotics in the form of cognitive shortcuts or decision heuristics cues in changing a consumer's ordering pattern in a restaurant setting (Stano, 2015; Li, 2019; Tyson, 2012).

This study sought the answer to the question, "*Can introducing a labelled Green coloured folder and a revised menu with food descriptions of each meal change customers' choices toward healthier alternatives in restaurant settings?".* The third cluster of participants was exposed to this intervention.

4.6.4.4 Intervention 3: Labelled Green Folder and New Green Menu with evocative description of food items and Nutritional Information disclosure.

Image 4.10 Menu with Nutritional Information disclosure.



The third intervention was a revision of the green folder and new menu designed for the second intervention, using nutritional information disclosure as the underlying marketing and advertising strategy.

Josiam and Foster (2009) examined this phenomenon, attempting to understand who actually seeks nutritional information and how relevant it is to the ordering patterns of consumers while dining out. They concluded that some market segments would dine more often if the nutritional information was presented on the menus and consumers who would normally eat healthier meals at home would look for more nutritional information while dining out. Hwang and Lorenzen (2008) concurred that nutritional information can help consumers make informed decisions, while Burton et. al. (2006) indicated that the inclusion of nutritional information on restaurant menus has an impact on consumer choices, encouraging them to consider reducing their intake of less healthy food. However, Xu and Jeong (2019) argued that "benefit-based messages are generally more persuasive than attribute-based messages in green restaurant advertisements" (p.).

In the context of this study, a new label “Nutritional Information of Each Meal” was added to the existing “Light and Healthy” label in the green folder. Nutritional information and calorific values of each meal were placed alongside evocative description text for each meal option, as shown in Figure 4.8. This disclosure for each meal, and under each meal, displayed parameters to include Required Daily Intake (RDI), Percentage of Daily Food Intake, Macronutrient Value breakdown into Carbohydrates, Fats, Proteins, and Calories. The intervention investigated the importance of nutritional information and calorific values in changing a consumer’s ordering pattern from normal to healthier meals. It sought answer to the question “Can introducing a labelled Green coloured folder and a revised menu with food description and nutritional calorific information change customers' choices toward healthier alternatives in restaurant settings?” The Third intervention was presented to the fourth cluster of participants.

4.6.4.5 Intervention 4: Large advertisement Posters with images from the Menu displayed on large High-Definition Televisions.

Image 4.11 Images of the healthy meals used in this research

Mediterranean salad

Warm Chicken salad

Caesar Salad

Roasted pumpkin salad with Fetta

Bruschetta

Grilled Salmon Fillet

Smoked Salmon salad

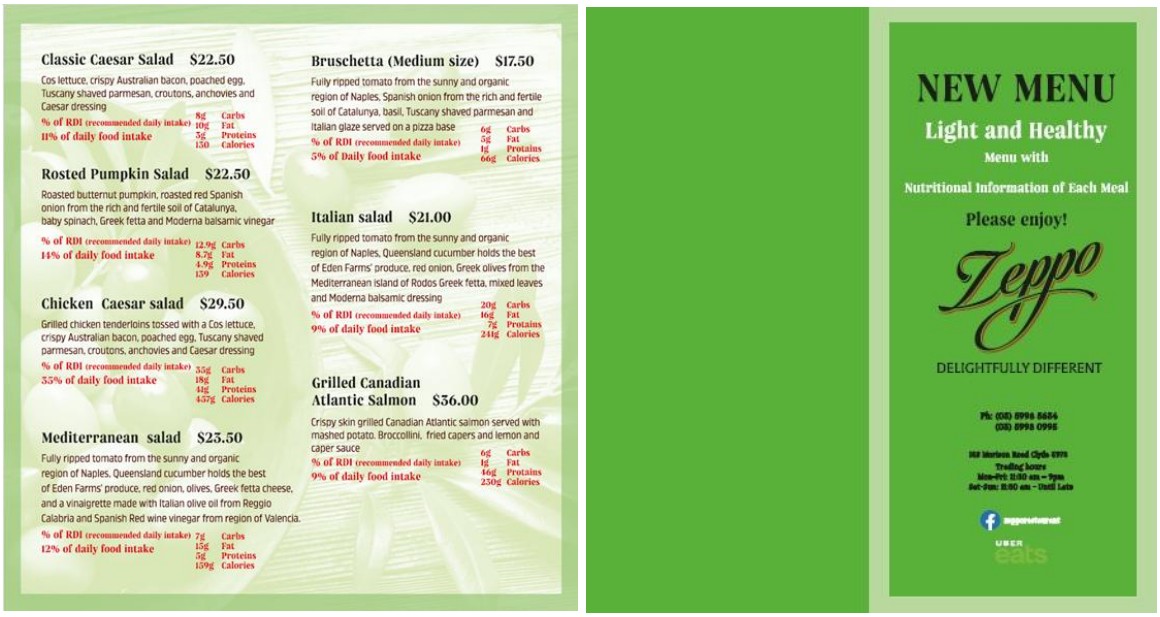
The fourth intervention consisted of designing large advertising posters featuring enlarged images of meals with nutritional information. Using product marketing positioning and differentiation strategies, the posters were placed near point-of-sale systems and other strategic points in the restaurant for greater visibility. In earlier studies that used Advertisement posters with nutritional information in restaurants, Fitzgerald et. al. (2004) noted small or no changes in ordering patterns in four out of 10 restaurants used in their experiment. Print advertisements, posters, and tables were used, containing nutritional information, which predominantly aimed to reduce the intake of sodium, sugar, and saturated fat. However, some restaurants experience a drop in healthy meal orders despite marketing advertising posters disclosing nutritional information. This research investigated the importance of nutritional information in changing a consumer's ordering pattern from normal meals (not healthy) to healthier ones, as the nutritional information is disclosed on TV advertising posters. Similar findings were experienced in several different experiments over the last two decades (Lando &

Labiner-Wolfe, 2007; Espino et. al., 2015). Thayer et al. (2017) reported that advertising posters were well received and provided nutritional knowledge to restaurant patrons. 91% of people in this study considered the nutritional information helpful, and influenced ordering patterns for 33%. However, in this experiment, coupons were used to encourage customers to order a healthier alternative (Thayer et al., 2017). In the present study, the fourth intervention sought to answer the question, "Can introducing advertising posters with nutritional information change customers' ordering patterns in restaurant settings?"

The fourth intervention was exposed to the fifth cluster of participants.

4.6.4.6 Intervention 5: Labelled Green Folder, Revised Menu to include Food description and Nutritional Information, Large advertisement Poster with images from the Menu displayed on large High-Definition Televisions.

Image 4.12 Food Description and Nutritional Information



Posters with images from the Menu displayed on large High-Definition Televisions with nutritional information are available in Appendix 1.

The fifth intervention was the last designed in this study and combined elements of earlier interventions. In this study, a labelled green folder and revised menu used in the third intervention, which contained images, descriptive text, as well as Nutritional information and calorific values, was presented to a sixth cluster of participants. At the same time, images of seven food items were displayed on three Television screens at strategic positions in the restaurant to gain the attention of consumers. This intervention sought to answer the question, "Can combination of a (1) labelled green folder with labels – 'light and healthy' and 'Nutritional Information'; (2) new menu with images, evocative description text, and nutritional information and calorific values; and (3) point-of-sales advertising posters of nutritional information on large Televisions have an impact on consumers ordering patterns in restaurants?" The last combination intervention was exposed to the sixth cluster of participants.

The control menu for baseline and five experiment menu interventions explored consumer choices in response to variations in presentation and promotion of food choices using marketing advertising functions to measure changes in the number of healthy foods ordered at the restaurant.

After establishing a baseline using Zeppo's standard menu for the control group, five interventions were introduced sequentially to different clusters of participants to test the hypotheses after a baseline was established as shown in Table 4.2. Consumer preferences were measured based on their actual purchases.

Table 4.2 Application of interventions in a Posttest-only control group design

SL NO	Sample Participant Cluster	Posttest Group Nomenclature	Intervention	Treatment
1	Cluster 1 – Control Group	CG	Customers ordered from the standard restaurant menu with no marketing intervention applied.	Control condition
2	Cluster 2 – Advertising Intervention	T1	Promotional posters highlighting healthier menu items were placed in the restaurant environment.	Advertising treatment
3	Cluster 3 – Menu Semiotics Intervention	T2	Menu design modified to include icons, visual highlights, and positioning to emphasise healthier menu options.	Menu design treatment
4	Cluster 4 – Nutritional Information Intervention	T3	Nutritional information displayed alongside menu items to support informed consumer decision-making.	Nutritional information treatment
5	Cluster 5 – Integrated Marketing Intervention	T4	Combination of posters, menu semiotics, and nutritional information used simultaneously.	Integrated treatment

This research, in designing interventions, addressed some gaps identified in earlier studies that used interventions to examine consumer behaviour in restaurants and other food service organisations.

Each intervention was applied for seven continuous days, and all customers who dined at Zeppo restaurant during those seven days and responded to the specific intervention were considered as naturally formed individual clusters related to the intervention. Formation of such clusters allowed for comparison of the point-of-sales collected from each cluster. In doing so, this study addressed a gap in the literature where sample sizes were often small and did not adequately represent the larger population.

4.6.5 Quantitative Data Collection

The purpose of the quantitative study was to test whether MAF was effective, as emerged from the literature. The study was designed to gather empirical evidence on the effectiveness of marketing and advertising interventions and to measure the impact of these interventions on customers' dietary choices and sales. Hence, the number of sales at the end of each intervention period was collected for analysis and comparative study. Participant clusters at Zeppo restaurant were exposed to interventions sequentially every alternate week, as shown in the table below.

Table 4.3 Quantitative data collection timeline, participants and interventions

Sample Participant Cluster	Posttest group nomenclature	Interventions and order of application	Data Collection Month/ Week
Cluster 1	Control Group	1. Baseline: Standard Menu	First Month - First Week
Cluster 2	Treatment Group 1	2. Intervention 1: Green Envelop and Standard Menu	First Month - Third Week
Cluster 3	Treatment Group 2	3. Intervention 2: Labelled Green Envelop and New Green Menu with evocative description of food items	Second Month - First Week
Cluster 4	Treatment Group 3	4. Intervention 3: Labelled Green Envelop and New Green Menu with evocative description of food items and Nutritional Information disclosure.	Second Month - Third Week
Cluster 5	Treatment Group 4	5. Intervention 4: Large advertisement Poster with images from the Menu displayed on three large High-Definition Televisions.	Third Month - First Week
Cluster 6	Treatment Group 5	6. Intervention 5: Labelled Green Folder, Revised Menu to include Food description and Nutritional Information, Large advertisement Poster with images from the Menu displayed on large High-Definition Televisions.	Third Month - Third Week

Interventions were applied every alternate week as shown in the table. Data would not be collected for a week between two interventions to avoid disruptions caused by seasonality and other limitations, such as public holidays, that could affect the research findings.

The natural observation technique was applied to observe participant activity during the experiment. Naturalistic observation (NO), often referred to as unstructured observation or participant observation, involves studying the natural behaviour of participants in natural

surroundings (Gillham, 2008). This approach involves close observation of participants' lives while maintaining a clear distance, so that participants remain unaware of the observation and data recording (Ompad et al., 2008) and is an inexpensive approach to data collection (Johnson & Turner, 2003). Zeppo restaurant facilitated natural observation of participants with few intrusions. During data collection and beyond, the anonymity of participants was maintained as no personal information was collected from them or from systems. Through natural observation, the quantitative study examined the potential of marketing and advertising strategies in changing a consumer's ordering pattern from everyday meals to healthier ones, without any financial incentives or coercion to entice customers to switch their ordering choices towards healthier dishes. After they had placed their orders, purchase orders were determined by sales data.

Quantitative data was collected using a sophisticated Point-of-Sales system (POS) provided by Ordermate, installed at Zeppo restaurant. OrderMate is a point-of-sale system that provides "functionalities to include advanced table management, phone/online orders for pickup & delivery, at-table ordering, powerful integrations and back-of-house reporting" (OrderMate, 2025).

At Zeppo, restaurant staff took customers' orders and collected data on healthier options selected for this research. The orders would be printed to the relevant section for food preparation, such as the main meals section and the pizza sections, and stored in the daily takings section of the Ordermate POS software.

The POS system generated a sales figure at the end of the business day. The sales numbers accumulated over the period of one week for each marketing advertising intervention were stored in the POS system. When healthy options were ordered, they were recorded along with everyday restaurant meals in the POS system. At the same time, healthy meal orders were

recorded separately on another computerised system. At the end of the day, a report on healthy items purchased was printed and kept in a specific file. This approach to data storing on multiple computerised systems and as physical reports prevented the possible loss of data due to system malfunction or possible breakage. The restaurant's computer system records are typically kept for one year, and Ordermate's head office also provides off-site data storage for the same period.

Every week, cumulative data from each intervention study were entered into Excel spreadsheets. At the end of each week used for intervention, data were extracted and stored for subsequent analysis. At the end of data collection, sales data collected from POS systems and stored in Excel spreadsheets were fed into IBM SPSS software as input for data analysis at the end of the quantitative phase. Statistical software IBM SPSS was used for data management and data analysis. Statistical methods were employed for quantitative data analysis, as detailed in the following section. Because the study was conducted as a field experiment in a natural restaurant environment, it was not possible to individually track or identify customers across multiple visits. In order to preserve the anonymity of participants, no personal data was collected from restaurant patrons, and ordering behaviour was analysed exclusively through aggregated point-of-sale transaction data. As a result, the participant clusters represent temporal customer groups rather than individually identified participants, meaning that each cluster corresponds to the population of diners present during the specific intervention period. While it is possible that some loyal customers returned to the restaurant during multiple weeks of the study and were therefore exposed to more than one Marketing Advertising Function (MAF), this potential overlap reflects the natural dynamics of real restaurant settings rather than a controlled laboratory environment. Consequently, the study prioritised ecological validity, observing authentic ordering behaviour under real service conditions. The absence of individual tracking means that a learning or familiarity effect from repeated exposure to

different interventions cannot be entirely ruled out. However, the relatively large and continually changing customer base, combined with the sequential introduction of interventions across different time periods, reduces the likelihood that repeated exposure by the same individuals significantly influenced overall ordering patterns. Instead, the analysis captures the aggregate behavioural response of restaurant customers to different marketing communication strategies as they would naturally occur in everyday dining contexts.

4.6.6 Quantitative Data Analysis

The earlier section explained the collection of raw data at Zeppo restaurant required for hypothesis testing. This section elaborates on the quantitative data analysis used for analysing the raw data.

The quantitative phase of the study focuses on examining the effects of MAF on food choice. In statistical hypothesis testing, the null hypothesis (H0) is a statement that assumes no effect, no relationship, or no significant difference between independent and dependent variables (Seltman, 2012). In this research, the researcher simply focuses on examining the effects of MAF on food choice. It serves as the default assumption that researchers aim to disprove. As discussed in Chapter 1, existing research found that food service MAFs were successful in nudging customers towards unhealthy food choices but less successful in nudging them towards healthy food and diets. This research tested whether MAF was effective and provided evidence for the effectiveness of Marketing and Advertising functions in manipulating consumer choice towards healthier food options. Customers' choices of seven healthy food

options were collected from each treatment after the intervention was applied. The responses were non-numeric or categorical. As such, statistical methods appropriate for categorical data were used in the quantitative phase.

4.6.6.1 Categorical data

Categorical data is used to describe the characteristics of a population or group. It is used for analysing relationships between different categories or groups. In behavioural studies, categorical variables can be used to investigate interactions between different factors (Azen & Walker, 2021). In this study, customers' food choices were non-numerical or categorical data collected from a baseline study and from five treatment/intervention studies and stored as sales data in the POS system. Non-numerical responses to the six treatments generated were categorised into six distinct categories or groups corresponding to each intervention. This quantitative data analysis was conducted to measure consumer preference, behaviour change, marketing effectiveness, and menu design impact on customers' ordering of healthy meals. The Statistical Package for Social Sciences (SPSS), IBM Version 21.0, was used for storing and managing the data and analysing it, using appropriate statistical methods. This study used statistical analysis methods of inferential analysis to analyse customers' food choices, test the hypotheses and respond to the research questions. Data were collected from all customers who visited the restaurant during each observation period, ensuring a complete and unbiased representation of consumer behaviour across both baseline and intervention phases. The dataset encompassed every transaction recorded through the restaurant's point-of-sale (POS) system, rather than selectively sampling only customers who exhibited specific behavioural responses to the marketing interventions. Although the raw data were initially categorical, representing

meal choices as either “healthy” or “standard”, the inferential analyses focused on the proportions and comparative frequencies of customers selecting the designated Light and Healthy menu items before and after each intervention. This approach enabled a rigorous examination of whether the applied marketing and advertising functions (such as menu design, semiotic cues, and point-of-sale posters) significantly influenced overall ordering patterns, thereby providing valid insights into real-world behavioural shifts rather than among a subset of responsive consumers.

4.6.6.2 Inferential statistical analysis

Quantitative data analysis varies depending on the type of data collected, the research purpose, the research question, and the assumptions underlying the methods (Onwuegbuzie & Leech, 2006). In field research, statistical analysis is broadly categorised into descriptive and inferential statistics methods (Statistics, 2013). Descriptive statistics is used to analyse data that is in numerical format and can summarise the characteristics of a population. While descriptive statistics techniques provide an ‘accurate and illuminating picture’ of the data acquired, they do not, on their own, indicate whether similar patterns can be observed if experimental manipulations were applied to new populations (Haden, 2019). Inferential statistics is used to predict characteristics of a population based on the summaries from a smaller sample of the population and make inferences and generalise the results of a smaller population to a larger/infinite population (Kuhar, 2010). It is primarily used for categorical data analysis and to draw conclusions and make inferences after analysing data collected through quantitative methods (Statistics, 2013).

Inferential statistics uses findings from sample data to generalise and make inferences or conclusions about a larger population of interest (Allua & Thompson, 2009). Hypothesis Testing, Regression Analysis, Confidence Intervals, Correlation, Analysis of Variance (ANOVA), Chi-Square Tests, One-Sample T-test, Independent-Samples T-test, Paired T-test (or Dependent Samples T-test), One-way ANOVA, Two-way ANOVA, Repeated Measures ANOVA are a few types of inferential tests (Delacre, Lakens & Leys, 2017).

In the context of this research, the inferential statistics method is used to understand customers' food preferences towards healthier choices in response to targeted marketing and advertising interventions. Its analysis uses the two-sample T-test and the Chi-Square test in the Zeppo restaurant experiment and data from customer sample clusters to draw broader conclusions about the larger restaurant customer base.

4.6.6.3 Welch's T-test

A T-test is a statistical test that can be used to compare means. The common types of t-tests include one-sample t-tests, independent samples t-tests, and paired/dependent samples t-tests. In a one-sample t-test, focus is on one mean or one dataset. The two-sample t-test, or independent samples t-test, is valid when comparing datasets from two separate and unrelated samples (Gao, Qiang, & Chen, 2018; Wooditch, Johnson, Solymosi, Medina Ariza, & Langton, 2021). Paired/dependent samples t-test compares datasets from the same sample or the same people over time in a pretest-posttest setting (Manfei et al., 2017). In two-treatment-group studies, the usual null hypothesis is that the two population means are equal, and the usual alternative hypothesis is that the two population means are unequal (Seltman, 2012).

Depending on sample sizes, two types of t-tests are described. Student's t-test is a statistical hypothesis test used to compare the means of two groups, particularly when the sample size is small and the population standard deviation is unknown (De Winter, 2013; Livingston, 2004). The Welch's t-test is a robust alternative to the Student's t-test and is used as a test for large unequal sample sizes (Delacre, Lakens & Leys, 2017). Marie Delacre, Daniel Lakens, and Christophe Leys observed that Student's t-test could be “severely biased and lead to invalid statistical inferences” and recommended Welch's t-test as an alternative when "the assumption of homogeneity of variance” was not met (Delacre, Lakens, & Leys, 2017).

In this research, data were collected from six different population clusters of varying sample sizes and exposed to different treatments in a Posttest-only control group setting. As such, Welch’s test, or the unequal variances t-test, an independent two-sample t-test was chosen for data analysis.

A two-sample test of proportion as well as a T-test compared the purchase rate of different healthy meals before and after an intervention. A statistical test such as Poisson could have been applied as well, but the result would not have differed significantly. Therefore, the combination of a two-sample test of proportion as well as a T-test was applied to obtain conclusive findings.

4.6.6.4 Chi-Square Test of Homogeneity to test proportions

Chi-Square Tests are used to analyse categorical data and test for associations between variables. Karl Pearson's family’s three main types of Chi-square tests described are the goodness-of-fit test, the test of independence and the test of homogeneity (Franke, Ho, &

Christie, 2012). The chi-square goodness-of-fit test is used when a sample is compared on a variable of interest against a population with known parameters. The chi-square test of independence determines whether two categorical variables in a single sample are independent from or associated with each other. The chi-square test of homogeneity is used to determine whether the proportions of a categorical variable are the same across different populations (Franke et al., 2012). The homogeneity test is used to compare two or more independent groups on a categorical outcome (Franke et al., 2012). This study used the Chi-Square test of homogeneity to analyse data from multiple groups of participants to determine the distribution of healthy meals during different treatment periods in response to varied interventions. The test was used to evaluate the increase or decrease in the proportion of healthy meals sold to the control and treatment groups.

The analysis probed for correlation between changes in the number of healthy meals ordered before and after the interventions of various marketing and advertising functions and the relevance of different situational and internal factors that might have had an impact on ordering patterns in the restaurant environment. Data was analysed to determine the influence of various marketing and advertising functions on consumers' food choices when ordering at a restaurant, and to determine whether the interventions could effectively steer individuals towards selecting healthier food options in a restaurant setting. This method helped explore the statistical significance of each marketing advertising function and the results they provided (increase/decrease in the number of healthy meals ordered). The research measured the correlation between different marketing advertising functions and their effectiveness in changing consumer choice towards healthier eating.

4.7 Second Phase: Qualitative Study - Ethics Application ID: HRE22-170

After concluding the first phase, this research designed a qualitative study to answer the third research question.

Qualitative research is a valuable approach for exploring the complex factors that influence healthy dining choices in restaurants. It enables a deeper understanding of human behaviour, attitudes, and beliefs by providing rich, detailed descriptions of people's experiences and perspectives regarding ordering healthier meals in restaurant settings. Some scholars argue that qualitative research is an essential complement to quantitative research, as it provides a more comprehensive understanding of social phenomena (Creswell, 2014; Denzin et. al, 2017).

This qualitative research helps uncover consumers' attitudes, beliefs, and practices regarding healthy dining options. It also provides an insight into the challenges and opportunities for promoting healthy dining in restaurants, including the barriers that prevent consumers from making healthy choices. As well, it offers possible strategies that restaurants can use to promote health options, and the factors that influence the adoption of healthy practices in the food service industry (as discussed in Chapter 1). Furthermore, qualitative research helps to identify the cultural and social norms that shape dining behaviour and attitudes, and how they can be changed to promote healthier choices (Charmaz, 2014). In this research, as a supplement to the quantitative study, a qualitative study helped increase validity and research rigour.

- A qualitative research question emerged from data collected and analysed in the quantitative section. Findings from the quantitative phase discovered that some interventions had a significant impact on the number of healthy meals ordered with the application of different marketing and advertising functions. Results from the analysis of findings from the quantitative phase rejected the NULL

hypothesis. Instead, they indicated that using marketing and advertising functions in a restaurant setting could nudge consumers to choose healthy food. However, within the scope of quantitative design and the methods it was not possible to probe deeper to explore why consumers chose the options they did when treated with interventions. There was no evidence about factors influencing the shift in customer behaviour in response to different interventions. While the quantitative study answered research questions 1 and 2, the first phase was unable to answer research question 3.

- *What are some of the situational factors that might have an impact on consumers' choosing patterns in restaurant settings, such as dinner occasion, and exposure to marketing and advertising functions?*

Limitations of quantitative methods hampered a deeper probe into customers' lived experiences and perceptions formed. To answer research question 3 and substantiate and build on the findings of the quantitative phase, research aimed to determine whether any situational factors might have had a significant impact on "substantial" changes in the number of healthy meals once marketing advertising functions were applied. A qualitative study was conducted to examine the situational factors influencing customers' responses to various interventions and the motivation behind their healthy meal choices.

4.7.1 Sampling and participant recruitment for qualitative study

In the qualitative phase of this study, a non-probability sampling strategy was adopted to recruit participants. Unlike probability sampling, where each member of the population has

an equal chance of selection, non-probability sampling relies on the researcher's judgment, predefined criteria, or accessibility to identify participants most capable of contributing relevant insights. Although this approach may introduce selection bias and limit statistical generalisability, it is widely recognised as appropriate for qualitative research where the goal is depth of understanding rather than representativeness (Shamsudin, Hassim, & Abd Manaf, 2024). Non-probability sampling is particularly valuable when the population is heterogeneous and specific individuals are better positioned to illuminate the research problem. Common forms include convenience, quota, snowball, and purposive sampling (Creswell & Poth, 2018).

In the qualitative component of this explanatory, sequential design which followed an extensive quantitative phase, convenience sampling was employed. Convenience sampling involves recruiting participants who are readily accessible to the researcher and willing to participate (Etikan, Musa, & Alkassim, 2016). This method is frequently used in qualitative inquiry because representativeness is not required for achieving rich, contextualised data; instead, the emphasis is placed on efficiently capturing meaningful perspectives. As Stratton (2021) notes, convenience sampling offers a "quick and straightforward approach" to qualitative recruitment by reducing time, resource demands, and logistical barriers. Given the practical constraints of conducting interviews in a live restaurant environment, convenience sampling was both appropriate and methodologically justified for this phase of the study.

4.7.2 Qualitative Data Collection - Interviews

The second phase of this study used the Interview method for collecting qualitative data for the experiment. Islam and Aldaihani (2022) emphasise that qualitative research using

interviews, among others, helps researchers make sense of findings and enhance understanding of the research problem, rather than making a future prediction. Semi-structured in-depth interviews were conducted to collect qualitative data on the experiences and perceptions of individuals who choose to eat healthily in restaurants. The purpose of the in-depth interview was to uncover the hidden motivation and triggers that a random restaurant customer considers when choosing a healthy meal from its menu.

In the earlier phase, this research designed a dominant quantitative phase to answer the main research question of the study. The qualitative phase was less dominant and was conducted to answer the third research question, a supplement to the main research questions that sought quantitative responses. Furthermore, the sample size of the quantitative study was large enough to facilitate hypothesis testing using multiple interventions in a Posttest-only control group experiment. As such, the qualitative study conducted fewer interviews to achieve objective six and answer the research question. Participants were selected using the Convenience sampling method of the non-probability sampling method. Costanza, Blacksmith, and Coats (2015) emphasise the numerous important points in using the convenience sampling technique for social experiments and the benefits it provides for qualitative findings. A posttest-only control group experiment is well-suited because it (i) avoids testing and sensitisation effects that can contaminate behaviour in repeated-measures designs, (ii) supports clean between-group comparisons of proportions for each intervention vs. a contemporaneous or immediately preceding control window, and (iii) scales to multiple intervention arms when the sample size is large (i.e., many independent customer transactions) (Campbell & Stanley, 1963; Shadish et al., 2002; Keppel & Wickens, 2004). With POS data capturing the full census of patrons in each period, the resulting large $n$provides high statistical power for tests on differences in proportions (e.g., chi-square or z-tests), enabling detection of even modest effects typical of low-cost nudges (Agresti, 2019; Cohen, 1988; Lakens, 2013). Methodological guidance further

shows that adequate allocation to each arm and clear temporal separation of interventions sustain internal validity while permitting multiple treatment comparisons without pretests (Chow et al., 2008; Suresh, 2011). Collectively, this evidence supports the stance used in this thesis, that a sufficiently large transactional sample justifies hypothesis testing across multiple interventions in a posttest-only control group design while maintaining strong causal interpretability and adequate power.

Convenience sampling was employed in this research (Robinson, 2014) to facilitate recruitment and save time. Research prioritised selecting participants who were keen on eating healthily when dining out, as well as those participants who were readily available and belonged to the various age groups. Participants aged 18 years or older were selected for the interview process. Employing adult interviewees provided the benefit of infusing a more conversational tone into the interviews, resulting in a heightened sense of naturalness. The r process was conducted at different restaurant venues, as participants were asked to participate in the research and were reimbursed for their time and participation. As a result, the participants did not see the interviewer as an authoritative figure who imposed rigid structures on the interview, which reduced the power imbalance between the interviewer and the participant (O'Toole et al., 2003; Durkin, Jackson & Usher, 2020).

Semi-structured and open-ended interviews are the most often favoured methods to “derive meaningful insights and draw comprehensive conclusions” (Burnard, 1991 . p.)

The qualitative phase of the study involved conducting in-depth interviews with 13 participants to gain insights into their cognitive perspectives and opinions regarding changes in ordering patterns in restaurant settings. Face-to-face interviews were conducted in venues and settings which were comfortable for the participants.

Findings from the quantitative phase informed the design of the interview method and questions. Questions explored various factors influencing ordering patterns, including situational triggers, marketing strategies of establishments, participants' prior knowledge of healthy dining, the significance of healthy eating, and their inclination towards healthier meal options while dining out. The study achieved data saturation through these 13 semi-structured interviews.

Several questions related to interventions designed in the quantitative phase and examined participants' perspectives about menu design and labels, impact of semiotics, nutritional information disclosure, posters on their choices, situations and factors motivating their choices. A sample of interview questions used for data collection is presented in the table below.

Table 4.2: Interview Questions for Qualitative Data Collection

Interview Questions Sample
How many times per month do you dine out?
The last time you dined on your own – what did you order?
When dining out, who do you usually eat with?
In your personal experience, would you consider yourself a healthy or unhealthy eater when dining out? In either case, why or why not?
How do you perceive your knowledge about healthy food availability in restaurants?
What is your primary source of knowledge about healthy eating when dining out?
What did you order the last time? Reasons for choosing that specific dish.
What are some of the triggering stimuli when ordering your food choices when dining out? How do you decide on what to order while dining out?
When you decide to order while dining out, what are the things you look for? What are your expectations and assumptions about your choices?
To what extent do people dining with you affect your food choices? Could you please tell us more about it?
When dining out, do you consider healthy options available on the menus? What would drive your attention to a healthier alternative, if any? Tell us more!

What factors do you consider when choosing your food while dining out? How would you describe their importance?
To what extent does the dining environment influence your food choices while dining out? How would you describe the importance of the dining environment on your food choices?
Do you read the food description on the menus (like this one in front of you) and explain how influential the food description is on your choices in selecting your meal? How would you describe their importance?
Do you read the food calories on the menus (like this one in front of you) and how food calories on the menu influence your meal selection? How would you describe their importance?
Could you please tell us about your perception of advertising posters (like this one in front of you) and what advertising posters do to influence your meal selection? How would you describe their importance?

In-depth interviews were conducted to understand the situational factors that could and might have played an important role in affecting a consumer's ordering process in restaurant settings. Each in-depth interview took around 40 minutes and addressed a series of likely scenarios participants experienced when dining out. Queirós, Faria and Almeida (2017) emphasise the advantages of using a qualitative approach in this research. They are: well-organised and readily comparable responses from respondents, and capable of reaching a larger sample size, which facilitates replication with ease. Interviews can be conducted relatively swiftly. Participants were asked to elaborate on their recent dining experiences and their considerations and assumptions for ordering healthier meals in restaurant settings. This research aimed to understand participants' level of understanding of nutritional information provision on healthy menus. The objective was to understand how situational factors, such as healthy menu options, the surrounding environment, for example, groups, dates, and casual dining out, have an impact on consumers' ordering process, and how they shape their ordering choices. The range of considerations varied depending on the age of hosts and guests, the type of venues in which

they were dining, the number of peers accompanying them, relationships, and emotional and cultural dependencies. The study also investigated various situational factors that served as triggers for food selection, which in turn have an impact on food selection in restaurant settings.

Participant were asked questions regarding their knowledge about the venue used in this research, menu items offered, their familiarity with the menu dishes used in this research, their ordering habits, and situational factors that might play an important role in their decision-making process when ordering restaurant dishes.

In a broader context, this study provided a better understanding of a restaurant's role in reducing the consumption of unhealthy meals in actual restaurant settings. But there were several limitations to the qualitative approach, including participants being highly inflexible, and having a limited range of response options. Moreover, gathering in-depth information can be challenging and developing an interview schedule can be time intensive.

4.7.3 Qualitative Data Management

Interviews were conducted in a face-to-face setting in locations convenient to the participants. They were recorded using professional recording devices and recordings were transferred to the investigator’s computer and copies made for safekeeping and as backup. Recordings of interviews were transcribed and prepared for subsequent interpretation and analysis. Transcripts were uploaded as input to the Qualitative Data Management Software called NVIVO for data management and preliminary analysis.

As discussed in the first phase of this chapter, interventions were framed by various marketing and advertising strategies, including semiotics, decision heuristics, information disclosure, and poster advertisements. The qualitative questionnaire design was informed by

various strategies employed in the quantitative phase and the results. The study was guided by a conceptual framework developed in Chapter 3. A deductive approach was used for creating broader themes, consistent with the interventions designed in the quantitative phase of this study.

Transcripts were reviewed using the advanced features of NVIVO software. Their metadata was classified into files and cases for labelling and describing attributes and values. NVIVO's Node function facilitated the creation of themes, and snippets of information from transcripts were coded into appropriate themes for further analysis. Based on the recurrence of similar information from different transcripts, new themes were created and content coded into the themes. Upon completion of the coding process, a project map representing the themes and their relationships was generated from NVIVO, as discussed in Chapter Five.

4.7.4 Qualitative Data Analysis

The Quantitative study in this research aimed to uncover the impact of marketing and advertising strategies on customer preferences. It showed with empirical evidence that customers changed their behaviour and chose healthier food options when they were nudged using semiotic resources, decision heuristic cues, nutritional information and images of what they were about to choose. The Quantitative study found out "what" customers chose in response to marketing and advertising interventions. A qualitative study was designed to understand customers' perspectives on "why" they chose "what" they chose. Through the analysis of qualitative data acquired using one-on-one semi-structured interviews, this study unravelled the situational factors that instigated customers' choice and change in ordering patterns towards healthier options. The second phase study used thematic analysis as applied to semiotic analysis and sentiment analysis to analyse the qualitative data collected through interviews.

4.7.4.1 Semiotic Analysis

Ferdinand de Saussure laid the foundation for developments in both linguistics and semiotics in the 20th century (Lagopoulos & Boklund-Lagopoulou, 2020). He coined the word 'Semiology' to explain the science that would study both verbal and nonverbal signs and their use in society (Lagopoulos & Boklund-Lagopoulou, 2020). Semiology or Semiotics is the study of signs and symbols, where meanings are emotional, cultural and societal factors, influencing how an observer interprets and associates meaning with a sign (Berger, 2017). Chandler (2022) described semiotics as the science of signs that provided "a set of assumptions and concepts that permits systematic analysis of symbolic systems" (p. 466) and observed that "all human communication was a 'display of signs'". Wang has discussed four models for Semiotic Analysis: (1) the dyadic model, (2) the triadic model, (3) the semiotic triangle, and (4) the semantic trapezoid and the semantic quadrangle (Wang, 2016).

Saussure described the 'dyadic model' or a 'two-part model' of the sign and defined sign as a composition of (a) Signifier - the form which the sign takes; and (2) the signified - the concept it represents (Shen, 2010). Charles Peirce proposed a three-part triadic model for analysing signs and defined three key concepts: an interpretant (I) (Signified - effect upon a person), a representamen (M) (Signifier or Medium), and an object (O). As Körtvélyessy, 2024 stated, Ogden and Richards conceptualised the semiotic triangle model to describe the relationship between word, meaning, and thing. In response to limitations of earlier models, "K. Hegel established the theory of the semantic trapezoid, and Russian scholar G. P. Melnikov established the theory of the semantic quadrangle, with four key concepts: concept, meaning, sign, and things, where sign is the carrier of meaning, meaning is generalisable and associated with a concept, and concept represents the thing" (Wang, 2016, p.).

In the context of this research, Colour, Typographic designs such as Font, Text, Labels and Images were used as Semiotic resources to modify the standard menu of Zeppo restaurant to design interventions. Interviewees were provided with research instruments used in the quantitative phase for six treatments; that is, Zeppo's standard menu, unlabelled green folder, labelled green folder with 'Light and Healthy' label, revised Zeppo menu with evocative textual description of food items, labelled green folder with 'Light and Healthy with Nutritional information' label, revised Zeppo menu with evocative textual description of food items and nutritional information (calorific values), images of seven healthy food options. They were asked questions to know their perceptions about the revised menus.

A semiotic analysis of colour revealed how green colour communicated various meanings and impacted diner experience. A semiotic analysis of text and labels showed how typographic modifications communicated various meanings and impacted diner experience. Similarly, a semiotic analysis of nutritional information disclosure revealed how nutritional information and calorific values on the menu communicated various meanings and impacted diner experiences and choices.

This study applied a two-part dyadic model for semiotic analysis of interviewee responses. The interventions contained several signs in the form of semiotic resources and formed the signifiers of marketing and advertising strategies. For example, 'Light and Healthy' was a signifier and 'Light and Healthy with Nutritional Information' was another signifier. Although the two signifiers looked similar textually, in terms of meaning-making they were distinct. Through semiotic analysis, the study found how customers perceived and interpreted semiotics in marketing and advertising strategies and why exposure to semiotics changed their perceptions about health, food and healthy food. This analysis highlighted the role of semiotic

resources in modifying consumer behaviour based on customers' lived experiences and emotional reactions.

4.7.4.2 Sentiment Analysis and Opinion Mining Technique

Liu describes Sentiment analysis and Opinion analysis as 'a field of study that analyses people's opinions, sentiments, evaluations, attitudes, and emotions from written language' (Liu, 2022). Human beings form sentiments and opinions based on their own lived experiences and environmental inputs to which they sense, absorb, and respond. Sentiments often formulate likes, preferences, awareness into 'yes', 'no', 'don't know', 'vaguely', 'somewhat' type of responses. Their analysis helps in assessing levels of acceptance or awareness of a topic. Sentiments need further unpacking to gain insight into why they hold a particular sentiment about a topic and what made them develop those sentiments. Opinion mining helps to find positive and negative attitudes about topics being examined (Zerr, Tran, Bischoff, & Niederée, 2013). A sentiment and an opinion often become a starting point to further probe for ''When' and Why' those opinions formed or 'What' made those opinions, uncovering factors influencing the formation of attitudes and these influencing choices and decisions.

In this study, sentiment analysis and opinion mining techniques helped to better understand customers' psyches. They provided more profound insights into their thoughts, feelings, and motivation, as well as their implications for the choice of healthy food from Zeppo menus. Questions such as 'Are you aware of Australian standards for healthy eating in terms of calorific values?' led to answers in terms of 'Yes', 'No', 'I don't know', 'Vaguely', revealing the level of awareness about Australian standards for healthy eating among participants. Sentiment analysis and opinion analysis helped understand customers' knowledge of Zeppo restaurant, awareness of Australian standards for healthy eating and calorific values, reasons

for food choices, and social, cultural and emotional reasons impacting their food choices. The study uncovered the situational factors that caused perception change and made the customers chose healthier food options, as discussed in Qualitative findings section of Chapter Five.

4.7.3.3 Transition to next phase – the qualitative study

However, the researcher also needed to understand potential situational factors that might have had an impact on their ordering process, and to what extent they influenced their food choices. That led to the qualitative section, undertaken by conducting in-depth interviews to unearth hidden situational factors that might also have had an impact on the ordering process in the restaurant environment.

4.8 Conclusion to Chapter 4 – Research Methods

Chapter 4 provided an overview of the mixed research methods and design employed in this study to address the five research questions presented in this thesis. Strengths and limitations of qualitative and quantitative research used in this study were also addressed, specifically in relation to the type of research and research questions. Hypotheses were established, with specific findings driving the relevant part of the research, predominantly looking at the significance of each marketing advertising function and whether they were significant (either on their own or in combination with other marketing advertising functions) to shift the consumers' ordering pattern towards the healthier alternative on the in-house menu. The collection process for both qualitative and quantitative data was explained and justified. The point-of-sales system was predominantly used for the quantitative part, while in-depth

interviews were conducted to provide insights into situational factors influencing consumers' ordering patterns in restaurant settings. Data analysis was performed using SPSS for quantitative data, while NVIVO was employed to analyse the similarity index for qualitative data. There were no ethical considerations in this research (both ethics approvals are attached in the Appendices), as personalised data were not obtained in a quantitative study. In-depth interview participants signed an informed consent form to participate in this research. The process of securing ethics approval for the in-depth interviews involved obtaining formal clearance from the relevant institutional committee, **the Victoria University Human Research Ethics Committee (VUHREC),** prior to participant recruitment. The ethics application detailed the purpose of the interviews, the sampling approach, interview procedures, and the types of questions to be asked, with particular attention to minimising potential psychological or social risks to participants. All participants were provided with a plain-language information sheet (to be signed by participants) outlining the study's aims, their voluntary participation, the right to withdraw at any time without penalty, and how confidentiality and anonymity would be maintained. Written informed consent was obtained from each participant before the interviews commenced, confirming their understanding of the study and agreement to participate. This research aims to provide tangible evidence of the importance of marketing and advertising functions in changing a consumer's ordering pattern towards the healthiest dishes in a restaurant setting. It will offer a blueprint for governments and policymakers to establish the role of hospitality venues in the fight against extreme obesity levels in Australia. The following chapter, Chapter Five, discusses findings from both phases of the experiment.

Chapter 5: Findings from the Mixed Methods study

5.1 Introduction

Chapter three discussed the research paradigm and methodology used for conducting this research. Grounded in Social Psychology and theories of behavioural change and reasoned action, the research applied a Mixed-Methods Methodology and chose an explanatory design to achieve the research objectives, where the Quantitative phase informed the Qualitative phase. An Advanced Interventional Design was applied to the quantitative phase for data collection and hypothesis testing. Qualitative data were acquired using the interview method and analysed using a thematic analysis approach. This chapter presents the findings from both quantitative and qualitative phases. It presents the key findings of this thesis, addressing the research question: How does a combination of different marketing advertising functions impact consumers' healthy ordering patterns in restaurants?' and is organised into four specific sections. Section 5.1 explores the quantitative impact of different marketing advertising functions on consumers' ordering patterns, followed by an analysis of in-depth interviews using the NVIVO system in Section 5.2. Section 5.3 examines the relevance of both findings, focusing on justification and establishing a relationship between quantitative and qualitative results.

Data collected through surveys with participants and interventions in restaurants were analysed using thematic and statistical analysis. These findings provide significant insights into consumer behaviour in restaurant settings which are crucial for understanding the role of situational factors in changing consumers' ordering patterns in restaurants.

5.2 Quantitative Phase - Hypothesis and Advanced Intervention Design

There are five research questions that this research thesis aims to address. The first quantitative research question was framed based on

RQ1. *How does introducing a Light and Healthy Menu (use of semiotics) change customers' ordering patterns in restaurants?*

This part of the research was carried out through a cause-and-effect experiment. Quantitative data was collected once the green Light and Healthy menu was introduced in a restaurant setting, measuring changes in the number of healthy dishes ordered at the venue.

The second quantitative research question was framed based on

RQ2. *How does introducing a Light and Healthy Menu (use of semiotics and evocative food description - positioning) change customers' ordering patterns in restaurants?*

This part of the research was conducted using a cause-and-effect experiment by applying semiotic cues and evocative menu descriptions within the Light and Healthy menu. This approach effectively increased the selection of healthier meals, demonstrating the persuasive impact of visual and linguistic positioning. Building on this, RQ3 examines how adding

nutritional labelling and point-of-sale advertising posters further reinforced these behavioural shifts toward healthier choices.

The third quantitative research question was framed based on

RQ3. *How can introducing a Light and Healthy menu, along with nutritional information about each meal, steer customers' choices toward healthier alternatives in restaurant settings?*

This part of the research was conducted using a cause-and-effect experiment. Quantitative data was collected once the green Light and Healthy menu, along with nutritional information about each meal, was introduced in a restaurant setting. The study measured changes in the number of healthy dishes ordered at the venue.

The fourth quantitative research question was framed based on

RQ4. *How does introducing advertising posters with nutritional information change customers' ordering patterns in restaurant settings?*

This part of the research used a cause-and-effect experiment, where quantitative data was collected once advertising posters of healthy dishes were presented throughout the restaurant on TV sets, along with nutritional information about each meal introduced in a restaurant setting, measuring changes in the number of healthy dishes ordered at the venue.

The fifth quantitative research question was framed based on

RQ5. *How does a combination of a light and healthy menu in a green folder, and point-of-sales advertising of nutritional information have an impact on consumers' ordering patterns in restaurants?*

This part of the research was conducted using a cause-and-effect experiment. Quantitative data was collected by presenting a Light and Healthy Menu in a green folder, along with advertising posters of healthy dishes, throughout the restaurant on TV sets. The aim was to measure changes in the number of healthy dishes ordered at the venue.

The following tables shows the number of customers who visited the venue during research weeks, along with the number of healthy meals ordered for each intervention.

Table 5.1 Sales data collected from the venue – week 1

Food Items	First month (week 1)	no intervention
	Number of healthy meals ordered	Total number of meals in restaurant
Caesar salad	11	
Roasted Pumpkin salad	5	
Smoked Salmon salad	7	
Warm Chicken salad	8	
Bruschetta	7	
Salmon Fillet	9	
Mediterranean salad	9	
Total number of meals	56	1904
Mean	8.0	
Percentage of healthy meals		**2.9%**

Table 5.2 Sales data collected from the venue – week 2

Food Items	First month (week 1)	Green folder with Light and healthy meals
	Number of healthy meals ordered	Total number of meals in restaurant
Caesar salad	21	
Roasted Pumpkin salad	15	
Smoked Salmon salad	14	
Warm Chicken salad	16	
Bruschetta	14	
Salmon Fillet	15	
Mediterranean salad	15	
Total number of meals	110	1944
Mean	15.7	
Percentage of healthy meals		**5.6%**

Table 5.3 Sales data collected from the venue – week 3

Food Items	First month (week 3)	Green folder with Light and healthy meals explained using pretentius wording
	Number of healthy meals ordered	Total number of meals in restaurant
Caesar salad	32	
Roasted Pumpkin salad	22	
Smoked Salmon salad	17	
Warm Chicken salad	21	
Bruschetta	21	
Salmon Fillet	17	
Mediterranean salad	19	
Total number of meals	149	1953
Mean	21.3	
Percentage of healthy meals		**7.6%**

Table 5.4 Sales data collected from the venue – week 4

Food Items	Second month (week 1)	Green folder with Light and Healthy (LH) meals with nutritional information
	Number of healthy meals ordered	Total number of meals in restaurant
Caesar salad	33	
Roasted Pumpkin salad	16	
Smoked Salmon salad	14	
Warm Chicken salad	11	
Bruschetta	17	
Salmon Fillet	11	
Mediterranean salad	13	
Total number of meals	115	1944
Mean	16.4	
Percentage of healthy meals		5.9%

Table 5.5 Sales data collected from the venue – week 5

Food Items	Second month (week 3)	Advertising posters displayed on TV sets throughout the restaurant (3 TV sets)
	Number of healthy meals ordered	Total number of meals in restaurant
Ceasar Salad	72	
Roasted Pumpkin salad	33	
Smoked Salmoon salad	33	
Warm Chicken salad	34	
Bruschetta	47	
Salmon Fillet	21	
Mediterranean salad	36	
Total number of meals	276	1888
Mean	39.4	
Percentage of healthy meals		14.6%

Table 5.6 Sales data collected from the venue – week 6

Food Items	Third month (week 1)	Green folders, LH menus with nutritional information and advertising on 3 TV sets
	Number of healthy meals ordered	Total number of meals in restaurant
Ceasar Salad	88	
Roasted Pumpkin salad	30	
Smoked Salmoon salad	47	
Warm Chicken salad	47	
Bruschetta	53	
Salmon Fillet	47	
Mediterranean salad	40	
Total number of meals	352	1911
Mean	50.3	
Percentage of healthy meals		18.4%

The use of a one-tailed statistical test in analysis of data collected was guided by the directional nature of the study's theoretical expectations. Although the hypotheses are phrased in terms of differences in ordering behaviour, the conceptual framework underpinning the study, specifically the application of behavioural nudging and marketing communication strategies, predicts that the interventions would increase, rather than decrease, customers' likelihood of selecting healthier menu options. The Marketing Advertising Functions (MAFs) implemented

in the study were intentionally designed to enhance the visibility, attractiveness, and perceived value of healthy menu items, which theoretically should lead to a positive shift in healthy meal ordering behaviour. Consequently, the analysis focused on detecting whether the interventions produced a significant increase in the proportion of healthy meals ordered relative to the baseline condition. Under this directional expectation, a one-tailed test was considered appropriate because the research objective was not to test for any possible difference in either direction, but rather to evaluate whether the interventions improved healthy ordering behaviour. Nevertheless, the study acknowledges that if the hypotheses were interpreted as strictly non-directional, a two-tailed test would also be statistically acceptable.

5.3 Findings emerging from the Intervention – tables

5.3.1 STUDY 1 – Intervention 1

Study 1 was conducted by comparing the restaurant's collected data for the control first week of the first month and third week of the first month (February 2024). The first set of data was collected in January 2024, and the number of healthy meals selected from the main menu was recorded. It should be noted that all the items on the Light and Healthy menu were also listed on the restaurant's main menu, although they were grouped according to the type of meal, rather than the health benefits. The data for the first week of the first month and the third week of the first month were compared with when the Light and Healthy menu was introduced, and items from the main menu were copied and given to the patrons in a separate Light and Healthy menu folder. The folder itself was a light **green colour** (use of the semiotics) and was placed deliberately on top of the main menu folder and presented to customers once they were

seated. Waiting staff did not engage in any form of conversation with customers regarding the new menu or the positioning of that menu on top of the standard one.

It is also very important that a restaurant has its own take-away section separately from in-house dining. The Light and Healthy menu was not offered to take-away customers, and data collected was only from dine-in restaurant patrons. Because these customers were unaware of the new green folders, when comparing the first week of the first month and the third week of the first month, very minimal if any changes were expected regarding the number of orders of Light and Healthy items for the take-away section.

Table 5.7 Month 1, Week 3

Control	Control the proportion of eat-in healthy meals	Intervention	Intervention proportion of eat-in healthy meals	Z-value	p-value	Significant
M1, W1	2.9%	M1, W3	5.6%	4.15	<0.001	**Yes**

After conducting an independent one-tailed test, findings indicated it was significant at the $p<0.01$ level under the null hypothesis of no difference. This research provides interesting statistics regarding the data before and after the intervention in the restaurant. The mean column indicated that more customers were ordering healthier meals after the introduction of the Light and Healthy menu presented in the light green folder. In total, customers ordered 110 meals from the Light and Healthy menu, representing an overall increase of 96% in comparison to the week when a traditional menu was offered, with all the light and healthy meals spread throughout the standard restaurant menu. After the introduction of the Light and Healthy menu, which grouped those items and presented them in a light green folder, the consumption of healthy meals increased from 56 to 110 meals per month for dining-in customers. Since the p-value is less than 0.05 (i.e., $p<0.001$), there was a significant difference between variables (before and after the intervention of the Light and Healthy menu) and therefore the null hypothesis can be rejected.

Most importantly, according to the two-sample test of proportion and its result (Z = 4.15), it can be concluded with 95% confidence that sales data derived from the first and second weeks were not the same. Therefore, the null hypothesis can again be rejected. Due to a very high Z number (4.15), it can be concluded that confidence was greater than 99.9%. Therefore, both tests indicated that there was a significant difference between the first and second week and in the number of healthy meals ordered once the intervention had been put in place (use of semiotics in the form of a light green folder, and a light and healthy menu).

5.3.2 STUDY 2 – Intervention 2

Study 2 was conducted by comparing the restaurant's data from the first week of the first month and the first week of the second month. The first data set was collected in the first week of the first month, and the number of healthy meals ordered were recorded. It is also worth noting that all the items from the *Light and Healthy* menu were also available in the restaurant's main menu, but they were grouped based on the type of meal, and ingredients were explained using pretentious wording. The data from the first week in the first month was compared with that of the first week of the second month, when the *Light and Healthy* menu items were accompanied by pretentious descriptions. The main goal of this approach was to position the food on the *Light and Healthy* menu in the mind of the consumer, purely based on the origin of the main ingredients; for example, Italian tinned tomatoes grown in the rich soil of Naples and picked when fully ripened, and Spanish red onions from the rich and sun-baked soils of Catalunya. Again, the *Light and Healthy* menu was presented in the light green folder (use of semiotics) and placed on top of the restaurant's main menu prior to being offered to the seated customer. Waiting staff did not engage in any form of conversation with customers

regarding the new menu or the positioning of that menu on top of the standard menu. Staff did not need to explain the "newly described" dishes, as they were differently described from the in-house menu.

Table 5.8 Month 2, Week 1

Control	Control the proportion of eat-in healthy meals	Intervention	Intervention proportion of eat-in healthy meals	Z-value	p-value	Significant
M1, W1	2.9%	M2, W1	7.6%	6.49	<0.001	**Yes**

After conducting an independent one-tailed test, findings indicate it was significant at the $p<0.01$ level under the null hypothesis of no difference. The research provides interesting statistics regarding customers' purchasing behaviour before and after intervention in the selected restaurant. The mean column showed that more customers were ordering healthier meals after the introduction of the Light and Healthy menu presented in the light green folder, and when the Light and Healthy items were evocatively described. An extra 149 meals were ordered from the Light and Healthy menu. This represented an overall increase of almost 266% in comparison to the week when a traditional menu was used, with all light and healthy items being spread throughout the standard restaurant menu. After the introduction of the Light and Healthy menu, when the Light and Healthy items were evocatively described and grouped in a light green folder, the consumption of healthy meals increased from 56 to 149 meals per week. Since the p-value is less than 0.05 (i.e., $p<0.001$), it can be concluded that there was a significant difference between variables (before and after the intervention of the Light and Healthy menu with evocative descriptions of food); therefore, the null hypothesis can be rejected.

Most importantly, according to the two-sample test of proportion and its result of $Z = 6.49$, it can be concluded with 95% confidence that sales data from the first and third months were not the same. Therefore, the null hypothesis can again be rejected. Due to a very high Z value

(4.48), it can be concluded that confidence is greater than 99.9%. Therefore, both tests indicate that there was a significant difference in the data for the first and third week and in the number of healthy meals ordered once the intervention took place (use of positioning - evocative descriptions).

5.3.3 STUDY 3 – Intervention 3

Study 3 was conducted by comparing the restaurant's data from the first week of the first month with the third week of the second month. The first week of the first month was set up as a first, controlled month, in which the number of healthy meals sold in the venue was recorded. In this treatment, customers were presented with the main menu on arrival at the restaurant. Healthy meal items were sporadically spread throughout the restaurant's menu, based on the type of meal, rather than on nutritional and health benefits; so there was no emphasis placed on healthy meals, which provides for a control treatment. That data was compared with that of the third week of the second month. However, this time, the researcher used the descriptive approach to the marketing advertising intervention by providing nutritional information about each meal which was presented in terms of protein, sugar, salt, and saturated fat intake. Waiting staff did not engage in any form of conversation with customers regarding the new menu or the positioning of that menu on top of the standard menu. Staff did not need to explain the "newly described" dishes, as they were differently described from the in-house menu. Images of the Light and Healthy items are attached in the appendices. Protein, sugar, salt, and saturated fat content were clearly displayed on the menu and visible to the patrons.

Table 5.9 Month 2, Week 3

Control	Control the proportion of eat-in healthy meals	Intervention	Intervention proportion of eat-in healthy meals	Z-value	p-value	Significant

M1, W1	2.9%	M2, W3	5.9%	4.48	<0.001	**Yes**

After conducting an independent one-tailed test, findings indicated it is significant at the $p<0.01$ level under the null hypothesis of no difference. The mean column in the above table indicates that customers were ordering more of the healthier meals after the introduction of the Light and Healthy menu with nutritional information of each meal, presented in terms of protein, sugar, salt, and saturated fat intake. Customers ordered an extra 115 meals from the Light and Healthy menu. That represented an overall increase of almost 205% in comparison to the figures for the control week, when a traditional menu was used, and all light and healthy meals were spread throughout the standard restaurant menu and personal selling, as an IMC function was not used. With the introduction of nutritional information on the Light and Health menu, the consumption of healthy meals more than doubled. Since the p-value is less than 0.05 (i.e., $p<0.001$), it can be concluded that there was a significant difference between variables (before and after intervention of Light and Healthy with nutritional information); therefore, the null hypothesis can be rejected.

Most importantly, according to the two-sample test of proportion and its result $Z = 6.48$, it can be concluded with 95% confidence that statistics for the first and fourth months were not the same. Therefore, the null hypothesis can again be rejected. Therefore, both tests confirm that there was a significant difference between the first week of the first month and the third week of the second month, and the number of healthy meals ordered post-intervention (nutritional information of each meal) where protein, sugar, salt, and saturated fat intake were presented.

5.3.4 STUDY 4 – Intervention 4

The first month, week one was set up as a first, controlled week, in which the number of healthy meals sold in the venue was recorded. In this experiment, customers were presented with the main menu on arrival at the restaurant. Healthy meal items were sporadically spread throughout the restaurant's menu based on the type of meal, rather than on nutritional and health benefits, so there was no emphasis placed on healthy meals, which provided for a control treatment. The data was compared with that of the second month, week 4, where advertising posters with nutritional information were displayed throughout the restaurant's TV sets (3), at eye level of patrons in the restaurant. All seven (7) healthy meals were changing on the TV sets, displaying different dishes with nutritional information at 30-second intervals.

Table 5.10 Month 3, Week 1

Control	Control the proportion of eat-in healthy meals	Intervention	Intervention proportion of eat-in healthy meals	Z-value	p-value	Significant
M1, W1	1.5%	M3, W1	3.2%	7.00	<0.001	**Yes**

After conducting an independent one-tailed test, findings indicate it was significant at the $p<0.01$ level under the null hypothesis of no difference. Research provided a very interesting finding regarding the application of the light and healthy advertising posters. Observing a mean finding, it was evident that consumers were ordering more of the healthy meals once they were exposed to marketing advertising function at point of sales advertising using posters on three TV sets. In the first week, consumers ordered 56 healthy meals, but with the introduction of the visual advertising posters of light and healthy meals, that figure jumped to 276 meals for the same period. That represented an increase of 493% on a week-to-week comparison. As the p-value is less than 0.05 (i.e., $p<0.001$), the researcher can conclude that there was a significant

difference between variables (before and after intervention of light and healthy advertising posters). Therefore, the null hypothesis can be rejected.

According to the two-sample test of proportion calculations, the result came out as Z = 12.72. Considering these findings, it can be concluded with 98% confidence that the proportions from the two months were not the same. Therefore, the null hypothesis can again be disregarded. Since the Z value is very high (Z = 12.72), it can be concluded that the confidence level in this instance is greater than 99.9%.

After completing an independent sample t-test and two-sample tests of proportion on both months, these tests confirmed that there was a significant difference between the two weeks and the number of healthy meals ordered in each. Therefore, both tests confirmed that the null hypothesis can be rejected.

5.3.5 Study 5 - Intervention 5

The first month, week one was set up as a first, controlled week in which the number of healthy meals sold in the venue was recorded. In this treatment, customers were presented with the main menu on arrival at the restaurant. Healthy meal items were sporadically spread throughout the restaurants' menu, based on the type of meal, rather than on nutritional and health benefits; so, there was no emphasis placed on healthy meals which provides for a control treatment. The data was compared with that of the third month week 1, where green Light and Healthy folders with pretentious wording explanation of each meals and nutritional value were printed underneath each meal, as well as advertising posters with the nutritional information of each meal (protein, sugar, salt, and fat) being clearly displayed throughout the restaurant on three TV sets for customers to see and read. The results were as follows:

Table 5.11 Month 3, Week 3

Control	Control the proportion of eat-in healthy meals	Intervention	Intervention proportion of eat-in healthy meals	Z-value	p-value	Significant
M1, W1	2.9%	M3, W3	18.4%	15.47	<0.001	**Yes**

After conducting an independent one-tailed test, findings indicated it is significant at the $p<0.01$ level under the null hypothesis of no difference. Research provided a very interesting finding regarding application of the Light and Healthy posters with nutritional information providing a specific level of fat, sugar, salt, and protein in each of the healthy meals. Observing a mean finding, it was evident that consumers were ordering more of the healthy meals once they were exposed to the marketing function of point-of-sale advertising. In the first month, consumers ordered 56 healthy meals, but with the introduction of the visual advertising appeal with the nutritional information presented in grams of fat, sugar, salt, and proteins, that number jumped to 352. That represented an increase of 629% on a week-to-week comparison. As the p-value is less than 0.05 (i.e., $p<0.001$), the researcher can conclude that there was a significant difference between variables (before and after intervention of light and healthy advertising posters with nutritional information). Therefore, the null hypothesis can be rejected.

According to the two-sample test of proportion calculations, the result came out as $Z = 15.47$. Considering these findings, it can be concluded with 95% confidence that the proportions from the two months were not the same. Therefore, the null hypothesis can be disregarded again. Since the Z value is very high ($Z = 15.47$), it can be concluded that the confidence level in this instance is greater than 99.9%.

5.4 Chi-Square tests – Odds ratios for all interventions

Similarly, the Chi-Square tests compared the five interventions (no intervention) against the Control Group. The odds ratios allowed us to rank the interventions according to their effectiveness against the control week.

A summary of the results (all interventions compared to the control) is shown below:

Table 5.12 Chi-Square tests compared the five interventions

			95% confidence interval	
	p-value	**Odds ratio**	**Lower CI odds ratio**	**Upper CI odds ratio**
Intervention 5	<0.0001	7.4	5.5	10.1
Intervention 4	<0.0001	5.6	4.1	7.7
Intervention 2	<0.0001	2.7	1.9	3.8
Intervention 3	<0.0001	2.0	1.4	2.9
Intervention 1	<0.0001	1.9	1.4	2.8

As with the proportions test, all the comparisons yielded a statistically significant difference between the controls and each intervention. The largest odds ratio in the table (7.45), for the comparison between intervention 5 and control, suggests that the sale of healthy meals during that intervention was 7.45 times more likely than during the control period. Intervention 5 is ranked number 1 relative to the other four interventions.

Pairwise Comparison Matrix — All Interventions

The table below provides a full pairwise comparison across all five interventions, structured similarly to a correlation matrix. Each row shows the odds ratio, 95% confidence interval, and p-value for one pair. An odds ratio greater than 1 favours the first-named intervention; less than 1 favours the second.

Table 5.13 Comparison of all interventions among themselves

Comparison	Odds Ratio	95% CI Lower	95% CI Upper	p-value	Significant
Intervention 1 vs Intervention 2	0.7262	0.5628	0.9369	0.0135	**Yes ***
Intervention 1 vs Intervention 3	0.9539	0.7287	1.2487	0.7313	No
Intervention 1 vs Intervention 4	0.3503	0.2781	0.4413	<0.0001	**Yes ***
Intervention 1 vs Intervention 5	0.2656	0.2122	0.3325	<0.0001	**Yes ***
Intervention 2 vs Intervention 3	1.3136	1.0212	1.6898	0.0333	**Yes ***
Intervention 2 vs Intervention 4	0.4824	0.3909	0.5953	<0.0001	**Yes ***
Intervention 2 vs Intervention 5	0.3658	0.2985	0.4482	<0.0001	**Yes ***
Intervention 3 vs Intervention 4	0.3672	0.2925	0.4611	<0.0001	**Yes ***
Intervention 3 vs Intervention 5	0.2785	0.2232	0.3474	<0.0001	**Yes ***
Intervention 4 vs Intervention 5	0.7583	0.6383	0.9009	0.0016	**Yes ***

* Significant at $p < 0.05$. Highlighted rows (orange) indicate statistically significant differences.

9 out of 10 pairwise comparisons are statistically significant ($p < 0.05$). The sole non-significant comparison is Intervention 1 vs Intervention 3 ($p = 0.731$), reinforcing the finding above. Interventions 4 and 5 are significantly superior to all others and also differ significantly from each other (OR = 0.758, $p = 0.002$), with Intervention 5 (combined approach) producing the highest odds of healthy meal selection overall.

5.4.1 The best promotional intervention

The previous table showed that the best two interventions were intervention 4 and intervention 5. In this follow-up analysis, we will use a chi-squared test to compare intervention **4** against intervention **5** to determine if intervention 5 (the best-performing intervention) is statistically superior to intervention 4.

Table 5.134 Best-performing intervention

Proportion				
	Healthy	Less Healthy	Total	Exposed
Intervention 5	352	1559	1911	0.1842
Intervention 4	276	1612	1888	0.1462
Total	628	3171	3799	0.1653
	Point estimate	[95% conf. interval]	(exact)	
Odds ratio	1.31872	1.10592	1.572554	
Attr. frac. ex.	0.241688	0.0957755	0.3640917	
Attr. frac. pop	0.0445183			
	chi2(1) = 9.94	Pr>chi2 = 0.0016		

A p-value< 0.05 (0.0016) indicates there is a statistically significant difference between the two interventions. An odds ratio of 1.32 reveals that the sale of healthy meals during intervention 5 was 1.32 times more likely than during intervention 4. Hence, intervention 5 is clearly the best intervention of the set.

Are Interventions 1, 2 and 3 Statistically Similar?

Researcher noted that Interventions 1–3 have much closer odds ratios (1.98, 2.07, 2.73) compared to Interventions 4 and 5 and asked whether these three are statistically indistinguishable. I performed two analyses: an overall 3-group chi-square test, and pairwise comparisons between each pair.

Table 5.15 Overall, 3-Group Chi-Square Test

Chi^2	df	p-value	Interpretation
7.4692	2	**0.0239**	Statistically significant difference exists among the first three interventions ($p < 0.05$)

Table 5.16 Pairwise Comparisons

Comparison	Odds Ratio	95% CI Lower	95% CI Upper	p-value	Significant?
Intervention 1 vs Intervention 2	0.7262	0.5628	0.9369	0.0135	**Yes ***
Intervention 1 vs Intervention 3	0.9539	0.7287	1.2487	0.7313	No
Intervention 2 vs Intervention 3	1.3136	1.0212	1.6898	0.0333	**Yes ***

* Odds ratios < 1 indicate the first-named intervention has lower odds of healthy meal selection than the second.

Interpretation

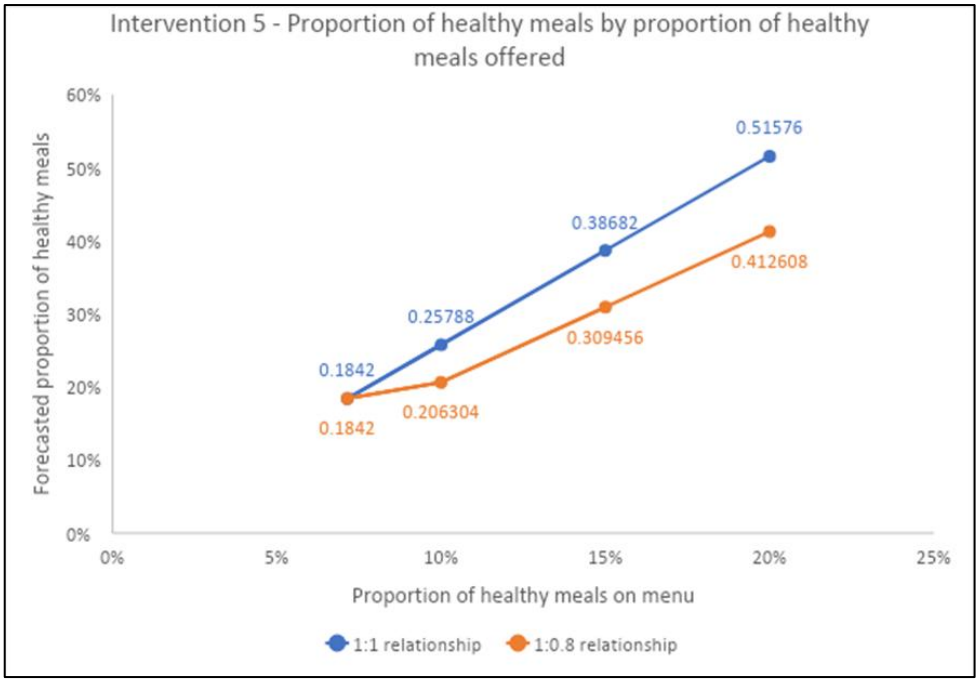
The overall 3-group test is statistically significant ($p = 0.024$), confirming that Interventions 1, 2 and 3 are not all equivalent. Pairwise analysis reveals that Intervention 2 (pretentious wording) differs significantly from both Intervention 1 ($p = 0.014$) and Intervention 3 ($p = 0.033$). Notably, Interventions 1 and 3 are statistically indistinguishable (OR = 0.954, $p = 0.731$), suggesting that adding nutritional information to the plain green folder (Intervention 3) produced no additional benefit over the folder alone (Intervention 1).

5.4.2 Forecasted proportion of healthy meals

Since intervention 5 was the most successful in generating the highest proportion of healthy meals sales, we will use this intervention to estimate the uptake of healthy foods relative to the amount of healthy food offered on the menu.

Healthy meals items, according to the Australian Dietary Guidelines, a healthy meal primarily consists of foods from the five core food groups while limiting discretionary items high in saturated fat, added sugars, and salt (National Health and Medical Research Council (NHMRC, 2013) account for ~7% of the in-house menu at Zeppo (7/98 items). Intervention 5 generated an uptake of 18.4% in healthy meals. If we assume a 1:1 uptake of healthy meals and increase the (current) seven items on the menu to 14, we may expect (under a linear relationship) the proportion of healthy meals sold to double. This linear relationship may not hold in practice. We could try different uptake rates, but we have no data to support them. As an exercise, we also calculated a 1:0.8 uptake. The results are plotted below.

Image 5.1 Proportion of healthy meals by proportion of healthy meals offered



Note: To further explore the relationship between healthy meals on the menu and healthy meals sold, Intervention 5 could be used while systematically changing the number of healthy items offered. For instance, the number of healthy meals could be increased to 10 for the 1st week, then to 12 for another week, and finally to 14 (and beyond if desired). This data would allow us to better explore the demand curve's shape.

In the Quantitative phase, by testing a series of hypotheses using appropriately designed interventions, actual sales in the restaurant were noted. Measured changes in sales helped determine the effectiveness of the interventions in shifting customers' behaviour and choices towards healthier menus and healthier menu options. However, situational factors influencing customers' behaviour and their responses to the intervention could not be ascertained in the quantitative phase. A qualitative research question emerged after the preliminary analysis of quantitative data: "What are some of the situational factors that can have implications on the ordering pattern of consumers in a restaurant setting? "

Therefore, a Qualitative phase was designed to answer the research question and unravel the situational factors influencing consumers' behaviour and choices. This research did not explore other marketing advertising functions (interventions) such as time of the day specials, day of the week specials, promotions and discounts, nor restaurant reviews or recommendations. While the quantitative phase brought clarity on "What" consumers chose as

a response to targeted marketing interventions (i.e., menus differing in presentation and information) the qualitative phase investigated "Why" the consumers chose "What" they chose from various menus. This in-depth inquiry facilitated uncovering the factors influencing consumer choice in response to marketing interventions and their success in nudging consumers towards making informed choices from healthier food options. The following section presents findings from the Qualitative phase of the study.

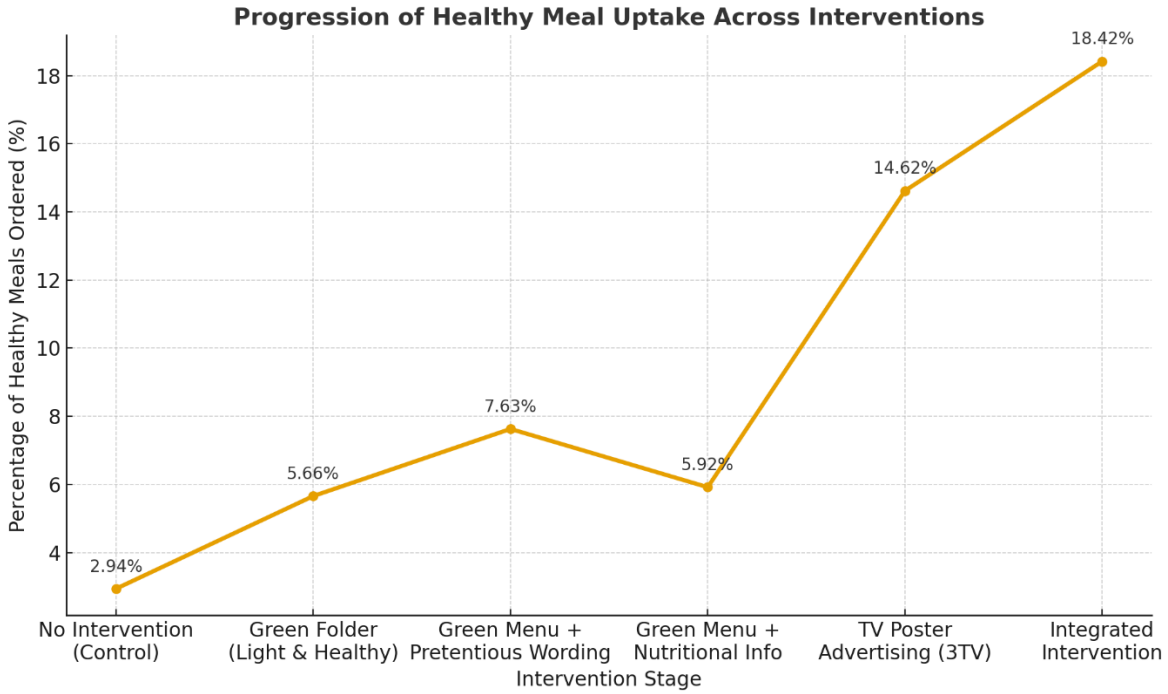
Table 5.17 Summary of all six intervention stages, showing the total number of healthy meals ordered and the percentage of healthy meals per week

Intervention Condition	Week / Month	Total Healthy Meals Ordered	Total Meals in Restaurant	Percentage of Healthy Meals
No Intervention (Control week)	First Month – Controlled Week	56	1,904	**2.9%**
Green Folder – "Light & Healthy" Menu	First Month – Week 1	110	1,944	**5.6%**
Green "Light & Healthy" Menu + Pretentious Wording	First Month – Week 3	149	1,953	**7.6%**
Green "Light & Healthy" Menu + Nutritional Information	Second Month – Week 1	115	1,944	**5.9%**
Advertising TV Posters of "Light & Healthy" Items (3TV)	Second Month – Week 3	277	1,894	**14.6%**
Integrated Intervention (Green Menu + Pretentious Wording + Nutritional Info + TV Ads)	Third Month – Week 1	352	1,911	**18.4%**

- The baseline (no intervention) week recorded only 2.9% healthy meal orders (56 out of 1,904).
- Introducing the green "Light & Healthy" folder nearly doubled healthy meal uptake to 5.6%.

- Adding pretentious wording further increased the selections to 7.6%, demonstrating the strong semiotic and linguistic influence on choice.
- The inclusion of nutritional information slightly increased uptake to 5.9%, reinforcing informational nudging but with limited effect compared to visual framing.
- The poster advertising intervention resulted in a significant behavioural shift (14.6%), indicating strong prompting through environmental triggers.
- Finally, when all cues were integrated, the uptake reached 18.4%, representing a sixfold increase compared to baseline behaviour.

Figure 5.2 Progression of healthy meal uptake (%) across the six intervention stages



5.5 Qualitative Phase

Findings from the earlier phase discovered that marketing and advertising functions geared towards healthy eating greatly influenced consumer choices. Increase in sales was directly proportional to upgrades in menu design and display, and transparency in labels.

However, factors influencing customer choice in response to different marketing and advertising interventions could not be ascertained in the quantitative phase.

Thus, interviews were designed to collect data on aspects such as:

- Occasions for getting together, such as birthdays, anniversaries or after-work get-togethers
- Company of people on the table, such as dining alone, family, friends, acquaintances, or simply colleagues from work, ordering patterns.
- Dietary restrictions, such as health considerations regarding the food choices due to allergies or simply being vegetarian, vegan or having gluten-free dietary requirements
- Health concerns, such as customers who are well-informed about calories or kilojoules energy intakes and tend to select the food that has a moderate level of energy per day or meal.
- Cultural influences, where people tend to select the food that is familiar to them and allows them to avoid uncertainty regarding the other dishes on the menu.

Before presenting the findings of the qualitative analysis, it is important to describe the characteristics of the interview sample and the data collection process. A total of **13 participants** were interviewed as part of the qualitative component of this study. The interviews were conducted with restaurant patrons who had experienced the menu environment during the intervention period and were therefore able to reflect on their ordering decisions and perceptions of the menu cues. Each interview lasted approximately **50 minutes to one hour**, allowing sufficient time for participants to discuss their dining experiences, menu interpretation, and the factors influencing their food choices in depth. The semi-structured interview format enabled participants to elaborate on their perceptions of the marketing communication interventions implemented in the restaurant, including

visual menu cues, descriptive language, and other promotional prompts. This approach generated rich qualitative insights that complement the quantitative findings by providing a deeper understanding of how customers interpreted and responded to the different marketing advertising functions (MAFs) embedded within the restaurant environment. Building on the quantitative study of this research, interview participants were presented with different menus used as marketing and advertising interventions in the earlier phase. Questions were framed to elucidate information on customers' behaviour and their choices in response to the marketing and advertising interventions.

5.5.1 Qualitative Findings

All participants in the present study were asked the same questions to increase the reliability and validity of the findings, which are summarised thematically in the Table below and subsequently under each theme. A total of 13 interviews were conducted with randomly selected individuals to gather qualitative insights into perceptions of menu cues and marketing interventions. Participants were not required to be regular patrons of the specific restaurant, allowing for broader perspectives on how such marketing strategies may influence food choice decisions. The synthesis is discussed in detail.

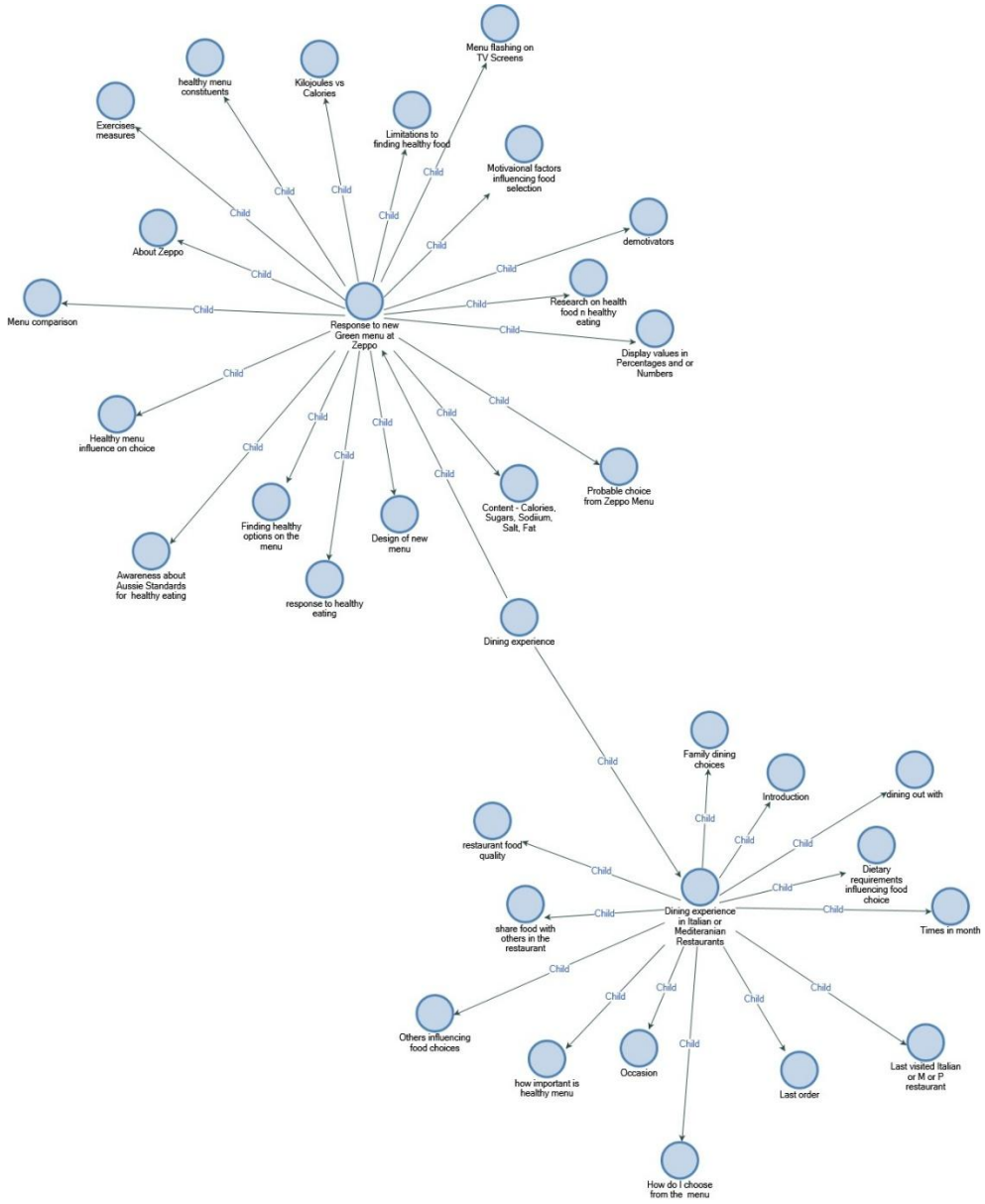
Table 5.18 research questions aiming to understand the situational factors affecting food choices

These research questions aim to understand the situational factors affecting food choices in the restaurant setting from a selected sample.
How many times per month do you dine out?
The last time you dined on your own – what did you order?
When dining out, who do you usually eat with?
In your personal experience, would you consider yourself a healthy or unhealthy eater when dining out? In either case, why or why not?
How do you perceive your knowledge about healthy food availability in restaurants?
What is your primary source of knowledge about healthy eating when dining out?

What did you order the last time? Reasons for choosing that specific dish.
What are some of the triggering stimuli when ordering your food choices when dining out? How do you decide on what to order while dining out?
When you decide to choose your order while dining out, what are the things you are looking for? What are your expectations and assumptions about your choices?
To what extent do people dining with you affect your food choices? Could you please tell us more about it?
When dining out, do you consider healthy options available on the menus? What would drive your attention to a healthier alternative, if any? Tell us more!
What factors do you consider when choosing your food while dining out? How would you describe their importance?
To what extent does the dining environment influence your food choices while dining out? How would you describe the importance of the dining environment on your food choices?
Do you read the **food description** on the menus (like this one in front of you) and explain how influential the food description is on your choices for your meal? How would you describe their importance?
Do you read the **food calories** on the menus (like this one in front of you), and how food calories on the menu influence your meal selection? How would you describe their importance?
Could you please tell us about your perception of **advertising posters** (like this one in front of you) and what advertising posters do to influence your meal selection? How would you describe their importance?

Key findings thematically drawn from the interviews are presented in detail in Figure 5.2.

Figure 5.3: Project map of themes generated in NVIVO (Author's own)



The interview questions were catalogued under two sections: one that focused on the dining experiences of the participants and the other on participants' opinions about Zeppo's menu interventions used in the quantitative phase of the study. It applied thematic analysis with sentiment analysis and semiotic analysis to analyse the qualitative data generated through the interview method. The following section presents the findings under different themes.

5.5.2 Factors influencing food choices and ordering patterns while out

Most participants adopted a non-vegetarian diet. One participant embraced a Halal Diet, two participants were Hindu vegetarians and vegans, and another required a gluten-free diet. However, those who had a non-vegetarian diet were willing to explore vegetarian and vegan options while dining out with friends, family and relatives, respecting their religious and personal choices**. Religious practices, sociocultural aspects, health-based dietary restrictions, and personal preferences** emerged as situational factors that motivate and influence food choices for participants while dining out.

Participants were asked questions to reflect on factors that influenced their ordering patterns in fine dining restaurants.

Participant X001, a vegetarian by diet, noted that he was happy to explore cuisines from other cultures and countries within the bounds of his dietary considerations. He quoted the example of dining at an Ethiopian restaurant and choosing from vegetarian options after seeing the orders of other diners, online reviews about the food options, and getting recommendations from the waitresses.

Participants X002, X011 and X013 preferred to explore choices that they would not necessarily cook or often eat at home. They observed that factors such as **effort, time, skills, and a desire to try new things** influenced ordering patterns. Participant X002 explained that:

> I could make it at home and get it at home; it's not really something I would go towards. I like getting calamari because it's not something I can get at home; it's not something that I eat at home often… When I go out, I try and get things that I can't cook at home; that's generally what I order. So, I wouldn't tend to order pasta because I can make, like

> spaghetti marinara, at home. So, I wouldn't order something that I make at home. I would order something that I can't make or don't make or is a lot of work to make (X002).

Novelty and exclusivity of the food options on the menu were key factors influencing X002's choices. Another participant observed that the authenticity of food largely influenced his choice. He liked to explore the cuisines of different countries and chose the healthiest of the options from the menus:

> We usually try different cultures… I always look for authentic foods, based on country, Thai food, Vietnamese, Indian, Turkish, and Mediterranean. Then I go to the restaurant and choose the healthiest one. Food menu. Every culture has its own healthy foods… Even for the pizzas, I usually order the authentic Italian pizza, not the New York style pizza (X004).

Participant X005 noted that **"size of the dish and the price"** was "always important for anything, especially food". When in the restaurant, she observed other customers' orders to get a better **understanding of the size of the dish** in real time before placing an order. Being able to visualise the food emerged as a critical factor influencing food choice.

Participant X007 used the opportunity to **order the food that he missed eating the most, as** it was not often prepared in his home environment where family eating habits influenced what he ate:

> At home, our daughter is a vegetarian, so we generally don't cook much meat or fish because no one likes fish, and no one likes meat. So, I take the opportunity to have fish when I go out… our family influence our eating habits until we go out *(X007)*.

Meanwhile, Participant X005 was mindful of the religious and cultural considerations of her friends and therefore chose food that suited their diet:

> Some of my friends are religious people. One of them is Buddhist, so sometimes he is vegetarian. We have to decide to go to a vegetarian restaurant or go to some restaurant that has vegan options.

Thus, family and friends, along with their choices, often influenced ordering patterns when dining in a group.

5.5.2.1 Factors influencing meal sharing with others

These factors also influenced interviewees' behaviour towards sharing food while dining out.

Participant X004, a Muslim from Iran, noted that he consumed a Halal diet oriented with his culture. He did not share meals with others when dining with Iranian friends, as they did not touch others' food, consistent with their native culture

> We don't share with my Iranian friends, but we do when I go out with my other friends and colleagues. We do not like to touch each other's food. It's cultural that we do not like to share food (X004).

However, if dining with a culturally diverse group of friends, colleagues and acquaintances from different nationalities, and ordering foods such as Pizzas, the participant was open to sharing food.

Participant X001 from India followed a Hindu Vegetarian diet, and his wife chose a vegan diet. His preference was for "a high protein diet". He considered that a protein-rich diet helped in being judicious about overeating carbohydrates and sugars: " feel that protein fills me up quickly, so I eat less and I'm not indulging in more dessert". These findings are consistent with research that indicates cosmological, ontological and epistemological factors influence religious and sociocultural practices of participants who follow traditional diets.

Participant X008 had a gluten-free diet and shared food with his housemates when it was Gluten-free. He observed that **his mood and stress levels influenced** the way he chose food when dining out:

> When I'm going out with a few people, I quite like doing shared meals, because that way you get kind of a gist of everything. If I'm in a bad frame of mind, like a bit stressed, I normally just order my own food, because I kind of just want the comfort of my own meal. But if I'm in a good mood and I'm with friends, I like to have a few options (X008).

Participants X005, X007, X009, and X010 shared meals but did not mention any situational factors that influenced their behaviour. It was a personal choice.

The cost of the meal was another factor that influenced participants' behaviour towards sharing meals. Participant X008 said that he would order a multi-course meal "depending on how much money" he had at the time, and what the occasion was, While X012 noted that when dining out with friends, they chose to share the meal if the cost was less than ordering individually:

> We'll look at the menu, we can look at both the [options]…We are wary of the price. For example, we will look at the individual dishes as well as the shared meals. Obviously, the shared meals cost more, but we will kind of compare. Okay! If we share this meal together, is it going to be more beneficial? And then split the cost from there. Or would it be cheaper to just go individual? As well as considering if we all have a shared interest in a shared meal. We're not going to get a shared meal if someone's not really interested in that shared meal, for example (X012).

Participant X002, who worked in a casual role, also emphasised economic viability influencing his ordering pattern: “As someone who is a casual and I don't have guaranteed work, I am always thinking, okay, I can only spend this much because I still need to pay for other things, I only got this much this week”.

Participant X001 was motivated by pet-friendly environments and outdoor settings where he could take his pet, whereas Participant X004 looked for a “[dining] experience” and “variety”. Participant X005 preferred the ambience and atmosphere that a restaurant offered to the home environment when dining with friends. Another Participant (X006) considered the group he was with when placing his order. If the group were “gluten-free or lactose intolerant”, he would “try to adhere to the same things just to fit in with them”. He noted that “**the smell and the aroma” of the food were the main attractions**. Similarly, Participant X007 found “taste” to be a motivational factor.

Thus, the religion-specific ontological underpinnings of the sociocultural environments in which the participants lived shaped their food choices and behaviour in a group dining setting.

5.5.2.2 Factors influencing the choice of healthy options from the menu

Several participants perceived vegetarian food as healthy while others emphasised authentic foods as healthier options than fast food versions; for example, authentic Italian pizza compared to New York pizza and Traditional cuisines of different countries compared to McDonald's and KFC experiences.

Family members influenced food choices for several participants and nudged them towards healthy meals.

One was motivated by an elder sibling who was "very conscious of what he ate", and in his company opted for healthier food:

> My eldest brother, he's very much a healthy person, he's very conscious of what he eats, he likes to put good food into his body… …[So] when I'm with my eldest brother I feel more towards what is healthier for me because that's kind of I feel influenced by him because I like to look up to him] (X002).

Participant X007 observed that his daughter who had turned vegetarian motivated them to try vegetarian food:

> She's introduced us to vegetarian meals, and we do dine nearly that's very similar to those home delivery where they actually give you the portions and all you have to do is just cook it and make it up. Yeah. And we've become quite liking that, we like the lightness of a vegetarian meal. So, my wife and I will continue that (X007).

In some cases, health issues and allergies promoted a shift towards healthy food choices. Participant X004, who was working and studying at a university, s noted that he and most of his colleagues who were 'skinny' when they went to university were "gaining weight after starting PhD". He attributed much of the change **to a sedentary lifestyle and food** habits: "because in the first year of PhD, many people, they're very busy, my colleagues, they use frozen foods. So, they just heat it in the microwave and eat it".

Participant X008, who was Coeliac, preferred to choose from gluten-free options.

5.5.2.3 Awareness about Australian Standards of Healthy Eating, nutritional values and units of measurement

According to Australian Institute of Health (2024) and Welfare and National Health and Medical Research Council (2013), a healthy meal can be defined in accordance with the recommendations of the Australian Dietary Guidelines, developed by the National Health and Medical Research Council. These guidelines define healthy eating as the regular consumption of foods from the five core food groups, vegetables and legumes/beans, fruit, wholegrain cereals, lean meats and alternatives, and dairy or dairy alternatives, while limiting the intake of discretionary foods that are high in saturated fat, added sugars, salt, and energy density (NHMRC, 2013). Within this framework, a healthy meal typically includes a balanced combination of vegetables, a source of lean protein, and wholegrain or high-fibre carbohydrates, prepared with minimal added fats, sugars, and sodium. Such meals are characterised by high nutrient density relative to energy content, supporting adequate nutrient intake without excessive caloric consumption. Consistent with evidence reported by the Australian Institute of Health and Welfare, diets aligned with these principles are associated with a lower risk of diet-related chronic diseases, including obesity, cardiovascular disease, and type 2 diabetes (Australian Institute of Health and Welfare, 2024). Accordingly, in the context of this research, a healthy meal refers to a menu item that prioritises core food group ingredients, incorporates vegetables and lean protein as central components, and avoids excessive discretionary ingredients, thereby aligning with the nutritional principles established in the Australian Dietary Guidelines. This theme examined awareness among participants about Australian Standards of Healthy Eating in terms of Nutritional value, Energy value, and Calorie count. They were asked questions about their familiarity with Australian Standards,

their understanding of the concept of healthy eating in relation to these Standards, and their influence on diet.

Participants had either a vague or no idea about the Australian Standards of Healthy Eating (X002, X004).

Participant X001 noted that he was 'Somewhat' familiar and 'not entirely' but had 'some idea'. He assumed that the Australian diet required "a very balanced diet… not high on trans-fat… be low on trans-fat, low on sugars, good balance between protein and fats, but not saturated fats".

Awareness of the measurement system of nutritional values was limited. In response to a question about the Unit of Energy Measurement in Australia, most participants were either aware or vaguely aware of Australian standards for healthy eating and units of measurement of energy from food sources (X002, X004).

Fewer people were aware of Kilojoules being used as a unit of energy measurement. Several participants converted the measures to Calories to make sense of the measurement. Participant X001 noted that he "always has to convert it back to calories to make sense of it. Whenever I see packaging, I always take out my phone and convert it". He preferred using calories as a measure because he used calories while growing up in India. of the research found that Pedagogy influenced the perception and interpretation of nutritional values, with one Participant noting that they were "not familiar with the level of calories or kilojoules that had to be taken on a daily basis" (X003). Fewer participants were aware of nutritional values and daily requirements, unless than they had done their own research (X012).

Some provided feedback on improving the menu design and making it more informative about specific types of fats; for example: "If I'm not wrong, it should not be high

on trans-fat, it has to be low on trans-fat, low on sugars, good balance between protein and fats, but not saturated fats" (X001). Meanwhile Participant X007 observed that information regarding values of protein, fats and carbohydrates would still be inadequate if the type of fat was not mentioned: "It's not just the level of fat, it's the type of fat as well".

5.5.3 Response to Interventions

Interventions designed for the quantitative phase were used during the qualitative phase. Interviewees were first presented with a standard menu, followed by a new menu. They were presented with scenarios where large-sized poster-style menu advertisements and digital menus with dynamic content on large televisions were used for indoor advertisement of menus. Participants were asked questions to elucidate their response to visual interpretation of the meals on digital menus and the new format's influence on their ordering pattern. The intention was to understand their choices and the factors influencing them.

The new menu contained descriptions of food items, nutritional value, and images and was enclosed in a Green coloured folder. Participants were asked questions to understand their thoughts and responses to the new menu, compared to the standard menu. In doing so, the study examined the effectiveness of marketing theories and strategies in combination with the theory of colours on human behaviour in relation to influencing consumer choices.

Participants appreciated the new menu both for its visual impact and the nutritional information that allowed them to make informed choices. They differentiated the menu design from the standard menu for its special green folder presentation, choice of green and earthly

colours, detailed description and information about nutritional value, as well as ingredients used.

Participant X001 noted that the new menu helped him "get a mental picture of what I'm going to eat, because the descriptions are nicely put". He liked the "additional touch" of visuals and explanation, so that he did not have to "ask the server a hundred questions" as to the ingredients in the food (X001).

Another participant noted that she would prefer the Green menu if she were dining with family, as her mother would appreciate the detailed presentation (X002). One X003 noted that she "really liked the cover" and found the menu to be natural and earthy with green and brown colours, while Participant X004 saw the new menu as "more appealing" for being "healthy". He expected to find "more greeny dishes" when the "cover was green, folder was green, or the menu was green". X005 liked the menu for offering a diverse range of choices, compared to the standard classic Italian one.

Participants appreciated the new design for its **augmented visual impact, attractive colours, images, and detailed information** about the food options and considered green colour as synonymous with good health and healthy food.

Participants were asked their opinion about the impact of poster advertisements and advertisements on large TVs. All the interviewees appreciated the new menu in the Green folder, poster advertisements, as well as the digital menu flashing on large televisions. Some preferred posters to TV advertisements as they felt it was difficult to read the TV content because of its short display time.

Participant X001 "loved" the idea of having to see food presented on TV screens. He had experienced digital menus in two other restaurants and observed that the food on screen

“looked really appetising” because the “colours that jumped out and an interesting sense of representation”.

Participant X002 observed that she “liked to see” what she was going to eat. Hence, seeing posters or images flashing on TV ensured that she “definitely takes notice of them” as she “sometimes overlooks healthier meals on the menu”.

Several Participants (X003, X007 and X013) observed that TV advertisements had to be very slow to enable to viewer to read the content but were advantageous as they made it possible to know ingredients while visualising the food options, rather than referring to the hardcopy of the menu. One (X004) noted that images and content on the TV, if strategically positioned and customised, would be impactful; otherwise, it would be “hard to follow”. Participant X005 chose the Green folder in preference to the others as she perceived Green as healthy, While Participant X006 noted that presenting on “screens would be on display for everyone at the same time” and it would be advantageous to incorporate customisable information into table menus. However, Participant X008 did not prefer TV advertisements in fine dining settings as “flashing screen menus reminded him of Fast-Food restaurants”. In contrast, Participants X009 and X010 noted that images on the TV could grab their attention and entice them to order even if they were not in the “mood” to order certain foods.

5.6 Summary of Chapter 5

The critical contribution of Chapter 5 to this thesis was the contextualisation of the consumer's situational factors which supported the evident shift in consumer preference towards Light and Healthy menu meals when different marketing advertising functions were introduced in restaurant settings. An understanding of situational factors is vital in food selection in restaurant settings. This is an important area where marketing advertising functions were applied, providing evidence of their significance in changing consumers' ordering patterns

in restaurant settings. Situational factors support this evident shift. The following table summarises the key findings from the qualitative and quantitative studies of this thesis.

Table 5.19 The key findings from qualitative and quantitative studies

Interventions and interviews	Quantitative findings	Qualitative findings relevant to quantitative analysis	How the findings answer the research question
Introducing a Light and Healthy Menu (use of semiotics)	More customers were ordering healthier meals after the introduction of the Light and Healthy menu presented in the light green folder	Several interview participants stated that family members influence food choices and nudged them towards healthy meals, and liked the colour of the menu – green menu	The findings indicate an exceedingly small probability of this result occurring by chance, under the null hypothesis of no difference. Therefore, consumers responded positively to the introduction of a Light and Healthy Menu (use of semiotics)
Introducing a Light and Healthy Menu (evocative descriptions of meal items - positioning)	Customers were ordering healthier meals after the introduction of the Light and Healthy menu presented in the light green folder, and when the Light and Healthy items were evocatively described.	Participants liked the "*additional touch*" of visual appeal and preferred the green menu. They "*really liked the cover*" and found the menu to be natural and earthy with green and brown colours. They liked "more greeny dishes" when the "cover was green, folder was green, or the menu was green". Participants appreciated the new design for its augmented visual impact, attractive colours, and images.	The findings indicate an exceedingly small probability of this result occurring by chance, under the null hypothesis of no difference. Therefore, consumers responded positively to the Introduction of a Light and Healthy Menu (evocative descriptions of meal items - positioning).
Introducing a Light and Healthy menu, along with nutritional information about each meal	Customers were ordering more of the healthier meals after the introduction of the Light and Healthy menu with nutritional information for each meal.	Participants appreciated the new design for its detailed information about the food options. It emerged from the study that participants considered green colour as synonymous with good health and healthy food, and information provided about nutritional value as important.	The findings indicate an exceedingly small probability of this result occurring by chance, under the null hypothesis of no difference. Therefore, consumers responded positively Light and Healthy menu, along with nutritional information about each meal.
Introducing advertising posters with nutritional	Customers were ordering more of the healthier meals after	Participants appreciated the new design for its detailed	The findings indicate an exceedingly small probability of this result occurring by

information about each meal	the introduction of the advertising posters with nutritional information for each meal.	information about the food options.	chance, under the null hypothesis of no difference. Therefore, consumers responded positively to advertising posters with nutritional information about each meal.
Combination of a light and healthy menu in a green folder, evocative descriptions of meal items - positioning and point-of-sales advertising of nutritional information	Consumers were ordering more of the healthy meals once they were exposed to advertising using posters on three TV sets at the venue.	TV sets help get a mental picture of what I'm going to eat. Some participants liked the “additional touch” of visuals and explanation of meals. As such, seeing posters or images flashing on TV would ensure that she “definitely takes notice of them” as she “sometimes overlooks healthier meals on the menu”. TV could grab my attention and entice me to order certain food, even if I was not in the “mood” to order certain foods, as some of the comments suggest.	The findings indicate an exceedingly small probability of this result occurring by chance, under the null hypothesis of no difference. Therefore, consumers responded positively to a combination of a light and healthy menu in a green folder, evocative descriptions of meal items, positioning and point-of-sales advertising of nutritional information.

Chapter 6 will interpret these results, providing the researcher, community and government policymakers with a clear understanding of the relevance and importance of applying different marketing and advertising functions to shift consumers' ordering patterns towards healthy menu alternatives.

Chapter 6 Results and Discussion

6.1. Introduction to Results, Discussion, and Findings

The preceding chapter presented the results of the study on the application of marketing and advertising functions (MAFs) within the Food Service Sector (FSS), highlighting their influence on consumer food choices and dietary patterns. The review established that strategies such as (1) decision heuristics, (2) advertisement themes, (3) nutritional information disclosure, (4) semiotic cues, and (5) the use of marketing advertising functions have been widely employed to shape consumption behaviours in restaurant settings. However, these functions have predominantly been utilised to increase sales and profitability (Jenkins, 2015; Tyagi & Bolia, 2024), often at the expense of consumer health. The expansion of the FSS has therefore paralleled a rise in diet-related health issues, including overweight and obesity. Specifically, the review identified how decision heuristics may mislead consumers through distorted caloric representations; how segmented and targeted advertisement themes promote unhealthy food choices; how emotionally charged messaging increases cravings for energy-dense, nutrient-poor foods; and how semiotic strategies have been used to 'greenwash' unhealthy options as healthy ones. These insights pointed to three significant gaps limiting the effective use of MAFs for public health promotion: (1) the dominance of profit-driven advertising over health-oriented communication, (2) a lack of robust empirical studies in real-time food service environments, and (3) limited evidence on how MAFs can be positively reoriented to support healthier dietary behaviour. The rationale for this study arises from the observation that a substantial segment of the FSS continues to use persuasive marketing tactics to promote unhealthy eating habits, thereby exacerbating the obesity crisis in Australia and developed countries. This research is grounded in the belief that, when appropriately reconfigured, FSS marketing advertising

functions can serve as effective tools for nudging consumer behaviour toward healthier food choices and fostering supportive dining environments. Accordingly, this study investigated the potential of FSS MAFs to influence real-time consumer ordering behaviour and support public health objectives. Three interrelated overall research questions guided it:

1. *Can the marketing and advertising functions of the FSS instigate voluntary behaviour change toward healthier food choices?*
2. *What is the impact of these functions on both consumer choice and restaurant sales?*
3. *What factors shape consumer ordering patterns concerning healthy eating in restaurant settings?*

To address these questions, the study examined the application of MAFs in a live dining context and evaluated their empirical effects on consumer decision-making and sales performance. The application of Fogg's Behaviour Model (FBM) in this research recognises that the semiotic menu design, specifically the use of green folders to present the *Light and Healthy* menu, served a dual behavioural function. First, the folders acted as a Signal (Trigger) by visually highlighting the presence of healthier options at the moment of ordering. The colour green, commonly associated with freshness, health, and sustainability in food environments, functioned as an immediate semiotic cue directing consumers' attention toward the healthier category.

Second, and arguably more importantly from a behavioural design perspective, the green folders also functioned as an Ability enhancer. By physically separating and clearly organising healthier options into a dedicated menu section, the intervention reduced the cognitive effort required for consumers to identify and evaluate healthier meals. In the context of FBM, this

design simplified the decision environment by lowering the effort associated with information search and comparison, thereby increasing behavioural ability at the point of choice.

While the folders therefore performed both roles, their primary contribution lies in enhancing ability rather than acting solely as a trigger. The visual signal draws attention to the option set, but the structured menu organisation meaningfully reduces cognitive friction in the ordering process. This distinction strengthens the theoretical contribution of the study by demonstrating how semiotic menu architecture can simultaneously activate behavioural triggers while improving decision ability, thereby operationalising two components of Fogg's Behaviour Model within a real-world restaurant setting.

Six research objectives were developed to achieve the study's overarching aim systematically. Chapter 6 also examines the interpretation of both quantitative and qualitative results, providing the researcher, community, and government policymakers with a clear understanding and recommendations on the relevance and importance of applying different marketing advertising functions in the restaurant environment in Australia and developed countries, and shifting consumers' ordering patterns towards healthier menu alternatives. The following section will revisit the overarching objectives of this research and thesis.

6.2. Quantitative research findings

6.2.1. Key findings and discussion 1 – The use of semiotics in restaurant settings

Recent behavioural, nutritional, and marketing studies emphasise the multifaceted cognitive and emotional processes underlying consumers' food decisions in restaurants. Hsu, Hsiao, and Tsai (2018) suggest that experienced diners engage in complex "mental accounting" during menu selection, often accompanied by anxiety and heightened cognitive processing.

Similarly, Yu et al. (2021) argue that habits, emotional states, and staff prompts substantially shape decision outcomes, implying a cognitively demanding decision environment. Rabab'ah and Al-Qudah (2022) further contend that persuasive menu design must rely on emotional triggers and rich mental imagery to facilitate choice, while Peters and Remaud (2020) maintain that perceived meal complexity, particularly whether a dish can be easily prepared at home, determines the level of cognitive investment diners make.

However, these studies collectively assume that restaurant patrons require substantial information processing, emotional engagement, or cognitive effort to be influenced. The findings of the current research challenge this assumption. In contrast to prior claims that detailed nutritional information or elaborate persuasive elements are necessary, this study is consistent that simple, low-effort nudges such as salience cues, semiotic prompts, and streamlined menu signals, produce measurable shifts in ordering behaviour. Hence, r diners do not always engage in the layered cognitive processes proposed in earlier work; instead, subtle environmental cues can effectively redirect choices even when motivation or attention is low.

By demonstrating that uncomplicated nudging strategies outperform cognitively demanding informational approaches, this study closes a key gap in the literature: it evidences that real-time restaurant choices are more responsive to behavioural prompts than to detailed nutrition communication, contradicting earlier assumptions and offering a more pragmatic pathway for industry application.

The thesis makes a significant empirical contribution to this body of work by testing Hypothesis H1, which posits that the introduction of a semiotically enhanced menu format, specifically a green “Light and Healthy” menu folder, will lead to a measurable increase in the selection of healthier meals. The intervention yielded a statistically significant behavioural shift, with healthy meal selections increasing **from 56 to 110 orders per week** ($Z = 4.15$, $p <$

.001). This confirms that semiotics, when strategically embedded as visual triggers, can drive real-time, health-oriented consumer behaviour in dining environments, validating the "**trigger**" component of Fogg's Behaviour Model (FBM).

The study expands on theoretical assertions by Tresidder (2015) and Dilek and Harman (2017), who argued for the symbolic power of food imagery and marketing in shaping consumer responses. It offers concrete evidence that semiotic cues such as colour, menu grouping, and visual emphasis can function as effective nudges in a restaurant environment. Cerrato (2012) explained that green symbolically evokes freshness, safety, and health which this research confirms in a practical sense. By integrating this association into the design of the healthy menu, this thesis confirms that affective colour cues are not only perceptually salient but behaviourally compelling in real-world restaurant environments.

While marketing researchers such as Solik (2014) and Kokiel, Kostenko, and Biliakovska (2024) have explored the theoretical dimensions of colour psychology and semiotics, practical applications in hospitality settings have remained limited. Li (2019) highlighted the persistent lack of intersemiotic translation in restaurant menus, where nutritional value and preparation methods are rarely conveyed in intuitive, visually accessible formats. This study bridges that gap, showing that the use of green folders for healthful menu options serves as both a visual anchor and a cognitive shortcut, enabling quicker, more health-conscious decisions.

The findings also contrast sharply with Atkinson and Palmer (2011) who reported that only 3% of customers at McDonald's selected health-promoted options such as the "Heart Foundation Tick" or Subway's "Six grams of fat or less" meals. Their results suggested a disconnect between health-focused promotion and consumer behaviour. However, those interventions lacked cohesive visual design or semiotic strategies. Healthy options were presented in a fragmented manner without visual grouping or intuitive design elements to enhance their

visibility or appeal. In contrast, the current intervention used integrated semiotic principles, colour, folder grouping, and linguistic cues to increase both salience and engagement, leading to statistically significant increases in the uptake of healthy menu options.

- This shift underscores how integrating behavioural theory with marketing practice reshapes consumer decision-making by enhancing **mental availability**—the ease with which healthier options come to mind at the point of choice. Traditional nutritional labelling provides information but rarely activates behaviour; by contrast, visual framing and semiotic design operate as **behavioural triggers** that lower cognitive effort and guide intuitive choices in real time (Simmonds et al., 2018; Wansink et al., 2005). Within Fogg's (2009) Behaviour Model, these cues serve as effective prompts that align motivation and ability, transforming awareness into action. From a **decision-making** perspective, this means that healthy options no longer rely solely on conscious deliberation or nutritional literacy but compete on **salience**—the extent to which they stand out and are cognitively accessible in the moment (Romaniuk & Sharp, 2004). When choice environments are designed using semiotic cues and visual framing, they function as nudges that restructure the immediate decision context, making healthier options more noticeable and easier to choose (Hollands et al., 2017; Tucker et al., 2022). Over time, repeated exposure to such consistent cues builds associative memory strength, thereby increasing the **mental availability** of healthy options and embedding them in long-term recall networks that support habitual behaviour change (Bennett & Hartel, 2022). In this way, Fogg's trigger principle becomes not merely theoretical but **practically operational**, demonstrating how environmental design and communication strategies can jointly steer decisions towards healthier outcomes. This thesis shows how important regulations are in the Australian hospitality industry.

6.2.2. Key findings and discussion 2 – the use of the positioning approach by using evocative meal descriptions in restaurant settings

Hypothesis 2 (H2) examined the impact of evocative menu language—featuring affective, geographic, and health-associated descriptors on consumer ordering behaviour in a live restaurant setting. The intervention introduced emotionally rich and origin-based descriptors such as "Naples tomatoes," "Spanish red onions," and "heart-healthy herbs" on a dedicated Light and Healthy menu. Weekly orders of healthy meals rose from 110 to 149—**a 35.5% increase**—and five different participant clusters were statistically significant ($Z = 6.49$, $p < .001$). These findings support the hypothesis that evocative menu language meaningfully influences consumer behaviour at the moment of choice in restaurant settings.

This intervention is notable for its ecological validity, as it was conducted over time in a real restaurant environment rather than in simulated or laboratory-based settings. It directly addresses a long-standing research gap noted by Ruhizat, Ngali, and Rahmat (2020), who observed that many restaurateurs neglect the strategic construction of menu descriptions, overlooking their persuasive potential.

The results empirically extend the work of Behnke, Jung, and Bai (2024), who developed a typology of hedonic and utilitarian menu descriptors and showed that emotionally framed language resonates more deeply with diners. This thesis operationalised their theoretical taxonomy in practice, applying hedonic (emotional), geographic (origin), and health-benefit descriptors to craft descriptions that increased perceived value, credibility, and taste expectations of healthier dishes.

Further reinforcing the importance of affective framing, Jung, Yunmei and Carl (2022) found that consumers associate specific descriptors such as *"*local," "natural," or "fresh" with lifestyle congruence and health consciousness—qualities that were tactically embedded in this study's menu descriptions. These affective signals improved not only the salience of healthy options but also their emotional appeal, a crucial differentiator in fast-paced ordering contexts.

The persuasive utility of menu language has also been observed by McCall and Lynn (2008), who noted that the use of sophisticated, sensory-laden descriptions elevates perceived food quality and justifies price premiums. Similarly, Feldman et al. (2011) found that concise, persuasive language can nudge behaviour without overwhelming consumers, provided that cognitive load is minimised. This research aligns with these findings that language engineered for clarity and affect, rather than overloading nutritional jargon, can guide behaviour with minimal resistance from restaurant patrons in the Australian hospitality industry.

Crucially, this research makes a novel contribution by showing how evocative language can act as a ***trigger*** within Fogg's Behaviour Model (FBM)—prompting behaviour when combined with consumer motivation and ability (physical). The menu intervention functioned as a real-time cognitive nudge that activated health-conscious decision-making **without requiring additional external motivation or discounts** which adds a vital behavioural layer to the existing menu engineering literature.

Unlike prior studies such as Atkinson and Palmer (2011) which found limited uptake of healthier fast-food options (e.g., Heart Foundation Tick items), the current research differs in a crucial respect: language was not only used as a label but as a **behavioural amplifier (trigger)**. The previously unsuccessful interventions lacked emotional resonance, linguistic richness, and structural prominence within the menu. These research findings demonstrate that when language is artfully embedded in visually distinct formats (e.g., dedicated green menu

sections), it can activate a compelling behavioural response. In contrast with studies like Fitzgerald et al. (2004) that measured poster advertising over only two weeks with insignificant results, this thesis applied a longitudinal, in-situ approach, confirming that well-designed verbal nudges sustain their influence over time.

Table 6.2 Strategic Use of Evocative Language and Public Health Benefits

Intervention	Mechanism of Action	Empirical Findings	Public Health Benefit	Relevant References
Evocative Language in Menu Descriptions	Uses affective, sensory, geographic, and health-focused descriptors to enhance appeal and salience	Healthy meal orders increased from 110 to 149/week (Z =6.49, p <.001)	Encourages healthier eating by enhancing perceived taste, value, and familiarity	Behnke, Jung & Bai (2024); Jung, Yunmei & Carl (2022); McCall & Lynn (2008); Ruhizat et al. (2020); Feldman et al. (2011)
Brand-Origin and Heritage-Based Phrasing (e.g., "Naples tomato")	Emotional association with authenticity, freshness, and premium quality	Heightened trust and perceived healthfulness of menu items	Shifts consumer choices toward healthy meals by aligning with lifestyle aspirations	Jung et al. (2022); McCall & Lynn (2008); Behnke et al. (2024)
Health Framing (e.g., "heart-healthy herbs")	Appeals to health consciousness and reduces decision anxiety	Boosts positive perception of nutritional quality	Supports intuitive health decision-making at the point of purchase	Cerrato (2012); Behnke et al. (2024); Feldman et al. (2011)
Linguistic Menu Engineering	Reduces cognitive load by simplifying complex nutritional content into digestible, compelling descriptions	Greater mental accessibility of healthy options; improved readability and engagement	Facilitates informed decisions without overt restriction	Feldman et al. (2011); Li (2019); Ruhizat et al. (2020)
Integration of Evocative Language with Visual Menu Design	Combines strategic wording with distinct menu sections or formats	Reinforces attention and preference for grouped healthy dishes	Promotes systemic behavioural change when combined with visual menu layout (e.g., Light and Healthy folder)	Feldman et al. (2011); Li (2019); Cerrato (2012); Jung et al. (2022); Ruhizat et al. (2020)

From a practical and policy standpoint, these results have substantial implications for academic research, social effects and the hospitality industry, which will be investigated in the following three sections.

6.2.2.1 Use of evocative meal descriptions in restaurant settings – relevance to market research professionals and academics, policy makers and social concerns in lowering obesity levels in Australia

Academic Contributions

- **Bridging a Research Gap**: This study addresses a critical gap identified by Ozdemir and Caliskan (2015) regarding the underexplored role of *evocative language* in real-world hospitality environments. It adds to the foundational work on menu design (Reynolds et al., 2005; Jung, 2014) by empirically testing affective descriptors in a naturalistic setting.
- **Theoretical Expansion of Menu Psychology**: The findings reinforce and expand on "menu psychology" theories by Pavesic (2005), Seaberg (1991), and Lockyer (2006), offering fresh empirical evidence that affective language can shape both perceptions and purchase behaviour.
- **Advancing Persuasion and Nudging Theory**: Through real-world experimentation, the research extends Paakkola's (2017) argument that subtle nudging in naturalistic settings can effectively influence consumer behaviour, especially among at-risk populations.
- **Contributions to Linguistic Marketing**: It supports Li's (2019) framework on effective semantic framing, while diverging from visual cues to show that *language alone* can shift ordering patterns—a key advancement in linguistic nudging literature.

- **Cognitive Heuristics and Emotional Value**: Empirical findings affirm the work of Wansink et al. (2001, 2005), Dagevos and van Ophem (2013), and Fernqvist and Ekelund (2014), demonstrating how evocative language generates hedonic perceptions and induces behavioural shifts.
- **Authenticity and Cultural Framing**: The results also support Kim et al. (2017), showing that descriptors evoking authenticity (e.g., "local", "homemade") enhance positive emotional responses and purchasing intent.

Contributions to the Hospitality Industry

- **Language as a Low-Cost Marketing Tool**: The use of evocative descriptors led to a rise in healthy meal orders (from 110 to 149/week), surpassing visual nudges like green folders. This confirms that menu wording is a *powerful, cost-effective tactic* that requires no operational change.
- **Enhancing Consumer Experience**: Findings affirm that well-crafted descriptors influence not only choice but also perceived quality and satisfaction (Wansink et al., 2005), giving restaurants a branding advantage.
- **CSR-Oriented Menu Design**: By increasing the appeal of healthy meals through sensory-rich language, restaurants can actively participate in public health initiatives while enhancing their social responsibility credentials (Guidetti et al., 2014; Kraak et al., 2017).
- **Staff Training Implications**: The results suggest that front-line staff should understand the power of language in reinforcing menu design, making it a potential training focus for customer-facing roles.

- **Improving Emotional Engagement**: By invoking indulgence and authenticity, evocative language primes emotional responses, helping restaurants differentiate their brand and boost loyalty (Dagevos & van Ophem, 2013; Jung et al., 2022).

Social and Public Health Contributions

- **Support for Obesity Reduction**: By nudging healthier choices using language instead of restrictions, this research offers a persuasive, non-coercive method for tackling Australia's obesity crisis—aligned with national public health goals (WHO, 2003; Heywood & Lund-Adams, 1991).
- **Policy Relevance**: The study confirms the limits of current informational tools (Potter et al., 2022; Dumanovsky et al., 2011) and offers real-world evidence that *descriptive menu design* can be more effective than standard calorie labelling.
- **Behavioural Catalyst Without Coercion**: Aligning with Turnwald et al. (2017), the thesis demonstrates that indulgent language influences behaviour even when nutritional data is absent, making it a more emotionally resonant form of public health communication.
- **Call for Regulatory Reform**: It proposes policy actions that mirror Heywood & Lund-Adams' (1991) integrated nutrition policy framework—e.g., mandating that a minimum proportion of healthy meals be described using affective language.
- **Empowering At-Risk Groups**: With Australians consuming over 30% of daily calories out-of-home (Strupat et al., 2019), persuasive language in full-service restaurants could support dietary improvement across vulnerable demographics like adolescents and low-income diners.

- **Educational Integration**: Echoing Alexander et al. (2010), the findings suggest that menu labelling efforts must be supported by public education and design standards that foster emotional, not just rational, engagement.

6.2.3 Key findings and discussion 3 – Use of description of nutritional information about each meal in restaurant settings

This thesis addressed Hypothesis 3 (H3) by examining whether the disclosure of nutritional information on restaurant menus could shift consumer ordering behaviour towards healthier choices. Results showed a statistically significant increase in healthy meal orders when a dedicated "Light and Healthy" menu included protein, sugar, salt, and saturated fat content for each item. Specifically, healthy orders increased from 59 to 115 per week of total meals sold (Z=4.48, p<.001), strongly supporting the hypothesis that nutritional transparency acts as an effective behavioural nudge.

Previous studies have highlighted the disconnect between perceived and actual nutritional content. For example, Burton et al. (2006) found that diners frequently underestimate the calorie, fat, and sodium levels of menu items, particularly in indulgent restaurant meals. When confronted with actual nutritional data, consumers adjusted their attitudes and selected healthier meals. However, much of this work was experimental or campus-based (e.g., Ge, Behnke & Almanza, 2014; Bansah, 2024), which limits generalisability to older, more diverse populations found in commercial dining. This thesis extends those findings through a real-world, longitudinal intervention in a full-service family restaurant setting—thus enhancing ecological validity. Unlike previous studies confined to single-nutrient disclosures (mostly calorie-only), this study provided a multi-nutrient profile in a simplified, embedded menu design, which allowed for easier cognitive processing. This is consistent with findings by Ge

et al. (2014) that clear presentation formats (e.g., energy labels) drive healthier choices, though their study focused on younger, university-based populations.

In contrast, earlier research (e.g., Higgins, 2012; Finkelstein et al., 2011) questioned the effectiveness of calorie labelling, showing no significant behaviour change. These inconsistencies highlight that format, framing, and integration of information matter. This thesis addresses these concerns by aligning menu architecture, simplified labelling, and nutritional categories most relevant to Australian consumers, such as sugar and sodium (see Kelly et al., 2009).

Furthermore, this research supports Alia, Wahba, and Atia (2024), who argue that individuals with higher nutritional literacy are more likely to act on provided data. However, as Bittman (2011) and Drewnowski & Barratt-Fornell (2004) noted, many Australians possess low baseline nutritional knowledge, suggesting the need for menu-integrated, low-literacy formats. The current study meets this challenge by presenting nutritional data in an intuitive structure alongside semiotic and evocative cues.

From a marketing theory perspective, this study validates Feldman et al. (2011), who identified that menu engineering and subtle messaging can trigger healthier behaviours. These results also align with those of Seymour et al. (2004) and Martínez-Donate et al. (2015), who advocated for real-world interventions that combine accessibility and behavioural nudging.

This thesis is one of the first real-world, longitudinal studies in the Australian restaurant context to test multi-nutrient labelling embedded within a branded menu strategy. It demonstrates not only that nutritional labelling works outside of experimental settings, but that its effectiveness is maximised when coupled with thoughtful menu presentation and integrated behavioural design.

For marketing professionals, this offers evidence-based menu strategies that align business goals with social responsibility. For policymakers, the results indicate the need for standardised labelling across the restaurant sector, extending beyond calorie counts to include broader health indicators. For the hospitality industry, this demonstrates that health-driven transparency can increase the uptake of healthy food without compromising profitability.

Table 6.3 Strategic Intervention and Public Health Benefits – Nutritional Labelling

Intervention	Mechanism of Action	Empirical Findings	Public Health Benefit	Supporting References
Menu-Embedded Nutritional Disclosure	Clear display of key nutrients (protein, sugar, salt, saturated fat) within "Light and Healthy" menu	Orders of healthy meals increased from 2.94% to 5.92% (Z =4.48, p <.001)	Empowers informed choice; encourages low-sugar/salt/fat selection	Burton et al. (2006); Ge et al. (2014); Alia et al. (2024); Feldman et al. (2011)
Multi-Nutrient Labelling Format	Reduces reliance on single metrics (e.g., calories); aligns with consumer health priorities (e.g., sodium, protein)	Stronger behavioural impact than calorie-only formats	Broadens awareness of diet quality and metabolic risk factors	Kelly et al. (2009); Drewnowski & Barratt-Fornell (2004); Bittman (2011); Higgins (2012)
Low-Cognitive Load Presentation	Simplified format embedded within branded menu architecture	Promotes sustained engagement among low-literacy consumers	Addresses population-wide gaps in nutrition knowledge	Bansah (2024); Seymour et al. (2004); Martínez-Donate et al. (2015); Alia et al. (2024)
Behavioural Menu Engineering	Pairing nutrition labels with semiotic design and evocative descriptions	Enhanced uptake of healthy meals over 3-week post-intervention period	Validates real-time, low-cost nudging for restaurant settings	Feldman et al. (2011); Ge et al. (2014); Bittman (2011); Finkelstein et al. (2011)

The following section will look into the social benefits, as well as the academic and hospitality industry perspectives.

6.2.3.1. Use of nutritional information disclosure on in-house menus in restaurant settings – relevance to market research professionals and academics, policy makers and social concerns in lowering obesity levels in Australia

Academic Contributions

- **Empirical Advancement in Nutrition Labelling Research -** This thesis addresses the gap in real-world, longitudinal evidence concerning *nutritional information disclosure* in full-service restaurant settings—an area previously dominated by fast-food studies (Chung et al., 2024; Glanz et al., 2007). The study confirms that when nutrition facts are visible and embedded into menu architecture, they consistently shift consumer behaviour toward healthier options, supporting findings from Cranage et al. (2005), Kang et al. (2015), and Malik (2013).

- **Theoretical Contribution to Behavioural Marketing and Menu Psychology** Integrating insights from Petimar et al. (2019) and Cawley et al. (2020), the thesis contributes to the literature on menu psychology by showing how *effective information design* bridges the gap between awareness and action, sustaining behavioural change over time. It extends the work of Sobaih and Abdelaziz (2022) on subjective norms and perceived behavioural control.

- **Advancing Research Methodology -** The study offers *experimental, in-situ evidence* rarely found in Australian hospitality marketing research, fulfilling calls from Rincón-Gallardo Patiño et al. (2020) and confirming real-time, field-based behavioural responses to nutritional disclosure.

- **Stimulating Future Research Directions** - it highlights the need for further study on how demographic and psychographic variables (e.g., gender, health consciousness)

moderate the effectiveness of nutrition labelling, contributing to a richer understanding of behavioural segmentation in hospitality marketing.

Hospitality Industry Implications

- **Commercial Viability of Nutrition Transparency -** The restaurant involved experienced a 0.8% revenue increase during the nutritional information disclosure phase, aligning with Din et al. (2012) and Kim & Ham (2016), who link nutritional CSR practices with customer trust, loyalty, and repeat patronage.
- **Enhancing Competitiveness through Health-Oriented Branding -** The findings echo Stangierska et al. (2019), affirming that transparent communication of nutritional content can attract health-conscious consumers and differentiate brands in a saturated market.
- **Optimising Menu Engineering and Communication -** Clear integration of nutrient data (e.g., sugar, saturated fat, sodium) into the *menu design itself*—rather than as separate signage—yields higher behavioural engagement, supporting design-led approaches to health communication (Seenivasan & Thomas, 2016).
- **Expanding Menu Strategy Beyond Visual Aesthetics -** This thesis supports a shift toward functional, behaviourally informed menu communication—linking nutrition facts with *semiotics* and *evocative language*—as a bundled strategy to encourage healthy decisions.

Policy and Public Health Contributions

- **Actionable Evidence for the National Obesity Strategy -** The results offer empirical support for system-level responses outlined in the *National Obesity Strategy 2022–2032* (Carrello et al., 2024), confirming the impact of information transparency on reducing calorie intake (Long et al., 2015).
- **Support for Mandatory Labelling in Full-Service Venues -** While fast-food outlets are often the policy focus (Bobba, 2013), the findings show that full-service restaurants also play a *critical role in national dietary patterns* (Walker et al., 2020). This research advocates for regulatory consistency across venue types.
- **Need for Policy-Backed Educational Reform -** The thesis corroborates the findings of Johnson (2022) and Alexander et al. (2010), arguing that nutrition disclosure should be accompanied by educational campaigns and clearer, standardised formats to maximise comprehension and use.
- **Reducing Obesity's Economic Burden -** With obesity projected to cost Australia up to $87.7 billion by 2032 (Department of Health and Aged Care, 2022), this research supports cost-effective prevention strategies aligned with Liu et al. (2020), who stress the health and fiscal benefits of comprehensive menu labelling.
- **Policy Recommendation: Structural and Informational Interventions -** This study calls for *dual-action policies*—requiring both nutritional transparency and a minimum percentage of healthy options on menus—to achieve behavioural and systemic change.

6.2.4. Key findings and discussion 4 – Use of point-of-sales advertising in restaurant settings

This thesis tested Hypothesis 4 (H4) to determine whether point-of-consumption advertising posters that included nutritional information could significantly influence consumer food choices in dine-in restaurant settings. The findings confirmed a statistically significant behavioural change, with healthy menu selections rising from 59 meals to 276 during the intervention period (Z=7.00, p<0.001), providing conclusive support for H4.

While international studies have long established that promotional signage can influence product uptake (Heinrich et al., 2012; Lee et al., 2003; Duran et al., 2015), these studies rarely addressed Australian restaurant settings, especially in non-fast-food, full-service environments. This research fills a critical empirical gap by offering longitudinal, real-world data from an Australian restaurant, directly addressing Glanz, Bader and Iyer's (2012) call for empirical testing of in-store nudging strategies.

The intervention implemented visual prompts (posters and digital screens) showcasing nutritional information and semiotic elements, including green colour schemes and simplified text, to nudge customers toward healthier options. The application of this intervention reflects Hameed's (2024) argument that not only presence, but design aesthetics, colour, layout, and content clarity, are key determinants of poster effectiveness. These findings resonate with Kim, Kim and Kim (2016), who showed that health communication is significantly more effective when visual and textual cues are integrated.

This thesis also aligns with Cohen et al. (2015) who identified that widespread promotion of energy-dense, nutrient-poor foods contributes to higher BMI in frequent consumers. By contrast, this intervention redirected in-store advertising away from high-calorie indulgent items towards nutritionally superior dishes, producing measurable change. Similarly, Bleich et

al. (2020) warned that restaurant advertising contributes to obesity, especially among low-income populations—highlighting the urgency for ethically responsible advertising strategies. This study operationalised that shift, proving that positive, health-oriented advertising is both practical and feasible in hospitality contexts.

The novelty of this work lies in its reverse application of advertising: while much attention has been given to the damaging effects of promotional marketing on youth and obesity (McClure et al., 2013; Bleich, 2020), there has been little evidence that similar advertising strategies can be repurposed to promote healthier choices in adult-focused dining. The thesis directly responds to that void.

Furthermore, Looman (2008) reported that posters often outperform personal selling in influencing food choices—a point validated in this study where poster prompts (absent of staff explanation) significantly increased healthy selections. Espino et al. (2015) echoed this through a meta-review that identified point-of-purchase information coupled with promotion as the most common and successful intervention model since 1979.

The findings from this study support the broader literature reviewed by Slapø et al. (2021) and Wolgast et al. (2022) which noted that restaurant interventions can promote healthier consumer behaviour but require well-designed, real-world validation to impact policy. The current research takes a step further by implementing multi-sensory, visually engaging marketing materials and demonstrating their practical success within the constraints of daily restaurant operations.

In summary, this thesis confirms that point-of-consumption marketing posters, when designed with behavioural insight and nutritional content, can serve as low-cost, high-impact nudges. These findings have substantial implications for marketing professionals, policymakers, and

hospitality practitioners seeking to mitigate the effects of poor dietary habits and support public health efforts aimed at combating obesity.

Table 6.4 Strategic Intervention and Public Health Benefits – Advertising Posters (H4)

Intervention	Mechanism of Action	Empirical Findings	Public Health Benefit	Supporting References
POS Posters & Digital Displays	Visual prompts placed at decision point featuring nutritional cues and green design	Healthy orders increased from 59 to 276 meals (Z =7.00, p <0.001)	Promotes in-the-moment healthier choices in restaurant settings	Glanz et al. (2012); Lee et al. (2003); Duran et al. (2015); Heinrich et al. (2012); Cohen et al. (2015); Espino et al. (2015)
Semiotic Design Elements in Posters	Use of colour (green), icons (hearts), and typography to signal healthfulness	Higher consumer attention and preference for featured healthy items	Increases salience of health messages and lowers reliance on textual comprehension	Hameed (2024); Kim, Kim & Kim (2016); Looman (2008); McClure et al. (2013)
Health Messaging in Dining Environments	Reversal of traditionally indulgence-based restaurant promotions	Demonstrates feasibility of promoting health without compromising experience	Counteracts obesity-promoting restaurant messaging among adult consumers	Bleich et al. (2020); McClure et al. (2013); Slapø et al. (2021); Wolgast et al. (2022)
Real-World Application in Australia	Full-service, non-fast-food setting with diverse patrons and no personal selling	Validated sustained behavioural change without staff intervention	Provides scalable, low-cost behavioural nudge to assist public health strategy	This Thesis; Espino et al. (2015); Bleich (2020); Cohen et al. (2015); Glanz et al. (2012)

The following section will examine the social benefits, as well as the academic and hospitality industry perspectives.

6.2.4.1. Use of point-of-sales advertising in restaurant settings – relevance to market research professionals and academics, policy makers and social concerns in lowering obesity levels in Australia

Academic Contributions

- **Fills a Gap in the Literature on Independent Dine-in Settings -** While prior research (Heinrich et al., 2012; Lee et al., 2003; Duran et al., 2015) focused largely on chain or franchised restaurants, this thesis delivers **longitudinal, real-world data** from a full-service, independently owned Australian restaurant. It confirms that POS advertising—via digital screens and posters—significantly shifts consumer choices towards healthier meals.

- **Advances Behavioural and Marketing Theory -** The study validates calls from Glanz et al. (2012), Kim et al. (2019), and Willems et al. (2017) for experimental investigation of in-store promotional strategies, while demonstrating real-time behavioural change. It confirms that **visibility, content framing, and placement** are critical to marketing effectiveness in health behaviour contexts.

- **Extends Understanding of Visual and Emotional Cues -** Referencing Thomas et al. (2008) and Opie et al. (2019), the thesis integrates qualitative data demonstrating that **non-medicalised, visual messaging** resonates better with participants, especially those with higher BMI, advancing psychosocial and consumer communication research.

- **Supports Demographic Responsiveness Findings -** The thesis echoes Josiam and Foster's (2009) finding that women, high-income diners, and health-conscious consumers are especially responsive to POS health prompts.

Hospitality Industry Implications

- **Cost-Effective Sales Promotion Strategy -** POS advertising, traditionally used for high-calorie promotions (Cohen et al., 2015; Bleich et al., 2020), can be effectively repurposed to promote healthier dishes, proving commercially viable even for independent restaurants (Park & Jang, 2012).

- **Boosts Brand Trust via CSR Alignment -** The study aligns with Carroll (1999), Kim and Ham (2016), and Cai et al. (2021), showing that CSR-aligned POS advertising strengthens brand image and consumer loyalty, particularly when focused on health and well-being.
- **Engages Unfamiliar Food Markets -** Persuasive POS tools reduced resistance to unfamiliar healthy items, as indicated in Cai et al. (2021), increasing their appeal through evocative naming, visual appeal, and credibility-enhancing nutritional claims.
- **Highlights Need for Calorie-Based Labelling -** Participants preferred calorie labels over kilojoules, matching earlier findings (Watson et al., 2013; Pettigrew et al., 2013; Wood et al., 2017). Restaurants can adapt accordingly to improve customer comprehension and engagement.

Policy and Public Health Contributions

- **Supports National Obesity Strategy Goals -** Consistent with the WHO (2024), Olsen et al. (2009), and Glanz et al. (2012), this thesis provides empirical support for POS marketing as a public health tool to reduce obesity through improved food decision environments.
- **Identifies Legislative Gaps in Labelling Policy -** While FSANZ mandates nutritional information for packaged foods (FSANZ, 1991), dine-in venues are exempt. The thesis advocates mandatory POS nutritional advertising in restaurants, with a focus on calorie-based, accessible displays to reduce decision-making ambiguity.
- **Validates Behavioural Policy Interventions -** The study answers De Oliveira's (2012) and Ngqangashe et al.'s (2022) calls for multi-stakeholder approaches, offering a scalable, low-cost behavioural nudge to align food marketing with health outcomes.

- **Recommends Policy-Enforced Communication Standards -** Building on empirical success, the thesis supports the implementation of minimum standards for POS advertising in dine-in and fast-food contexts to ensure uniform visibility, format clarity, and health impact.

This research confirms Hypothesis 4, establishing that professionally designed, strategically placed, and nutritionally informative POS advertising can effectively influence real-time consumer behaviour in favour of healthier meal choices. It contributes novel field-based evidence to the academic literature, practical strategies to the hospitality sector, and actionable insights for policy reform aligned with Australia's National Obesity Strategy.

6.2.5. Key findings and discussion 5 – use of Light and Healthy folders (semiotics) with pretentious wording explanation of each meal (positioning), nutritional value of each meal and advertising posters with the nutritional information of each meal altogether

This thesis addressed Hypothesis 5 (H5) by testing whether a multi-modal, integrated marketing communication (IMC) strategy, consisting of semiotic cues, evocative menu descriptions, nutritional labelling, and point-of-sale (POS) advertising, would produce a compounded behavioural effect on consumer food choices in a full-service restaurant setting. The results confirm a statistically significant increase in the selection of healthier meals during the intervention ($Z = 15.47$, $p < 0.001$), with 18.42% of meals ordered being from the "Light and Healthy" menu, compared to 2.94% during the control week.

While prior studies have explored individual elements such as menu layout (Lockyer, 2006; Wansink et al., 2001), descriptive food naming (Kim, Youn & Rao, 2017; Fernqvist & Ekelund, 2014), and nutritional disclosure (Burton et al., 2006; Cranage, Conklin & Lambert,

2005), this thesis uniquely contributes longitudinal, real-world evidence that these strategies, when applied simultaneously, can amplify behavioural outcomes. This is particularly significant in the Australian hospitality context where empirical research on IMC remains limited (Šerić, Gil-Saura & Ozretić-Došen, 2015; Selvakumar, 2014; Musyimi, 2018).

The study confirms Glanz, Bader and Iyer's (2012) and Cohen et al.'s (2015) proposition that consumer-centric, multi-layered marketing approaches, strategically placed at the point of decision, can more effectively promote healthier consumption. These findings advance IMC theory beyond the domain of branding and customer satisfaction, positioning it as a public health tool within the dining environment.

Real-World intervention included:

- Green menu folders as semiotic cues of health and freshness (Ozdemir & Caliskan, 2015).
- Pretentious and evocative meal descriptors (e.g., "Spanish red onion," "Naple's tomato") to enhance taste perceptions (Wansink et al., 2005).
- On-menu nutrient labels listing protein, salt, sugar, and saturated fat (Ge, Behnke & Almanza, 2014; Kang, Jun & Arendt, 2015).
- POS advertising posters and digital screens, using colour and symbol-based design, to reinforce health messaging (Hameed, 2024; Willems, Brengman & Van De Sanden, 2017).

This design reflects Martey (2020) and Aleem (2015) who argued that combining multiple tools within a coordinated IMC strategy is more effective than using isolated techniques. The current thesis confirms this in the Australian full-service restaurant sector—an environment under-researched compared to fast food or institutional settings.

The intervention achieved sustained behavioural change across a diverse customer base, supporting Josiam and Foster's (2009) observation that response to nutritional information varies by demographic factors such as gender, age, and income. The high acceptance of this multi-channel strategy across segments underscores its broad applicability.

Moreover, it builds on Willems et al. (2017) by moving from small-scale experimental design to large-sample, in-situ validation (n = 1,911), thus contributing to external validity. It also echoes Slapø et al. (2021) in confirming that even small behavioural shifts, when sustained and scaled, can yield significant public health gains.

The findings support the research of Raghubir (2004) and Johnen and Schnittka (2020) that Reason to Believe (RTB) strategies, such as tangible cues and health messages, are more effective than discounts or price incentives in maintaining perceived product value and long-term behavioural change.

Thus, the combination of semiotics, evocative language, transparent nutritional labelling, and visual advertising presents a cost-effective, scalable, and ethically sound approach to influencing meal selection, making it a viable public health intervention for policymakers and restaurant owners alike.

Table 6.5 Strategic Interventions and Public Health Benefits

Integrated Intervention Components	Behavioural Mechanism	Empirical Findings	Public Health Benefit	Supporting References
Green Menu Folders (Semiotics)	Visual cue signalling health, freshness, and lightness	Increased attention and salience of healthy options	Facilitates intuitive identification of healthier meals	Ozdemir & Caliskan (2015); Wansink et al. (2001); Lockyer (2006)
Evocative Meal Descriptions (Positioning)	Enhances perceived taste, authenticity, and emotional engagement	Boosted appeal and perceived value of healthy meals	Counters stigma of "healthy = bland"; supports positive food identities	Wansink et al. (2005); Fernqvist & Ekelund (2014); Dagevos & van Ophem (2013); Kim, Youn & Rao (2017)
Nutritional Labelling	Increases informational ability to make informed decisions	Directed choice away from high-fat, high-sugar options	Enables consumers to align choices with health goals	Burton et al. (2006); Ge, Behnke & Almanza (2014); Kang, Jun & Arendt (2015); Cranage, Conklin & Lambert (2005)
POS Advertising Posters & Digital Signage	Reinforcement of healthy cues through visual marketing	Prompted ordering at point-of-purchase; improved healthy selection rates	Directs attention at decision point; supports impulse control	Glanz et al. (2012); Hameed (2024); Willems et al. (2017); Looman (2008); Sameti & Khalili (2017)
Integrated IMC Strategy (All 4 combined)	Synergistic interaction of visual, linguistic, and informational nudges	Healthy meals increased from 2.94% to 18.42% (Z =15.47, p <0.001)	Demonstrates high-impact, scalable behaviour change mechanism	Šerić et al. (2014, 2015); Selvakumar (2014); Musyimi (2018); Amalia & Syaipudin (2023); Slapø et al. (2021); Johnen & Schnittka (2020); Aleem (2015);

6.2.5.1. Use of Light and Healthy folders (semiotics) with pretentious wording explanation of each meal (positioning), nutritional value of each meal and advertising posters with the nutritional information of each meal, all altogether – relevance to market research professionals and academics, policy makers and social concerns in lowering obesity levels in Australia

Academic Contributions

- **Bridging Theory and Practice in IMC for Health Promotion -** This thesis addresses a significant gap in the literature by empirically testing the cumulative impact of integrated traditional marketing functions—semiotics, positioning, nutritional disclosure, and point-of-sale (POS) advertising—on healthy ordering behaviour in a real-world, dine-in restaurant setting (Kim, Youn & Rao, 2017; Looman, 2008; Ozdemir & Caliskan, 2015). Unlike most prior studies that tested components in isolation or simulated environments, this research provides robust **longitudinal data** (n = 1,911) validating their combined effectiveness.

- **Extending the Role of Traditional Marketing in Modern IMC Frameworks -** The findings support the call by Duct Tape Marketing (2024) and Kim, Huang and Kim (2022) to re-evaluate traditional marketing tools within contemporary integrated marketing communication (IMC) strategies. It responds to Carins and Rundle-Thiele's (2014) critique by showing how traditional marketing can deliver **socially responsible outcomes**.

- **Innovating in Social Marketing and Behavioural Research -** By integrating insights from Kraak et al. (2017) and Rusmevichientong et al. (2014), this study confirms that

positive reinforcement and coordinated nudges are more effective than punitive or fear-based campaigns in altering health-related behaviour. It also contributes a replicable, evidence-based framework for health-focused IMC in hospitality.

Social and& Public Health Contributions

- **Reducing Obesity Through Environmental Nudging -** The 18.42% increase in healthy meals sold during the intervention confirms that **real-time marketing nudges** can meaningfully alter consumer behaviour in favour of healthier choices (Boyland et al., 2022; Glanz & Hoelscher, 2004).
- **Addressing Structural Gaps in Australian Food Policy -** The research reveals how dine-in restaurants, often exempt from FSANZ regulations, can serve as vital touchpoints for influencing health behaviour—particularly as Australians spend 32% of their food budgets dining out (ABS, 2017). It reinforces the need for upstream regulatory reform, as called for by Temple (2023) and Sacks et al. (2009).
- **Responding to Societal Demand for Health-Conscious Dining -** Aligning with consumer trends identified by Dataessential (2024), the study is consistent that restaurant patrons expect healthier menu options and respond positively to wellness-oriented cues, especially when taste and indulgence are preserved in the food narrative.

Hospitality Industry Contributions

- **Cost-Effective, Scalable Marketing Model -** The findings illustrate that traditional marketing tools, green menu folders, descriptive language, nutritional transparency, and POS posters, can be deployed together in a **low-cost, high-impact** model that increases healthier meal uptake without affecting profit margins (Stanton, 2015; Looi et al., 2022).

- **Enhancing Brand Value Through CSR-Driven Strategy -** Echoing Kim and Ham (2016) and Cai et al. (2021), the integrated approach reinforces **corporate social responsibility (CSR)** as a viable brand differentiator. Restaurants can use health-focused marketing not only to boost sales but to build trust and long-term loyalty.
- **Empowering Informed Decision-Making at the Moment of Choice -** By shifting away from economic incentives and focusing on narrative, visual, and informational prompts, this thesis offers a viable alternative to traditional discount strategies that often promote unhealthy consumption (Brimblecombe et al., 2017).

This research validates Hypothesis 5, confirming that a strategically integrated mix of traditional marketing functions significantly shifts consumer behaviour towards healthier food choices in dine-in restaurant settings. It offers a replicable IMC model that advances marketing scholarship, supports public health goals, and delivers actionable solutions for the hospitality industry. The study urges policymakers to formalise these strategies through mandatory marketing standards, positioning restaurants as proactive partners in Australia's fight against obesity.

Table 6.6 Comprehensive table of Key Findings and Recommendations by Intervention Stage

Intervention Condition	% of Healthy Meals	Change from Baseline	Key Findings	Key Recommendations for Decision-Making
No Intervention (Control)	2.94%	—	Baseline shows very low healthy meal selection despite healthy options being available. Customers were not visually or cognitively cued toward those items.	Establishes the necessity for environmental and semiotic cues to overcome behavioural inertia (Fogg, 2009; Wansink & Van Ittersum, 2013). Decision-makers should treat this as a benchmark for evaluating the efficacy of subsequent nudging interventions.
Green Folder – "Light & Healthy" Menu	5.66%	2.72%	Simply changing the menu's **visual framing** increased healthy choices by nearly double. Indicates **semiotic cues** (colour coding, menu separation) act as effective **behavioural triggers** under Fogg's model.	Reinforce semiotic colour cues (green = health, freshness) across menus, posters, and point-of-sale design to strengthen associative learning and automatic triggers (Silayoi & Speece, 2007; Fogg, 2009). Consistency enhances cue recognition and recall in real-time decision contexts. effect.
Green Menu + Pretentious Wording	7.63%	4.69%	Addition of **evocative, aspirational, or descriptive language** enhanced engagement and curiosity, confirming the persuasive impact of **linguistic framing**.	Adopt persuasive and sensory-rich menu descriptions (e.g., "Mediterranean vitality salad," "locally sourced roasted pumpkin") to elevate motivational appeal (Jeong & Jang, 2020; Wansink et al., 2001). Linguistic framing activates affective responses that drive choice intention under FBM's motivation dimension healthier meals.
Green Menu + Nutritional Information	5.92%	2.98%	Nutritional labelling reinforced informational awareness but had only a modest incremental effect compared to linguistic nudges. Shows that **rational information alone is less powerful than emotional/visual cues** in decision-making.	Integrate nutritional information subtly alongside visual and emotional triggers, rather than presenting it in isolation (Drewnowski et al., 2020; Fuster et al., 2021). This ensures informational transparency (kilojules (AU standard) or calories (Widely used in gyms throughout Australia) while maintaining behavioural simplicity—supporting FBM's ability component (reducing friction). cognitive overload.
Advertising TV Posters (3TV)	14.62%	11.68%	Visual environmental prompts through **point-of-sale posters and digital screens** led to a substantial behavioural shift. Indicates the power of **contextual triggers** and **repeated exposure**.	Invest in ambient advertising within dining environments (menu boards, digital screens) as a consistent behavioural prompt (Fogg, 2009; Wansink & Van Ittersum, 2013). Repetition builds familiarity, sustaining awareness and motivation through contextual priming.
Integrated Intervention (Green Menu + Pretentious Wording + Nutritional Info + TV Ads)	18.42%	15.48%	The combined strategy produced a **sixfold increase** from baseline. Demonstrates **synergistic effects** when motivational (language), ability (information), and trigger (visual) components work together.	Implement a comprehensive IMC approach integrating semiotic design, persuasive messaging, and environmental prompts. Aligns with Fogg's Behaviour Model, where behaviour occurs when motivation, ability, and trigger converge (Fogg, 2009). This integrated strategy is recommended for policy and operational scalability.

Table 6.7 Scope of Generalisability of the Study's Findings

Context / Segment	Likely Effectiveness of MAF Strategies	Explanation / Conditions
Full-service restaurants	**High effectiveness**	Customers spend more time reviewing menus and interacting with staff, increasing exposure to menu cues, descriptive language, and personal selling interventions.
Quick Service Restaurants (QSR)	**Moderate effectiveness**	Decision time is shorter and ordering is often habitual, reducing the influence of descriptive language and staff recommendations. Visual cues and simplified menu signals may still be effective.
Low promotion periods	**High effectiveness**	When fewer competing promotions are present, marketing communication cues such as menu semiotics and advertising posters are more visible and influential.
High promotion periods	**Lower effectiveness**	Heavy discounting, specials, or promotional campaigns may overshadow subtle menu interventions and influence choices primarily through price incentives.
Price-sensitive consumer segments	**Moderate effectiveness**	Customers may prioritise price over health attributes. Marketing cues may still influence perception but price remains a dominant decision factor.
Health-conscious consumer segments	**High effectiveness**	These customers are already motivated to select healthier meals; menu cues and descriptive language help simplify and reinforce their decision-making.
First-time restaurant visitors	**Higher effectiveness**	New customers rely more heavily on menu cues and descriptions when forming initial impressions and selecting meals.
Repeat / loyal customers	**Moderate effectiveness**	Returning customers may rely on habitual ordering patterns, reducing sensitivity to menu changes or marketing cues.
Restaurants with stable menus	**High effectiveness**	When menu offerings remain consistent, marketing communication cues become a primary signal guiding choice behaviour.
Restaurants with frequently changing specials	**Lower effectiveness**	Changing promotions and specials may shift customer attention away from menu-based communication cues.

6.3 Qualitative research findings

The qualitative phase of this mixed-methods experimental study provided vital contextual depth to complement and explain the quantitative outcomes. Through in-depth interviews, the study uncovered a range of situational, psychological, cultural, and environmental factors that shape food choice decisions in restaurant settings. These insights significantly enhance the understanding of how and why certain marketing and advertising interventions exert influence, particularly within a real-world, full-service restaurant context.

Participants revealed a complex interplay of motivators guiding their meal selections. These included:

- Religious and dietary restrictions, such as halal or vegetarian preferences.
- Cultural familiarity, with a preference for dishes evoking heritage or comfort.
- Health consciousness, particularly among individuals with pre-existing health conditions or specific dietary goals.
- Emotional and situational triggers, including mood, time constraints, or stress.
- Social influence, where decisions were significantly swayed by dining companions, family dynamics, or peer groups—especially when surrounded by health-conscious individuals.

These findings validate and extend the work of Glanz and Hoelscher (2004) and Cohen et al. (2015) who stressed the importance of environmental and interpersonal factors in shaping food behaviour. They also reinforce insights of Josiam and Foster (2009) who found that health-oriented consumers are more responsive to menu cues when reinforced by social and cultural alignment.

Qualitative data confirmed that visual cues such as colour-coded menus (especially green tones), symbolic elements (e.g., "Light and Healthy" branding), and food imagery played a significant role in drawing attention and shaping expectations. This is consistent with findings from Ozdemir and Caliskan (2015) and Wansink et al. (2005) who highlighted the semiotic power of menu aesthetics in influencing attention and choice. Similarly, participants responded positively to evocative language that conveyed taste, authenticity, and geographical origin, echoing the earlier quantitative support for this strategy. Descriptors such as "Spanish red onion" or "Naples tomato" were noted to evoke emotional and sensory appeal—supporting the argument advanced by Kim, Youn and Rao (2017) and Fernqvist and Ekelund (2014) that positioning via language enhances the perceived quality and value of healthier meals.

Importantly, nutritional transparency, especially clear disclosures of sugar, salt, protein, and saturated fat, was considered helpful but only when presented in intuitive, digestible formats. **Many participants admitted to being unfamiliar with Australia's kilojoule-based system**, often mentally converting it into calories to assess meal suitability. This confirms Drewnowski and Barratt-Fornell's (2004) and Bittman's (2011) observations about the general public's low nutritional literacy. The use of advertising posters and digital screens was also viewed favourably. However, responses highlighted that design, placement, and information density influenced the effectiveness of diverse dietary preferences. Training staff to subtly support healthy choices (e.g., highlighting vegan or low-calorie options) can reinforce marketing interventions without appearing coercive. The use of digital screens, poster advertisements, and thematic colour cues (e.g., green for health) offers a practical, low-cost strategy to promote healthier meals, especially when aligned with culturally relevant messaging and environmental ambience. Offering diverse, culturally inclusive menu options (e.g., halal, gluten-free, vegetarian) can broaden appeal and foster inclusivity, thereby attracting a wider demographic.

6.3.1.3. Qualitative findings - Implications for State and Commonwealth governments, and policy makers

Findings underscore the importance of public health policies that mandate or incentivise the display of nutritional information in both kilojoules and calories, improving consumer comprehension and informed decision-making. Policy makers should consider educational campaigns to increase public literacy around Australian Standards for Healthy Eating and energy intake guidelines, addressing the existing gaps in awareness. The demonstrated success of low-cost, in-premise nudges (e.g., coloured menu folders, point-of-sale posters, descriptive language) presents a valuable framework for scalable policy interventions that balance health

promotion with business interests. Policymakers may also consider partnerships with the hospitality sector to co-develop marketing toolkits and labelling templates that promote healthy eating without imposing undue burden on small businesses.

6.4 Quantitative and Qualitative Research Findings

The experimental mixed-methods design of this thesis enabled a comprehensive examination of how marketing advertising influences healthy food choices in a real-time restaurant setting. The quantitative phase established clear statistical relationships between marketing interventions, such as green menu presentation, evocative menu descriptions, poster displays, and nutritional labelling, and measurable changes in ordering patterns that were firmly supported by statistical analysis. Each successive intervention yielded a statistically significant increase in healthy meal selections, demonstrating a strong correlation between the design and presentation of marketing advertising functions and consumer behaviour and resulting in healthier meals being ordered.

6.4.1 Quantitative Findings (Sales and Behavioural Data)

1. Statistically significant increases in healthy meal orders were observed after the implementation of sequential MAF interventions:
    - *Semiotic cue (green menu folder)* led to a 96% increase in healthy meal selections.
    - *Descriptive menu language* further amplified this to a 266% increase.

- *Nutritional labelling* and *POS posters* produced additional incremental gains in healthy choices.

2. Each intervention contributed to real-time behavioural change at the point of decision, with no negative impact on overall sales or customer volume.
3. A synergistic effect was observed when multiple MAFs were combined, showing stronger outcomes than when interventions were introduced in isolation.
4. Sales remained stable, and profit margins were not compromised throughout the intervention phases, dispelling concerns that healthy menu marketing may harm business performance.

However, while the quantitative findings confirmed what changes occurred (i.e., shifts in sales data and ordering patterns), the qualitative phase explained why and how these changes took place. The study investigated the underlying reasons for this significant change in the number of healthy meals ordered. The interviews uncovered the underlying situational, cultural, psychological, and social factors that moderated consumer responses to each intervention. Factors such as cultural familiarity, health consciousness, dining companions, perceived authenticity of food, and even colour associations (e.g., green as symbolic of health) provided depth and nuance to the quantitative patterns observed. Each of these factors can be directly or indirectly linked to the model used in this thesis, Fogg's Behavioural Model (FBM). Those findings can be connected to either situational motivation (enhanced by the nudging technique used) or the provision of situational triggers that consumers are considering or to which they already have predisposition knowledge.

6.4.2 Qualitative Findings (Interviews and Observations)

1. Consumers noticed and appreciated health-related cues, particularly descriptive naming and POS signage, which enhanced taste expectations and perceived value.
2. Many participants expressed surprise at their own choices, attributing them to "unconscious" prompts, demonstrating the power of environmental triggers.
3. Healthier items were more likely to be chosen when they did not appear restrictive or inferior, but instead matched the indulgent framing of other menu options.
4. Situational factors, such as dining companions, time pressure, and occasion, played a critical role in shaping behaviour, particularly when motivation or ability was low.
5. Patrons lacked confidence in interpreting kilojoule information alone but responded positively when labelling was paired with persuasive or explicit language.

The interdependence of the two phases is evident in three critical ways:

1. ***Complementarity*:** Quantitative data validated the effectiveness of interventions, while qualitative data enriched understanding by revealing the motivation, barriers, and contextual variables behind consumer choice.
2. ***Triangulation*:** Converging evidence from both datasets reinforced key findings—for example, the visual appeal and informational content of green menu folders not only increased healthy sales (quantitative) but were also described by participants as helpful, trustworthy, and easy to interpret (qualitative).

3. ***Expansion*:** The qualitative phase expanded the scope of inquiry by uncovering variables not initially measured in the quantitative phase—such as emotional states, social conformity, financial constraints, or environmental triggers—which influenced the effectiveness of interventions for different customer groups.

6.4.3 Quantitative and Qualitative Findings combined – implications of the findings

6.4.3.1. Academic Contributions

- Theoretical Advancement: This research applies and extends Fogg's Behaviour Model (FBM) in a physical dining context, demonstrating its strength in explaining real-time consumer behaviour when motivation, ability, and trigger converge.
- Empirical Gap Filled: It addresses the lack of longitudinal, real-world studies on the synergistic use of MAFs in hospitality, moving beyond simulation-based or intention-focused designs.
- Methodological Innovation: By combining quantitative sales data with qualitative consumer insights, this study offers a mixed-methods approach that strengthens validity and deepens theoretical interpretation in the Australian hospitality market.
- Cross-Disciplinary Bridge: The work links marketing, public health, and hospitality management, contributing to emerging scholarship in socially responsible marketing.
- A more nuanced interpretation of the findings can be developed by examining the role of semiotic menu design, specifically the use of green visual markers identifying healthier menu options, through the lens of Fogg's Behaviour Model (FBM). FBM

posits that behaviour occurs when motivation, ability, and a trigger converge at the same moment (Fogg, 2009). Within this framework, the semiotic elements introduced in the menu design appear to perform a dual behavioural function, operating both as a signal (trigger) and as an ability enhancer that simplifies the decision-making process.

- First, the green visual markers function as behavioural signals, drawing immediate attention to healthier menu options at the point of choice. In this sense, the semiotic cue operates as a trigger, prompting customers to consider a particular set of menu items that they may otherwise overlook. Restaurant menus often present numerous options simultaneously, creating a complex decision environment in which customers must quickly evaluate alternatives. By visually highlighting healthier items, the semiotic cues act as a prompt that directs attention toward these options at the critical moment of ordering.

- At the same time, the findings suggest that the semiotic design also plays an important role in enhancing ability, a key component of FBM. Rather than merely signalling the presence of healthy options, the visual markers reduce the cognitive effort required to locate and evaluate those options within the menu structure. In traditional menus, identifying healthier meals may require customers to read multiple descriptions, interpret nutritional information, or compare several items. The introduction of a simple visual cue significantly reduces this search cost, enabling customers to recognise healthier alternatives more quickly and with less cognitive effort. In this way, the semiotic intervention improves the usability of the menu interface, making it easier for consumers who may already possess some level of motivation to select healthier meals.

- This dual function highlights an important theoretical insight: semiotic menu design simultaneously activates two mechanisms within Fogg's Behaviour Model. As a signal,

it triggers consideration of healthier options; as an ability enhancer, it simplifies the decision process required to act on that consideration. The empirical results of the study suggest that the effectiveness of the semiotic intervention may derive precisely from this combination. Customers who are moderately motivated to choose healthier foods may fail to act on that motivation if the menu structure requires substantial cognitive effort to identify appropriate options. By reducing this friction while simultaneously prompting attention, the semiotic cues facilitate the alignment of motivation, ability, and trigger, thereby increasing the likelihood that the desired behaviour, ordering a healthier meal, will occur.

- Recognising this dual role contributes to behavioural marketing literature by demonstrating that menu-based communication strategies can influence consumer behaviour not only by signalling choices but also by restructuring the decision environment to make those choices easier to execute. This interpretation extends existing applications of Fogg's Behaviour Model to restaurant contexts and suggests that effective marketing interventions may operate through multiple behavioural pathways simultaneously, rather than through a single mechanism alone.

6.4.3.2. Implications for the Hospitality Industry

- Practical, Low-Cost Tools: Simple changes—like green folders, descriptive language, and clear nutritional messages—can nudge healthier behaviour without harming revenue.

- Menu Design Strategy: Restaurants should reframe healthy meals with indulgent, appetising language, and integrate visual cues (e.g., colours, icons) that signal health in an appealing way.
- Staff Training: Verbal nudging by trained waitstaff can reinforce written cues, especially in full-service restaurants where personal interaction is key.
- Brand Positioning: Aligning menu communication with public health values enhances trust, especially when messaging appears genuine and non-patronising.
- Profitability Maintained: Promoting healthy items need not undermine profitability—this research proves it can support both commercial and social outcomes.

6.4.3.3. Implications for Policymakers and Public Health

- Policy Integration with Industry Practice: Policies that encourage kilojoule labelling and healthy defaults should also support persuasive marketing techniques, not just informational disclosure. It should also, based on qualitative research, use more informative and easy-to-understand terminology such as calories as a form of disclosure of energy intake in the restaurant industry.
- Support for Full-Service Restaurants: Current policy efforts often target fast-food chains; this research demonstrates the importance of extending interventions to full-service venues where nuanced consumer engagement occurs.
- Scalable Nudging Models: The combined use of semiotics, naming, labelling, and POS messaging offers a scalable intervention model that is cost-effective and behaviourally sound, contributing to a lower energy intake which in the long run will contribute to a lower obesity rate in Australia.

- Educational Campaigns Needed: As many consumers still misunderstand kilojoules and health labels, there is a need for broader public education that complements restaurant-based interventions. Based on qualitative research, consumers are more familiar with calories as the unit of energy intake. Australian policymakers should therefore introduce easy-to-understand health labels.
- Incentivising Industry Change: Findings may inform incentive programs or guidelines to encourage hospitality operators to voluntarily adopt health-promoting practices.

In summary, the integration of both quantitative and qualitative approaches yielded a holistic understanding of consumer behaviour in restaurant settings. The quantitative phase offered measurable evidence of behavioural change, while the qualitative phase provided contextual and experiential insight into the cognitive and social mechanisms driving that change. Together, these findings underscore the importance of using a multi-dimensional approach to evaluate the efficacy of marketing strategies aimed at promoting healthier food choices.

6.5 Summary

This chapter directly contributes to the field of social marketing by demonstrating how marketing and advertising functions (MAFs), traditionally used to increase sales, can be ethically redirected to encourage healthier food choices in restaurant settings. This study provides a practical, evidence-based model for promoting health-conscious decisions in out-of-home dining contexts.

The interventions developed, such as menu-based semiotic cues, evocative food descriptions, nutritional information, and point-of-sale advertising, reflect the social marketing emphasis on non-coercive, behaviourally informed strategies. Rather than imposing restrictions, the study employed persuasive communication and environmental design to make the healthier choice easier, more attractive, and more accessible, consistent with social marketing's "nudge" approach.

Significantly, this research advances the integration of Fogg's Behaviour Model (FBM) into the social marketing discipline by showing how motivation, ability, and triggers can be simultaneously activated in a commercial hospitality environment. Each intervention aligned with one or more elements of FBM, providing a structured mechanism to achieve voluntary, health-promoting behaviour change.

Moreover, the findings challenge the assumption that promoting healthy choices necessarily comes at the expense of business viability. By demonstrating that health-focused MAFs did not reduce customer numbers or profit margins, this study supports the argument that commercial and public health objectives can be mutually reinforcing, a central tenet of contemporary social marketing.

In sum, this research positions restaurants not merely as venues of consumption but as active partners in social marketing efforts to address poor nutrition and rising obesity rates. It offers a replicable framework for using integrated marketing communication strategies to support health-related behaviour change, reinforcing the transformative potential of social marketing within the food service industry.

Chapter Seven - Conclusion

7.1 Introduction

This chapter synthesises the key findings and implications of the research, reflecting on the study's theoretical, methodological, and practical contributions. Drawing on evidence from a longitudinal, mixed-methods design, it revisits the research aim and objectives, highlights the major outcomes, discusses their significance for policymakers, marketers, and restaurateurs, and outlines limitations and future research directions. Ultimately, this thesis confirms that ethically applied marketing advertising functions (MAFs) can nudge consumers towards healthier food choices in real-world restaurant settings without undermining commercial sustainability.

7.2 Revisiting Research Purpose, Aim, and Questions

This research set out to explore how marketing and advertising functions (MAFs) can influence healthier consumer choices in restaurants, addressing three guiding questions:

1. Can MAFs instigate behaviour change toward healthier food choices without coercion?
2. What impact do MAFs have on ordering patterns and restaurant sales performance?
3. What psychological and situational factors moderate consumer responses to MAFs?

Through five quantitative interventions and a complementary qualitative phase, this thesis provided robust answers to these questions, offering new theoretical insights and practical strategies for both public health and hospitality contexts.

7.3 Key Findings

The study produced six central findings:

1. **Effectiveness of Interventions:** Semiotic cues (green menu folders), evocative descriptions, nutritional labelling, and point-of-sale posters each produced statistically significant increases in healthy meal selections in the Australian restaurant industry. The combined interventions had the most potent effect, confirming the compounded impact of multi-modal strategies.

2. **Behavioural Change Without Coercion:** Key new finding is that consumers responded positively to subtle, persuasive cues without regulation, pricing changes, or overt pressure, supporting the potential of ethical nudging strategies in hospitality contexts.

3. **Commercial Viability:** Key new finding is that sales and patronage remained stable throughout the interventions (averaging 1,924 patrons per week). Health-promoting MAFs increased the uptake of healthy meals without harming revenue or customer retention.

4. **Validation of Fogg's Behaviour Model (FBM):** Findings confirmed FBM's premise that behavioural change requires the convergence of motivation, ability, and prompts. MAFs operated effectively as triggers, simplifying decision-making and enhancing consumers' perceived ability to choose healthier meals.

5. **Role of Psychological and Contextual Factors:** Qualitative insights revealed that trust, taste expectations, health consciousness, social dynamics, and time pressure shaped consumer responses, explaining *why* and *how* interventions worked.

6. **Value of Mixed-Methods Design:** The integration of quantitative sales data and qualitative interviews provided both statistical confirmation of behavioural change and explanatory depth, enriching the ecological validity of the findings.

Collectively, these findings confirm that MAFs can be powerful tools to promote healthier food choices in restaurants while supporting, rather than undermining, business performance.

Table 7.1. Linking Research Contributions to Empirical Evidence

Type of Contribution	Contribution to Knowledge	Supporting Evidence from the Study	Location of Evidence in Thesis
Theoretical Contribution	Extends the application of **Fogg's Behaviour Model** to restaurant decision environments by demonstrating how marketing communication cues act as behavioural triggers influencing food choice at the point of purchase.	The study demonstrates that menu-based communication strategies influence healthy meal ordering behaviour through mechanisms consistent with motivation, ability, and trigger components of the behavioural model.	Conceptual framework and theoretical discussion (Chapter 3); interpretation of behavioural mechanisms in findings (Chapter 5).
Empirical Contribution	Provides real-world evidence that **marketing advertising functions (MAFs)** embedded in restaurant menus and environments significantly influence customer ordering behaviour.	Quantitative results show measurable changes in healthy meal orders following the implementation of menu semiotics, descriptive language, nutritional information, advertising posters, and personal selling interventions.	Quantitative results from field experiment using POS transaction data (Chapter 4).
Methodological Contribution	Demonstrates the value of using a **sequential field experiment combined with point-of-sale (POS) transaction data** to evaluate consumer behaviour in hospitality settings.	The study employed a field experiment with **five treatment conditions and one control condition**, implemented across weekly clusters of restaurant patrons, analysing real purchasing behaviour rather than self-reported intentions.	Research design and experimental setup (Chapter 3); data analysis and experimental outcomes (Chapter 4).
Practical / Managerial Contribution	Identifies specific marketing communication strategies that restaurant operators can implement to encourage healthier menu choices without restricting consumer freedom.	Findings show that visual cues, descriptive language, promotional prompts, and staff recommendations can increase the visibility and perceived attractiveness of healthy menu options.	Quantitative results (Chapter 4) and qualitative interview insights explaining customer perceptions (Chapter 5).
Policy Contribution	Highlights the potential role of the hospitality sector in supporting public health objectives through menu-based nudging strategies.	Evidence from the study indicates that relatively low-cost communication interventions can influence healthier food choices in real restaurant environments.	Discussion of implications for policymakers and public health frameworks (Chapter 6).
Behavioural Insight Contribution	Provides qualitative insight into how customers interpret and respond to menu-based marketing communication cues.	Semi-structured interviews with **13 restaurant patrons** revealed how visual cues, menu descriptions, and promotional prompts influenced customers' perceptions and decision-making processes.	Qualitative findings and thematic analysis (Chapter 5).

7.4 Implications and Significance

7.4.1 For Policymakers

Policymakers should consider a more systematic integration of behavioural insights into nutrition policy aimed at improving food choices in hospitality environments. One promising approach involves the implementation of **interpretive menu labelling systems**, such as traffic-

light indicators or star-rating schemes, which translate complex nutritional information into clear and easily interpretable signals for consumers. Such systems can simplify decision-making at the point of purchase and enhance consumers' ability to identify healthier options quickly. In addition, **standardising health-related messaging across restaurant venues** could strengthen consumer trust and reduce confusion created by inconsistent or fragmented nutritional information. Consistent messaging would allow customers to develop familiarity with health indicators and facilitate more informed comparisons across food outlets. Policymakers may also benefit from fostering **public–private partnerships** that encourage collaboration between government agencies, health organisations, and hospitality operators to align restaurant practices with national dietary guidelines. Through coordinated efforts, the hospitality sector can play a more active role in promoting healthier eating environments. Given the growing reliance on out-of-home dining, policymakers must recognise the **untapped potential of the hospitality industry in obesity prevention**, ensuring that menu-based nudging strategies are incorporated within broader public health and nutrition policy frameworks.

7.4.2 For Marketers and Academics

From a marketing perspective, restaurant operators can strategically employ communication tools that subtly guide consumers toward healthier menu choices while preserving freedom of choice. One effective approach involves the use of **point-of-sale triggers**, such as in-store posters and digital prompts, which act as timely cues that capture customers' attention at the moment of decision-making and highlight healthier alternatives on the menu. In addition, marketers can enhance the appeal of healthy dishes by **reframing them through evocative and sensory-rich descriptions**, emphasising attributes such as freshness, flavour, and quality rather than focusing solely on health benefits. This approach can help counteract common

consumer perceptions that healthier meals are less indulgent or satisfying. Importantly, marketing strategies should also be **tailored to varying levels of consumer health consciousness**, recognising that diners differ in their motivations, nutritional awareness, and responsiveness to health-related messaging. By adapting communication strategies to these differing consumer profiles, marketers can improve the effectiveness of menu-based interventions. At the same time, further academic research is needed to examine how such communication strategies can be **refined and scaled across diverse food service environments**, including quick-service restaurants, casual dining establishments, and full-service venues.

7.4.3 For Restaurant Owners

For restaurant owners, menu design and frontline communication represent powerful yet underutilised tools for influencing customer decision-making in ways that support healthier consumption patterns. One practical strategy involves **redesigning menus to visually differentiate healthier options**, using layout, icons, colour cues, or dedicated menu sections that increase the salience of these items and simplify customer navigation at the point of choice. In addition to visual cues embedded within the menu, restaurants can strengthen these signals by **training service staff in verbal nudging techniques**, enabling waitstaff to subtly recommend healthier dishes or highlight appealing attributes such as freshness, flavour, or chef recommendations. This combination of menu-based and interpersonal communication can reinforce healthy choices without restricting consumer autonomy. Furthermore, restaurant operators can benefit from **developing socially responsible brand identities** that align their business practices with broader public health narratives and dietary guidelines. By positioning healthier menu offerings as part of a commitment to customer well-being and responsible hospitality, restaurants can strengthen brand reputation and differentiate themselves in increasingly health-conscious markets. Collectively, these strategies not only contribute to

improved consumer dietary choices but can also **enhance customer loyalty, trust, and long-term brand equity**, while simultaneously supporting wider societal efforts to address diet-related health challenges.

7.5 What Is New and Holistic in This Framework/Study

This study introduces a novel, theory-driven conceptual framework that is both holistic and pragmatically grounded. Unlike previous models, which either emphasised consumer psychology without fully incorporating marketing practice or evaluated marketing functions without theoretical depth, this framework integrates:

- Fogg's Behaviour Model (FBM) as the *sole theoretical foundation*, offering a behavioural lens that prioritises real-time action over intention. FBM is particularly well-suited to restaurant environments where decisions are often fast, socially influenced, and shaped by environmental triggers.
- A multi-layered structure that combines *triggers* (MAFs such as semiotics, evocative language, labelling, POS posters), *motivation* (special occasion, health orientation, prior knowledge), and *ability/simplicity factors* (time to order, ease of access, cost), all of which align with FBM's core conditions: motivation, ability, and prompt.
- A focus on the synergistic effect of integrated interventions, rather than assessing single cues in isolation. This reflects how consumers experience marketing stimuli in naturalistic restaurant settings and aligns with Integrated Marketing Communication (IMC) principles.

- The explicit inclusion of mediators (e.g., perceived taste, usefulness, trust) and moderators (e.g., situational triggers, health consciousness), offering a more nuanced understanding of how and why MAFs succeed or fail in shifting behaviour.
- Application within a full-service restaurant setting which has been underrepresented in both public health and hospitality marketing research, despite its rising relevance to modern consumer dining behaviours.

7.6 Contributions of the Study

7.6.1 Theoretical Contributions

This study makes several significant theoretical contributions to marketing and hospitality scholarship by demonstrating how integrated marketing communication (IMC) tools function as real-time behavioural mechanisms in Australian restaurant environments.

First, the research extends Fogg's Behaviour Model (FBM) beyond its traditional applications in digital and persuasive technology contexts by empirically validating its relevance to in-situ food-choice decisions in full-service restaurants. The findings confirm that the core FBM constructs, motivation, ability, and triggers, can be operationalised through practical hospitality marketing instruments such as menu design, semiotic cues, evocative menu language, nutritional labelling, and point-of-sale advertising. This extension advances behavioural marketing theory by showing how immediate consumer choices can be shaped through low-cost, non-intrusive IMC interventions at the point of decision.

Second, the study provides strong field evidence with a novel conceptual framework that integrates consumer psychology with environmental and communicative marketing cues in real-world dining contexts. Unlike traditional models that privilege attitudes or intentions, this

framework captures the interplay among situational triggers, cognitive effort, and environmental design, offering a more accurate explanation of how consumers navigate food choices under time pressure and cognitive load. This theoretical integration enhances the explanatory power of IMC research by aligning psychological mechanisms with the realities of hospitality settings, thereby improving the generalisability of behavioural theory to operational restaurant environments in Australia.

Third, the research reframes marketing advertising functions (MAFs) within the hospitality industry by reconceptualising them as dual-purpose instruments that simultaneously drive commercial outcomes and support public health objectives. Rather than positioning menus and in-store promotions solely as sales-enhancing tools, this study is consistent that their capacity to function as behavioural nudges that encourage healthier consumption without compromising consumer autonomy or business performance. This reconceptualisation challenges dominant assumptions in hospitality marketing theory. It provides a foundation for integrating public health considerations into mainstream IMC strategy, particularly within the Australian food service sector, where voluntary, design-based interventions are increasingly favoured over regulatory mandates.

Collectively, these contributions advance marketing theory by bridging the gap between behavioural science and applied IMC practice, positioning hospitality marketing as a scalable and ethically grounded mechanism for influencing consumer behaviour in real-world settings.

7.6.2 Methodological Contributions

- **Sequential Mixed-Methods:** The study provides strong field evidence of how triangulation can capture both measurable outcomes and underlying consumer motivation, as elaborated in Chapter 3.
- **Ecological Validity:** Unlike simulation studies, interventions were tested in a live restaurant context over four months, enhancing real-world relevance. This was clearly stated in Chapter 2, as a lack of similar studies done in Australia.
- **Operationalisation of Behavioural Constructs:** Constructs such as ability and triggers were translated into measurable, restaurant-specific variables (e.g., labelling, menu cues), as elaborated in Chapter 2.

7.6.3 Practical Contributions

- **Blueprint for Restaurants:** Provides evidence-based, revenue-neutral strategies for nudging healthier behaviour.
- **Policy Guidance:** Offers empirical support for menu labelling and POS health promotion regulations in the Australian context.
- **Tools for Health Promotion:** is consistent that the effectiveness of low-cost, scalable nudges to shift consumer behaviour in situ.

7.7 Methodological Limitations

Despite its strengths, this study has several methodological limitations.

- **Who places the order:** This research also did not take into consideration whether women or men ordered those healthy meals. Kiefer (2005) and Wardle (2004) suggested that there are differences in eating habits and dieting behaviours between men and women.

1. **The sample size** was not specified in this research, since it included all patrons who visited the establishment during specific months. However, that was addressed by using proportion figures for each of those months to determine the proportion of customers influenced by advertising interventions.
2. **Attitude change:** It will not investigate the attitude changes of patrons before and after the intervention.
3. **Contextual Scope:** Conducted in a single family-oriented à la carte restaurant, findings may not be fully transferable to fast-food outlets, fine dining, or institutional settings.
4. **Seasonal Effects:** The study was undertaken during summer and early autumn, when lighter meal choices are more common, limiting insight into seasonal variation.
5. **Demographic Variables:** Behavioural differences by gender, age, or health orientation were not examined, despite evidence that these factors influence dietary behaviour.

- **Overlapping Interventions:** Some interventions were introduced sequentially (e.g., menu labelling with evocative descriptions), making it difficult to isolate their independent effects.
- **Sample Characteristics:** Although the sample size was large (~7,000–8,000 patrons), the qualitative phase was less dominant and not demographically stratified.
- A further limitation of this study relates to the possibility of **time-related shocks** influencing customer ordering behaviour during the intervention periods. Because the research was conducted as a field experiment in a real restaurant environment, external

factors that vary over time could not be fully controlled. For example, fluctuations in weather conditions, seasonal dining patterns, public holidays, local events, or broader economic factors may influence customers' dining preferences and menu selections independently of the implemented interventions. Such temporal variations could potentially introduce bias into the observed ordering patterns, particularly when interventions are implemented sequentially over several weeks. While the study attempted to minimise these effects by maintaining consistent restaurant operations and menu offerings throughout the experimental period, it is not possible to entirely rule out the influence of time-specific contextual factors. Consequently, some of the observed changes in ordering behaviour may partially reflect external temporal influences rather than solely the effect of the marketing advertising functions (MAFs) tested in this research. Future studies could address this limitation by implementing parallel treatment conditions across multiple restaurants or time periods, thereby allowing greater control over potential temporal shocks.

- A further limitation of this study concerns **the durability of the observed behavioural effects**. The interventions implemented in this research capture short-run changes in customer ordering behaviour within the specific periods during which the Marketing Advertising Functions (MAFs) were applied. Although the results demonstrate statistically significant shifts in the selection of healthier menu items during the intervention weeks, the study design does not allow conclusions to be drawn regarding whether these effects persist over time. The research was not conducted as a longitudinal study, and therefore, it cannot determine whether the observed behavioural responses represent temporary reactions to the interventions or whether they reflect more durable changes in customers' decision-making patterns. Establishing the longevity of such effects would require longer-term panel data or follow-up

observations after the interventions have ceased, for example by examining ordering patterns three to six months after the interventions were removed to assess whether healthier ordering behaviour remains elevated. Consequently, while the study provides evidence that marketing communication strategies can influence immediate ordering decisions in restaurant environments, the long-term sustainability of these behavioural changes remains unknown, representing an important avenue for future research.

- A limitation of this research is that the psychological mechanisms proposed by Fogg's Behaviour Model were not measured using quantitative mediator variables. Although behavioural outcomes were objectively recorded using sales data, explanations for why behaviour changed are inferred from qualitative interviews rather than from statistically tested mediation pathways.

These limitations highlight areas where future studies can refine methodological design and deepen understanding of how nudging strategies function across diverse contexts.

7.8 Recommendations for Future Research

Future work should:

1. Test interventions across varied food service settings (e.g., fast food, fine dining, institutional catering)

This study was conducted within a single full-service restaurant which, while enhancing ecological validity, limits the generalisability of the findings to other food service formats. Consumer decision-making processes, time pressure, price sensitivity, and menu complexity vary substantially across fast-food outlets, fine-dining restaurants, and institutional catering

environments such as hospitals and universities. Future research should replicate these interventions across diverse settings to assess whether the observed IMC effects are context-dependent or transferable across the broader Food Service Sector. This would address the limitation of single-context analysis and strengthen external validity.

2. Compare summer and winter dining patterns to assess seasonal influences

The longitudinal data in this study were collected within a defined time window which may not fully capture seasonal variations in consumer preferences, such as shifts towards lighter meals in warmer months or comfort foods in winter. Seasonal factors can influence motivation, perceived health relevance, and menu appeal, potentially moderating the effectiveness of marketing interventions. Future studies that compare intervention outcomes across seasons would help isolate whether behavioural responses are stable over time or contingent on climatic and temporal conditions, addressing the limitation of temporal scope.

3. Explore demographic differences (e.g., gender or age responsiveness)

While this study analysed aggregate ordering behaviour, it did not disaggregate effects by demographic characteristics such as age or gender due to data constraints inherent in point-of-sale systems. Prior research suggests that responsiveness to health cues, nutritional information, and visual design may vary across demographic groups. Future research incorporating demographic segmentation, through surveys, loyalty data, or observational methods, would enable more nuanced behavioural analysis and address the limitation of the absence of individual-level consumer profiling.

4. Isolate the independent effects of language, colour, typography, or semiotics

The study intentionally layered multiple IMC elements to reflect real-world marketing practice; however, this design limits the ability to attribute behavioural change to any single design component. While the cumulative effects were strong, the independent contribution of specific elements—such as colour cues, typography, or evocative language—remains theoretically underexplored. Future experimental designs that isolate and manipulate individual IMC variables would address this limitation and provide finer-grained theoretical insight into which design features exert the most substantial behavioural influence.

5. **Involve staff and management in co-creating strategies that balance revenue with health promotion**

This research focused on environmental and non-verbal marketing interventions, deliberately excluding staff interaction to isolate the effects of passive IMC tools. While this strengthens internal validity, it limits understanding of how organisational actors, such as frontline staff and managers, might amplify or moderate these effects. Future research adopting participatory or co-creation approaches could examine how staff engagement, training, and managerial buy-in interact with IMC strategies to balance commercial objectives with public health outcomes, addressing the limitations related to organisational and human factors.

7.9 Final Conclusion

This thesis confirms that marketing and advertising functions, when ethically designed and strategically applied, can be practical levers for promoting healthier eating in restaurants. Far from being mutually exclusive, public health goals and commercial interests can be aligned through evidence-based interventions that subtly shape real-time decisions.

More importantly, findings from this research make a significant theoretical contribution to the marketing literature by advancing understanding of how marketing communication operates as a behavioural mechanism at the point of choice, rather than merely as a driver of attitudes or intentions. Addressing a persistent gap in academic literature and hospitality insights, which has largely inferred behaviour from self-reports, laboratory experiments, or information disclosure effects, the findings demonstrate that integrated marketing communication functions can trigger immediate, systematic shifts in consumer choice in high-friction, time-pressured environments. Using longitudinal, field-based transaction data, this study shows that semiotic cues, evocative language, and point-of-sale prompts function as low-effort triggers that activate behaviour when motivation and ability are already present, consistent with Fogg's Behaviour Model. Crucially, the results challenge dominant assumptions in marketing theory that effective persuasion requires deliberative processing or extensive information provision. Instead, the evidence reveals that simplified, contextually embedded cues outperform cognitively demanding interventions by aligning with how consumers actually decide in situ. By empirically demonstrating that marketing interventions can reliably shape behaviour without changing stated preferences or attitudes, this research extends marketing theory beyond persuasion-centric models toward a behaviour-first framework of influence. In doing so, it reframes menu design and in-store communications as generalisable marketing instruments capable of producing immediate, scalable behavioural outcomes, thereby contributing to core debates in marketing about how, when, and why communications translate into action.

By extending behavioural theory, advancing methodological practice, and delivering practical tools for industry and policy, this research is consistent that marketing can be repurposed as a driver of societal wellbeing. In reframing MAFs as instruments of both profitability and public good, the study provides a roadmap for transforming the hospitality sector into an active partner in addressing obesity and promoting healthier communities.

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Ethics approval for the Quantitative Research Methods

Application ID: HRE22-170

Ethics approval for the Quantitative phase was submitted and approved by Research Ethics at VU on 15.12.2022.

Dear ASPR BRADLEY WILSON,

Your ethics application has been formally reviewed and finalised.

» Application ID: HRE22-170

» Chief Investigator: ASPR BRADLEY WILSON

» Other Investigators: ASPR DAVID BEDNALL, MR Boris Kolar

» Application Title: Understanding how consumers respond to the promotion of healthy choice options in a restaurant setting.

» Form Version: 13-07

The application has been accepted and deemed to meet the requirements of the National Health and Medical Research Council (NHMRC) 'National Statement on Ethical Conduct in Human Research (2007) Updated 2018' by the Victoria University Human Research Ethics Committee. Approval has been granted for two (2) years from the approval date, 15/12/2022.

Ethics approval for Qualitative Research Methods

Ethics approval for the qualitative phase was submitted and approved by Research Ethics at VU on 15.12.2022.

Dear ASPR BRADLEY WILSON,

Your ethics application has been formally reviewed and finalised.

» Application ID: HRE22-170

» Chief Investigator: ASPR BRADLEY WILSON

» Other Investigators: ASPR DAVID BEDNALL, MR Boris Kolar

» Application Title: Understanding how consumers respond to the promotion of healthy choice options in a restaurant setting.

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