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# How does addiction of fast-food turn into anti-consumption of fast-food? The mediating role of health concerns

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## Abstract

This research investigates the complex relationships between fast-food addiction (FFA) and fast food-anti-consumption (FFAC). Specifically, we propose an intervening process through which FFA turns into FFAC. Using a randomised sample of 437 respondents from Sichuan Province, China, this study tests how concern about obesity and chronic disease arising from FFA can lead to FFAC. Consistent with published research, we find that consumers' situations (availability of fast-foods, attitudes towards food) coupled with food-based advertising practices are positively associated with FFA. Health concerns and food waste (FW) enhance negative feelings and motivate consumers to find ways to overcome FFA. As a result, consumers exhibit FFAC to overcome health concerns and undesirable mental states positively correlated with FFA. Our research offers new insights into the processes that drive FFAC and provides a robust guide for policymakers, applied psychologists, consumers, and food marketers who can use health-related marketing appeals to limit the binge eating of unhealthy foods.

## 1 | INTRODUCTION

Consumption of fast-food has increased due to its convenience and availability, thus increasing obesity and health concerns (Goyal & Singh, 2007). Studies have found that consuming calorie-rich fatty foods leads to fast-food addiction (FFA) (Farah & Shahzad, 2020; Khalid et al., 2019). Overconsumption and FFA threaten consumer well-being in terms of health and cost (Pentina & Amos, 2011). Thus, marketing literature needs to increase its concern for consumer welfare (Tosun & Yanar Gürce, 2018). To promote consumer well-being, marketing research into food consumption has emphasised the topic of fast-food anti-consumption (FFAC) (Ashraf et al., 2019; Oral & Thurner, 2019; Sudbury-Riley & Kohlbacher, 2018; Tosun & Yanar Gürce, 2018). For marketing researchers "what and when to consume is important but sometimes what not to consume is more important" (Autio & Heinonen, 2004, p. 147). Hence, we ask, "What factors can affect FFAC?" and "Can FFAC achieve consumer well-being?"

Consumers adopt FFAC due to health motives that help increase self-control and manage consumption (Ashraf et al., 2019; Oral & Thurner, 2019; Shahzad et al., 2019). Although prior research has reported factors associated with FFA or FFAC, most studies focus on only one phenomenon (Khan et al., 2019; Lee et al., 2009). Consequently, there is a lack of research explaining the complete picture of how individuals become addicted and the underlying mechanisms that lead to FFAC (Shaban & El-Bassiouny, 2017).

We aim to provide a complete view of the factors associated with FFA and FFAC. We also provide an intervening process through which FFA turns into FFAC. Several consumer behavioural studies explain what causes FFA (Goyal & Singh, 2007; Nawaz et al., 2017), for example, quantitative findings of previous studies suggest that cravings for and impulsiveness towards fast-food have a significant relation with

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FFA (Khalid et al., 2019). A recent study found FFA is the result of personal, social, and advertising factors (Aydin et al., 2018). Personal factors that may influence FFA include the availability of fast-food and consumer attitudes towards the consumption of fast-food (Qin et al., 2010) including the influence of social factors (family, friends and reference groups) (Islam & Ullah, 2010). At the same time, companies promote FFA lifestyles (Shahzad et al., 2015) through advertising practices, including informative and persuasive advertising appeals (Theocharous, 2015). FFA can be associated with health problems, including obesity, heart disease and digestive problems (Burmeister et al., 2013). Because FFA is a complex mental health issue that can harm well-being, there is an immense need to effectively treat it (Khalid et al., 2019). However, shifting consumption to functional foods may not work because the taste and convenience of fast-foods are so appealing (Ghoochani et al., 2018; Qin et al., 2010).

A change in consumption lifestyles could help increase consumer well-being (Aydin et al., 2018). Increased health concerns associated with fast-food consumption have led to restrained-consumption behaviours (Farah & Shahzad, 2020). Health concerns are conceptualised as a rational, cognitively derived antecedent of the decision to consume food (Champion & Skinner, 2008; Jin et al., 2017). Past studies mainly focused on the emotion-laden relationship between eating fast-food and addictive behaviour. While some studies try to explain the processes that lead to fast-food resistance among consumers (Arslan et al., 2018). Our research is the first to discuss the mediating role of health concerns between FFA and FFAC. Sudbury-Riley and Kohlbacher (2018) found that fast-food addicts use health concerns as a coping mechanism and therefore adopt FFAC. Yet studies into the relationship between FFA and FFAC in the presence of health concerns (Shahzad et al., 2019) and the impact of individual, socio-cultural, and marketing factors on FFA behaviour are scarce, especially in China (Yarimoglu et al., 2019). Another factor that potentially affects FFAC is food waste (FW) (Mo et al., 2018). It is reasonable to believe that the FW phenomenon may also influence FFAC and yield results that contribute to the well-being of society (Bonadonna et al., 2019).

There is a lack of research regarding the effects of FW and FFAC (McCarthy & Liu, 2017). FFAC is a reality in developing countries where food is limited for many, while large quantities of food are wasted globally (Secondi et al., 2015). Accordingly, the behavioural mechanisms linked with FW and restrained/anti-consumption require further investigation.

## 1.1 | Restraint theory and the theory of planned behaviour

In this study, Restraint Theory (RT) (Figure 1) is employed as a theoretical underpinning as it considers the psycho-social aspects of human behaviour. The RT model asserts that "a reliance on cognitive control over eating, rather than physiological cues, leaves dieters vulnerable to uncontrolled eating when these cognitive processes are disrupted" (Polivy & Herman, 1985, p. 198). Earlier studies selected the Theory of Planned Behaviour (TPB) model to explain purchase behaviour within a range of inorganic food contexts (Farah & Shahzad, 2020; Khalid et al., 2019; Shahzad et al., 2019). The fundamental proposition of this current study is that one's beliefs about health concerns regarding fast-food may influence one's consumption behaviour.

## 1.2 | Theoretical model

Figure 1 is based on RT proposed by Herman and Mack (1975) and Ogden (1994). RT was developed to understand and restrict consumers' food intake for weight control. It evaluates both causes and consequences which helps to restrict excessive consumption for obesity

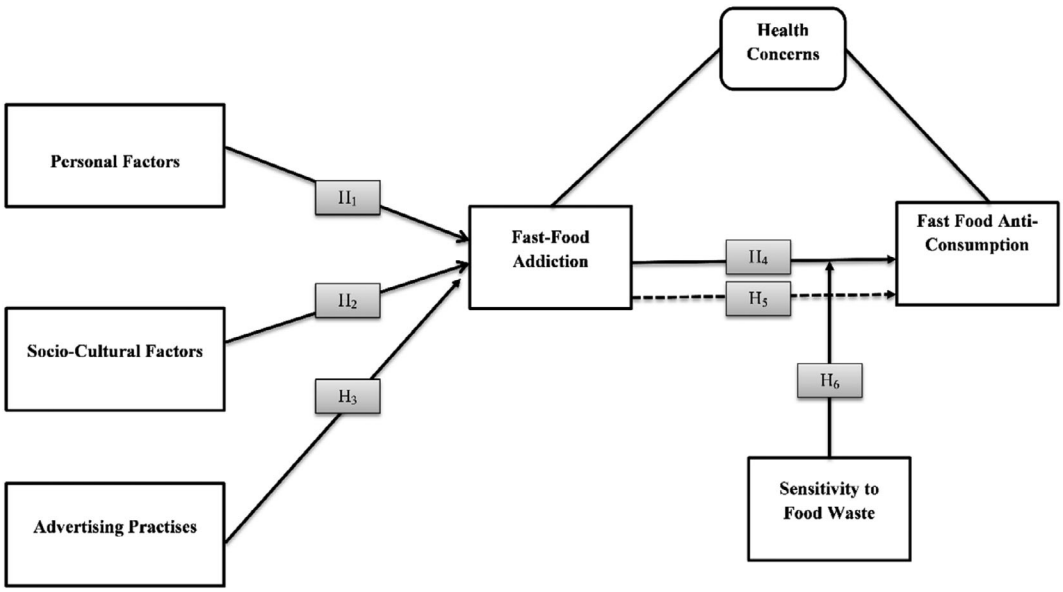


FIGURE 1 Conceptual model of fast-food anti-consumption behaviour

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prevention. They found that attempting not to eat sometimes increases overeating among dieters. Our model is built upon the idea that "controlled eating is a conscious practice enforced by individuals' personal preferences as well as their environment" (Farah & Shahzad, 2020, p. 380). In our research, we propose that health concerns, as a result of FFA, are a driver of FFAC.

## 1.3 | Fast-food anti-consumption

FFAC is difficult to observe and measure because they are normally a non-event. Yet the idea that reasons for and against food consumption are not automatically opposites is an important motivator for anti-consumption research including this current study. For instance, a person avoiding purchasing meat products because they are in favour of animal welfare does not mean those who consume meat are not in favour of animal welfare (Chatzidakis & Lee, 2013). In the case of dairy product anti-consumption, the consumer thinks about animal welfare, casein allergies, environmental, cultural or religious norms, and self-concepts like the healthiness of dairy products or fat levels (Hartmann et al., 2016).

Some authors argue that human desire involves conscious cognition that has a strong affective component and may also be involved in the determination of appetite. Intrusive thoughts about appetite targets are triggered automatically by external or physiological cues. When intrusions elicit significant pleasure or relief, cognitive elaboration usually ensues. For instance, if a consumer binge eats a large amount of fast-food, such cues may trigger obesity and health concerns which may then lead to unpleasant feelings (Kavanagh et al., 2005). We posit that these unpleasant feelings might motivate FFAC.

The mechanism of FFA concerning FFAC has never been studied when consumer health concerns are present. Therefore, this study seeks to uncover the factors that influence FFA behaviours that later drive FFAC.

FFAC constructs have previously evolved from economics literature, in contrast, our study uses the anti-meat consumption scale (Tosun & Yanar Gürce, 2018). Furthermore, little research has evidence that explains FFAC and its impact on human welfare (Bogueva et al., 2017; O'Connor et al., 2005). Moreover, no study has looked at the behavioural antecedents of FFAC (Arslan et al., 2018). RT is used to explain how various factors like FFA, consumer social responsibility, and FW drive FFAC and its ultimate effect on human welfare. Specifically, RT was developed to assess causes and consequences associated with food consumption and to restrict them. Studies have found that when consumers set boundaries to their eating habits it sometimes results in overeating (Ogden, 1994). According to Khalid et al. (2019), while there is plenty of knowledge about consumer food-related avoidance behaviour, marketing literature needs to update FFAC-related research. Another question is how FFA can restrict binge eating to achieve consumer welfare (Burmeister et al., 2013). Essentially, our study draws upon restraint literature for the purpose of obesity management.

In priori literature, FFAC has been discussed in four broad categories, FFAC due to (1) brand preference (Lee et al., 2009), (2) economic concerns (Kleijnen et al., 2009), (3) health concerns (Tosun & Yanar Gürce, 2018; Wang et al., 2019), and (4) sustainability concerns (Shahzad et al., 2019) and/or religious connotations (Muhamad et al., 2019). Each factor plays a vital role in FFAC. For instance, Majabadi et al. (2016) found that many study participants reported health concerns as a major factor discouraging fast-food consumption. So, FFAC motives discourage consumption for health and sustainability reasons (Lim, 2017; Nawaz et al., 2017). Furthermore, researchers suggest that anti-consumption is relevant to FFA due to (1) impulse buying (Upadhye et al., 2021), (2) compulsive buying (Pradhan et al., 2018), and (3) food addiction, which is an uncontrolled and obsessive syndrome where consumer's experience strong pleasure-seeking impulses and cravings (Adriaanse et al., 2010).

## 1.4 | Antecedents of fast-food addiction

Fast-food is prominent in today's diet as it is strongly associated with consumers' taste and lifestyle (Akbay et al., 2007). Ehsan (2012) showed that consumers perceive fast-food as an important food category due to its variety and convenience. Studies have found a large shift towards fast-food consumption among young consumers, especially in developing countries (Khalid et al., 2019). Fast-food consumption has shown a huge increase because of price and promotional deals (Ghoochani et al., 2018; Nawaz et al., 2017). Thus, health risks associated with fast-food are increasing, especially among the young (Yarimoglu et al., 2019). Fast-food consumption is linked to a higher risk of obesity which can lead to cardiovascular diseases, type 2 diabetes, digestive issues, and depression (Dennis et al., 2006). Past studies have shown an increase in fast-food consumption when the relationship between fast-food consumption and health concerns is diminished (Aydin et al., 2018).

Apart from the health concerns, there are certain environmental sustainability concerns connected with fast-food consumption. For instance, consumers are worried about animal welfare (Tosun & Yanar Gürce, 2018) and meat production which has a substantial effect on the environment (Bogueva et al., 2017; Henchion et al., 2014). Health-conscious consumers care about the production and distribution of food products, notably that health risks may lead to FFAC (Shahzad et al., 2019; Sudbury-Riley & Kohlbacher, 2018). FFAC studies revealed that consumer food-related lifestyles (Meleo-Erwin, 2012), health concerns (Arslan et al., 2018; Lee & Ahn, 2016; Sudbury-Riley & Kohlbacher, 2018), sustainability concerns (Tosun & Yanar Gürce, 2018), and/or animal welfare are the main drivers of restrained consumption behaviour (Tosun & Yanar Gürce, 2018). A study conducted on several food categories in Turkey found that unfamiliar objects in food products, deceptive campaigns, and spoiled products led to FFAC (Arslan et al., 2018).

Tice et al. (2007) examined acts of self-regulation. For instance, health concerns associated with binge food consumption tend to limit a consumer's probability to consume food excessively, as they are more likely to closely monitor their health and well-being. Thus, health concerns generate anti-consumption tendencies. Hence, consumers'

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self-regulatory characteristics (moods and emotions) are imperative determinants of consumption practices. However, consumer impulse buying is also an important topic in the current research. Consuming fast-food in an impulsive manner can create internal conflict, where the pleasure driven by consumption may also result in undesired feelings. These undesired feelings can also generate health awareness, resulting in reduced consumption (Baumeister et al., 2007; Iyer et al., 2020).

Fast-food consumption also depends on situational factors such as social influence, emotional values (craving and impulsiveness), and conditional values (brand name and Servicescape) (Khalid et al., 2019). Khalid et al. (2019) developed a model predicting fast-food consumption behaviour among Pakistani and US consumers and found a significant relationship between craving and impulsiveness and FFA and consumption. Based on the literature, we assume that consumers' social, marketing, and conditional values create FFA (Khalid et al., 2019) while health concerns can restrict consumption of fast-foods. Thus, the study model is suitable for the assessment of food-related consumption behaviours (Burmeister et al., 2013; Farah & Shahzad, 2020).

Food-related lifestyles and FFA have remained prominent subjects in food and marketing literature (Weinberg, 2011). Particularly in the modern world, where the consumption of obesogenic and sugary foods has increased sharply (McKiernan et al., 2008). Consumption of junk and fatty foods result in addictive behaviour (Gearhardt et al., 2013). Studies have found that addictive behaviour is connected with behavioural aspects (e.g., impulsivity and cravings) (Khalid et al., 2019).

Studies have found a significant relationship between food craving and FFA, food craving is where an individual has a desire to eat fast-food in the absence of basic starvation (Rogers & Smit, 2000). Craved foods including fast-food, sweetened drinks, and chocolate contain high fats (Rogers & Smit, 2000; Shahzad et al., 2019). Cravings stimulate the increased consumption of such foods (Field et al., 2016). Another factor that is strongly associated with addictive behaviour is food-related impulsiveness which is considered a personality trait (Gearhardt et al., 2013). Studies have observed consumer impulsiveness as a strong predictor of addictive behaviour linked with eating disorders (Meleo-Erwin, 2012). A cross-culture study on United States and Pakistani consumers found a significant relation between food craving and impulsiveness and FFA (Khalid et al., 2019).

According to Shahzad et al. (2015), social group influence together with emotional and behavioural responses trigger addictive behaviour through consumer generational behaviour. Food consumption behaviour has a significant impact on friends and family (Monaco & Bonetto, 2018). Studies indicate that the relationship between fast-food consumption and the impact of social influence increases as socialisation increases (Ghoochani et al., 2018), and recommendations of family and friends affect food-related decision-making (Khattak, 2016; Soerjoatmodjo & Kaihatu, 2016).

The psychology of food choice revealed that increased consumer-centred advertising can trigger increased consumption (Kaur & Hundal, 2017). Studies have highlighted that food and fast-food consumption patterns among young consumers are linked to their personal preferences triggered by advertising schemes such as food deals. Various surveys have reported the effect of advertising appeals and their influence on food consumption, for example, a study on food advertising as a mirror of food consumption found nostalgia and emotional appeals are strong predictors of food consumption (Theocharous, 2015). Moreover, studies have identified that factors such as food presentation, colour, and smell have a great impact on excess consumption (Mattila & Wirtz, 2001).

Thus, the researchers propose:

**H1.** A positive relationship exists between personal factors and FFA.

**H2.** A positive relationship exists between socio-cultural factors and FFA.

**H3.** Advertising practices and FFA are positively associated.

## 1.5 | Mediating role of health concerns

Kaynak and Ekşi (2014) stated that today's lifestyle increases binge eating and reliance on fast-food. However, health-conscious consumers will reduce their unhealthy food consumption despite their desire for these foods (Tosun & Yanar Gürce, 2018). Previous studies indicate that immoderate consumption of fast-food results in negative emotions, for example, anxiety and guilt. Eventually, these negative emotions unsettle consumers' habitual attitudes and generate feelings of dissatisfaction and disconnection with the fast-food (Strandvik & Heinonen, 2013). This response results from a state of anxiety that these eating habits will lead to serious health problems. These FFAC tendencies are behavioural and cognitive efforts to deal with the negative outcomes of binge eating or drinking. Consequently, some consumers move towards FFAC (Farah & Shahzad, 2020). Kang et al. (2015) establish that consumers show more health concerned behaviour during food intake. Health concern is conceptualised by Jin et al. (2017) as "a rational, cognitively derived antecedent of the decision to consume nutritious food" (p. 2105).

The negative outcomes of binge eating, and drinking motivate consumers to change behaviours for the sake of their well-being. In this journey, the consumer develops a connection with the counter-behaviour of anti-consumption (Cova & D'Antone, 2016) and considers this behaviour an option for coping with negative health concerns (Fitzgerald et al., 2013). Based on the TPB, behavioural intentions play a mediating role between actual behaviour and its antecedents. Our study is the first to look at how health concerns play a mediating role between FFA and FFAC, this relationship is in the developing stage (Hoque et al., 2018). Detachment from FFA creates a sense of control and power in the consumer (Suarez, 2014), which subsequently creates anti-consumption tendencies and behaviours (Jayasimha et al., 2017).

The beginning of the modern, fast-paced life provokes binge eating of fast-food products, which drive addiction to these convenient

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foods (Burmeister et al., 2013). Conversely, consumers who are health conscious utilise self-control to manage a conflict between psychological forces, desire and willpower. Baumeister et al. (2007) classified self-control into two categories "those that directly reduce desire, and those that overcome desire through willpower" (p. 379).

Ironically, the psychological anxiety and embarrassment that a consumer experiences with FFA leads the consumer to "leave and disengage from the behaviour, exhibiting a sense of self-control and willpower" (Tosun & Yanar Gürce, 2018, p. 492). Eventually, FFA acts as a counter behaviour to assist with restrained or anti-consumption behaviour.

Based on these arguments, we speculate:

**H4.** A positive relationship exists between FFA and FFAC.

**H5.** Health concerns mediate the relationship between FFA and FFAC in such a way that addiction to food products may lead to health concerns, which in turn, will result in FFAC.

### 1.6 | Moderating role of food waste

Another motivation for FFAC is FW, which is a global problem (Minten et al., 2016). Griffin et al. (2009) define FW as "any waste that is raw, cooked, edible and associated inedible material (e.g., bones, eggshells, and fruit and vegetable peelings) generated during the preparation or consumption of meals or all food produced or purchased that is unused by humans" (p. 68). FW is associated with three important human aspects, personal, societal, and behavioural factors (Secondi et al., 2015; Szabó-Bódi et al., 2018).

FW has immensely harmful effects both in developed and developing economies (Secondi et al., 2015). The consequences of FW range from environmental unsustainability to economic disorders to harming social well-being (Stefan et al., 2013). The EU defines FW as "foodstuffs that, although still edible, are discarded by some players of the supply chain for aesthetic reasons" (Secondi et al., 2015, p. 25).

The FW phenomenon is particularly visible in issues of achieving consumer welfare. Food supply chain systems and individual behaviours are being held accountable (Fao, 2015). Around one-third of food produced is lost or wasted (Fao, 2015), simultaneously, millions of people globally are suffering from food shortages. FW is a global issue considered detrimental to consumer welfare (Henson & Traill, 2000).

Alongside poor food production and supply chain processes, and inadequate household food buying and storage cause FW (Stangherlin & de Barcellos, 2018). It must be noted that FW and food loss are two different philosophies. Food losses occur in the first half of the food supply chain, the production level, for example, harvesting or storage (Hingley et al., 2013). However, FW occurs at the end of the supply chain, at the retailing, distributing, and consumption stages (Lanfranchi et al., 2016). FW is strongly connected with human behavioural approaches and can be seen in various stages of consumption (Secondi et al., 2015). This phenomenon is embedded in the consumer pre-acquisition, acquisition, consumption, and disposition stages (Silvennoinen et al., 2014).

Previous studies have abandoned their efforts to understand the relationship between consumer behavioural influences and FW. Little is known about the elements of consumer behaviour that can successfully reduce FW (McCarthy & Liu, 2017; Stefan et al., 2013; Szabó-Bódi et al., 2018). An important human psychological factor is the feeling of guilt when wasting food (McCarthy & Liu, 2017). Consumers' social norms and environmental concerns can also reduce FW (Mo et al., 2018; Porpino et al., 2016; Silvennoinen et al., 2014). Consumer consumption patterns and wastage behaviour have a substantial effect on both society and consumer well-being (Stefan et al., 2013). Food convenience and the appeal of food have become important factors in changing dietary patterns globally (Ehsan, 2012; Ghoochani et al., 2018; Qin et al., 2010).

The researchers stipulate:

**H6.** FW has a positive effect on FFAC in such a way that consumers with high sensitivity to FW will favour restrained-consumption to achieve food-related human welfare.

## 2 | METHODS

The primary objective of our study is to identify antecedents of FFA which can drive FFAC using RT and the TPB among Chinese consumers.

Based on the goal of our research a "Positivist" approach, meant for theory testing, was applied. Our study utilised a quantitative analysis approach with statistical analysis. Scientific evidence was collected through a survey and then statistically analysed (Ashraf et al., 2019).

This study aims to test the cause-and-effect relationship by using a relational research design. This is a survey-based study, surveys can be categorised into two types, relational and descriptive surveys (Rungtusanatham et al., 2003). Descriptive surveys explore the current state of matters, while relational surveys are meant to study the relationship between predictors and outcome variables. Our study utilised a relational survey approach where data were collected through a structured questionnaire adopted from existing literature. As discussed earlier, the study is based on theory testing rather than theory formation. It is also cross-sectional, therefore data were collected at one point in time and then statistically tested. Our study is a field study in that respondents were asked to respond to a field survey concerning their fast-food consumption experience.

### 2.1 | Sample selection

Many Western studies are focused on food avoidance drivers and their impact on consumer welfare (McCarthy & Liu, 2017). However, our review of the literature stresses the need for studies on FFAC

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motives in developing contexts like China (Wu & Chen, 2018). In the Chinese context, food-oriented diseases such as obesity, heart issues, and other health risks have increased (Luomala et al., 2015), thus necessitating more FFAC studies related to health and fast-food consumption.

This study utilised consumers from the Sichuan province of China who regularly consume fast-food (Goyal & Singh, 2007). The sample was drawn based on convenience sampling. According to Nunnally (1978), "the size of a convenience sample should be above or near 300 to prevent biases and errors" (p. 244).

A total of 500 online questionnaires were distributed (Gram et al., 2015; Kotler & Armstrong, 2013). The participants were recruited using the Wjx.cn website (https://www.wjx.cn/), a crowdsourcing website where participants receive money for completing tasks. Wjx.cn is used to run experiments and surveys at a low cost with a quick and effective response rate (Fu et al., 2018; Gao et al., 2020; Xie et al., 2020; Zhang et al., 2019).

## 2.2 | Sample instrument and data collection

Data were collected through a structured questionnaire that consisted of two sections. The first section included demographic details, followed by:

- a five-item scale to measure FFAC (Tosun & Yanar Gürce, 2018).
- a nine-item scale used to measure FFA (Gearhardt et al., 2013).
- a ten-item measure of socio-cultural factors (Shahzad et al., 2015).
- a five-item scale measuring individual consumption motivation factors (Ghoochani et al., 2018).

The subsequent section included:

- a six-item scale addressing advertising appeals (Cheng et al., 2009).
- a two-item scale assessing FW and consumption (Stefan et al., 2013).
- a four-item scale assessing health concerns and consumption (Jin et al., 2017).

## 2.3 | Data analysis

Of the 500 questionnaires distributed, 437 responses were received. The respondents were 40.7% male and 59.3% female. Most respondents were born between 1977 and 1990 (98.2%) with 0.9% born between 1965 and 1977 and 0.9% born between 1947 and 1964. In terms of marital status, 75.6% of respondents were unmarried, 24.4% were married. Finally, regarding education levels, 35.5% had a master's degree or above, 62.2% had graduate degrees, and 2.3% were at a primary or illiterate level. Demographic details can be found in Table 1. Completed questionnaires were sorted and then coded. Incomplete responses were removed for data accuracy and completeness. Confirmatory factor analysis (CFA) was then used for factor loading and association. Gaskin's master validity macro was used in master validities of all variables. The Statistical Package for the Social Sciences (SPSS) version 21.0 and the Analysis of Moment Structure (AMOS) software were used for data analysis (Farah et al., 2018; Ramadan et al., 2019).

**TABLE 1** Demographics

| Variables | Frequency | Percentage |
|---|---|---|
| Gender | | |
| Male | 178 | 40.7 |
| Female | 259 | 59.3 |
| Marital status | | |
| Married | 106 | 24.4 |
| Unmarried | 331 | 75.6 |
| Employment | | |
| Employed | 64 | 14.7 |
| Unemployed | 373 | 85.3 |
| Year of birth | | |
| 1947–1964 | 4 | 0.9 |
| 1965–1977 | 4 | 0.9 |
| 1977–1994 | 429 | 98.2 |
| Education | | |
| Undergraduate degree | 10 | 2.3 |
| Graduate degree | 272 | 62.2 |
| Master's degree and above | 155 | 35.5 |

*Note*: Sample size: 437 respondents.

# 3 | RESULTS

## 3.1 | Reliabilities analysis

Values of composite reliability (CR) and Cronbach's alpha ($\alpha$) reliability are in Table 2 and the threshold criteria are achieved (Bagozzi & Yi, 1988).

## 3.2 | Convergent and discriminant validity

CFA techniques through AMOS were utilised (Farah et al., 2018). The valuation of scale is often linked with exploratory factor analysis (EFA) or CFA, in addition to establishing the validity of measures such as convergent and discriminant validity.

According to Fornell and Larcker (1981), the threshold values criteria for convergent validity are: CR range >0.90 great; >0.80 good; >0.70 fair (Nunnally, 1978), convergent validity average variance extracted (AVE), >0.50 (accuracy of instrument) (Linn, 2000), and multicollinearity variance inflation ion factor (VIF) <5.00.

The demographic variables are used as control variables. Hayes (2017) have found a significant effect of demographics

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**TABLE 2** Convergent validity results

| Measures | Factor loading | Cronbach's $\alpha$ | CR | AVE |
|---|---|---|---|---|
| FAST food anti-consumption | | 0.821 | 0.773 | 0.743 |
| *I am reluctant to eat fast-food because* | | | | |
| *FFAC1*. I want to be slim and fit. | 0.841 | | | |
| *FFAC2*. Controlling fast-food intake and eating fruit and vegetables is healthier. | 0.873 | | | |
| *FFAC3*. It is hard to find high-quality fast-food. | 0.811 | | | |
| *FFAC4*. Of human welfare reasons. | 0.785 | | | |
| *FFAC5*. It is better for the environment. | 0.835 | | | |
| Fast-food addiction | | 0.781 | 0.890 | 0.711 |
| *FFA1*. When I start eating certain foods, I eat much more than I planned. | 0.828 | | | |
| *FFA2*. I worry about not eating or cutting down on certain types of food. | 0.861 | | | |
| *FFA3*. I often feel sluggish or lazy from overeating. | 0.780 | | | |
| *FFA4*. I feel negative when I consume certain foods often or in large quantities. | 0.881 | | | |
| *FFA5*. I consume the same types of food or the same amount even if I experience emotional and/or physical problems. | 0.890 | | | |
| *FFA6*. Over time, I have found I need to eat more to get the feeling (comfort or pleasure) I want. | 0.834 | | | |
| *FFA7*. I have had withdrawal symptoms when I cut down or stop eating certain foods. | 0.810 | | | |
| *FFA8*. My behaviour concerning fast-food and eating causes significant distress. | 0.789 | | | |
| *FFA9*. My ability to function effectively (daily routine, job/school, social/family activities) is significantly affected by fast-food and eating. | 0.887 | | | |
| Socio-cultural factors | | 0.741 | 0.771 | 0.681 |
| *SC1*. In my culture, it is suitable to eat fast-food. | 0.719 | | | |
| *SC2*. My tradition supports eating fast-food. | 0.761 | | | |
| *SC3*. I eat fast-food because my family members do. | 0.741 | | | |
| *SC4*. I eat fast-food because my friends do. | 0.601 | | | |
| *SC5*. I eat fast-food because my colleagues do. | 0.765 | | | |
| *SC6*. I talked with my peers about the product on social media. | 0.850 | | | |
| *SC7*. I talked with my online peers about buying fast-food. | 0.823 | | | |
| *SC8*. I asked my peers for advice about fast-food. | 0.912 | | | |
| *SC9*. I obtained fast-food product information from my peers. | 0.865 | | | |
| *SC10*. My peers encouraged me to buy fast-food. | 0.887 | | | |
| Personal factors | | 0.832 | 0.848 | 0.645 |
| *IF1*. I tend to consume fast-food because it is very accessible. | 0.933 | | | |
| *IF2*. I tend to consume fast-food because it is near my workplace. | 0.832 | | | |
| *IF3*. Fast-food products make me feel pleasant. | 0.814 | | | |
| *IF4*. Fast-food products are attractive. | 0.891 | | | |
| *IF5*. The nutritional value of fast-food is equal to traditional foods. | 0.897 | | | |

(Continues)

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**TABLE 2** (Continued)

| Measures | Factor loading | Cronbach's $\alpha$ | CR | AVE |
|---|---|---|---|---|
| Advertising practises | | 0.722 | 0.743 | 0.611 |
| *A1*. Advertising makes product information immediately accessible. | 0.871 | | | |
| *A2*. Advertising is a convenient source of product information. | 0.892 | | | |
| *A3*. Advertising is a good source of up-to-date product information. | 0.814 | | | |
| *A4*. Advertising supplies relevant product information. | 0.797 | | | |
| *A5*. Ads show the latest products and information available. | 0.855 | | | |
| *A6*. Advertising provides news about special prices. | 0.817 | | | |
| Health concerns | | 0.871 | 0.824 | 0.673 |
| *HC1*. Concern about my health makes me want to purchase healthy food. | 0.919 | | | |
| *HC2*. My physical appearance or weight makes me want to purchase healthy food. | 0.871 | | | |
| *HC3*. The threat of food-related disease makes me choose healthy food. | 0.941 | | | |
| *HC4*. Self-consciousness about my health makes me want to choose healthy food. | 0.896 | | | |
| Food waste | | 0.794 | 0.831 | 0.697 |
| *FW1*. Throwing away food bothers me. | 0.886 | | | |
| *FW2*. When I throw away food, I feel guilty. | 0.897 | | | |

**TABLE 3** Discriminant validity results

| Factor | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Socio-cultural | **1 (0.641)** | | | | | | | |
| Personal | 0.47 | **1 (0.623)** | | | | | | |
| Advertising practices | 0.41 | 0.44 | **1 (0.613)** | | | | | |
| FFA | −0.09 | 0.41 | 0.42 | **1 (0.691)** | | | | |
| FFAC | 0.49 | 0.47 | 0.44 | 0.43 | **1 (0.622)** | | | |
| Health concerns | 0.55 | 0.51 | 0.40 | 0.53 | 0.57 | 0.59 | **1 (0.609)** | |
| FW | 0.37 | 0.41 | 0.44 | 0.34 | 0.45 | 0.54 | 0.42 | **1** |

*Note*: All correlations are significant at $p = .01$, Square-root AVE scores are displayed in parentheses.

between predictors and criterion variables. Correlation analysis was used to find the association between predictor and criterion variables. Hayes' (2017) techniques were used to test the effect of different predictors of FFAC. Model 4 was used for mediating effects.

Fornell and Larcker's (1981) approach was then used to achieve the fitness of measures (Table 3).

Table 3 indicates that socio-cultural factors are negatively correlated to FFA ($r = -.09$, $p < .01$). Personal factors and advertising practices are positively correlated to FFA ($r = .41$, $p < .01$ and $r = .42$, $p < .01$, respectively). This suggests that FFA is positively correlated to health concerns ($r = .53$, $p < .01$) and FFAC ($r = .43$, $p < .01$).

FW and the mediating variable health concerns are significantly correlated to FFAC ($r = .45$, $p < .01$ and $r = .57$, $p < .01$, respectively).

### 3.3 | Structural model and hypothesis testing: Main effect relationships

The values of the indices and the estimation of the model showed a good fit (Steenkamp & Baumgartner, 2000) with: CMIN/df = 1.824, GFI = 0.921, AGFI = 0.871, CFI = 0.954, RMSEA = 0.059, RMR = 0.047, and TLI = 0.851 (Farah et al., 2018; Ramadan et al., 2019).

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The results of the indices (Table 4) with the estimation of the model showed a good fit (Steenkamp & Baumgartner, 2000) with: CMIN/df = 2.134, GFI = 0.957, AGFI = 0.928, CFI = 0.881, RMSEA = 0.057, RMR = 0.046, and TLI = 0.887. Figure 2 reflects the path coefficients of the structural equation model (SEM). The examination of the hypotheses was based on *t*-values greater than 1.96 representing a significant path (Hair et al., 1998). The results reveal a positive significant relationship between personal factors and FFA ($\beta = 0.218$, $t = 3.941$, $p < .001$), supporting H1.

The relationship between socio-cultural factors and FFA displayed an insignificant effect ($\beta = 0.070$, $t = 1.340$, $p < .001$), this does not support H2, advertising however shows a positive and significant effect on FFA. Likewise, FFA showed a significant positive influence on FFAC ($\beta = 0.209$, $t = 3.218$, $p < .001$), thus confirming H4. The results of the SEM are presented in Table 4. Finally, FW displayed a positive and significant effect on FFAC ($\beta = 0.195$, $t = 2.461$, $p < .001$), supporting H6.

## 3.4 | Mediation analysis (indirect effects)

The results obtained from the Chinese sample (Table 5) represents Path c, the impact of FFA in the absence of the mediating variable health concerns, which is the main effect relationship between the dependent and independent variable ($\beta = 0.209$, $t = 3.218$, $p < .001$) supporting H4. FFA has a positive and significant effect on FFAC.

Path a represents the relationship between FFA and health concerns, this indicates the relationship between the independent variable and mediating variable ($\beta = 0.140$, $t = 2.601$, $p < .010$) and displays that the relationship between FFA and health concerns is significantly positive.

Path b denotes the relationship between health concerns and FFAC, this path is the relationship of the mediating variable and dependent variable ($\beta = 0.390$, $t = 2.151$, $p < .010$) and shows that

**TABLE 4** Structural equation model estimates

| PATH | | | |
|---|---|---|---|
| From | To | Hypotheses | Standardised estimate (CR) |
| Personal | FFA | H1 | 0.218 (3.941) |
| Socio-cultural | FFA | H2 | 0.07 (1.341) |
| Advertising | FFA | H3 | 0.157 (3.811) |
| FFA | FFAC | H4 | 0.209 (3.218) |
| CR = 1.96 ($\alpha = 0.05$ level) | | | |

**TABLE 5** Mediating role of health concerns

| Path | β | SE | T | p | LLCI | ULCI |
|---|---|---|---|---|---|---|
| Direct and total effects | | | | | | |
| Path c, total effect | 0.209 | 0.05 | 3.218 | .001 | 0.06 | 0.29 |
| Path a | 0.143 | 0.02 | 2.601 | .001 | 0.02 | 0.12 |
| Path b | 0.391 | 0.04 | 21.51 | .001 | 0.49 | 0.62 |
| Path c′ | 0.048 | 0.04 | 0.93 | .313 | 0.04 | 0.06 |
| Showing mediation | | | | | | |
| | | | β | SE | LLCI | ULCI |
| Indirect effects using bootstrap | | | | | | |
| | | | 0.12 | 0.03 | 0.03 | 0.14 |

*Note*: Sample size: 437 Chinese respondents. LL, lower-limit; CI, confidence interval; UL, upper-limit; Path c represents total effect when IV Interdependent FFA is regressed with DV FFAC when Med Health Concerns is not in the model; Path a represents when IV Interdependent FFA is regressed with Med Health Concerns; Path b represents when Med Health Concerns is regressed with DV FFAC; Path c′ represents the direct effect of IV Interdependent FFA on DV FFAC when Med Health Concerns is present in the model.

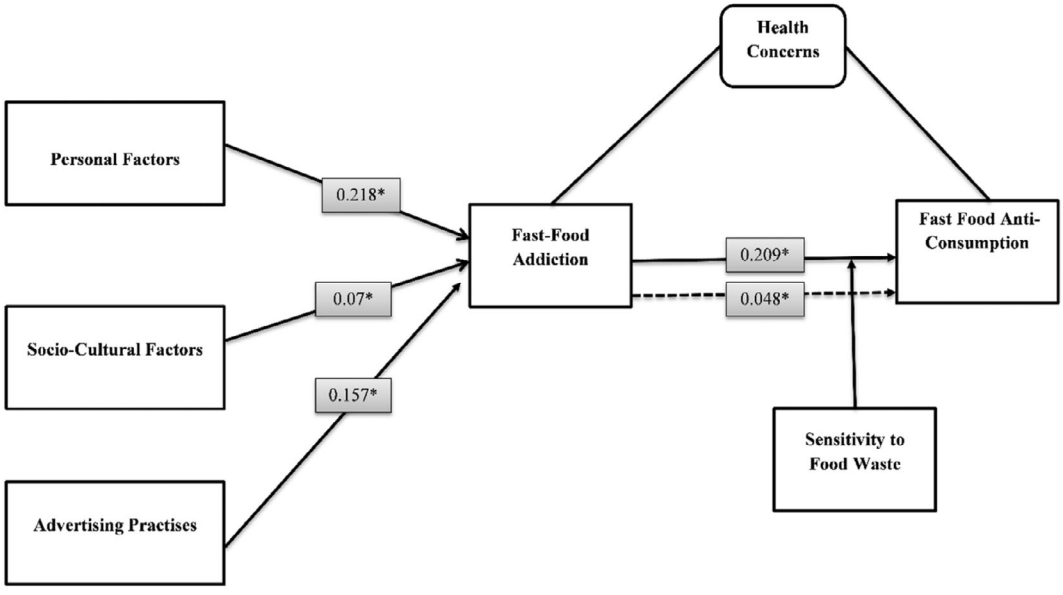


**FIGURE 2** Structural equation model path coefficients

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**TABLE 6** Conditional effect for different values of the moderator (FW) using the Johnson–Neyman technique

| FW | Effect | SE | *t* | *p* | LLCI | ULCI |
|---|---|---|---|---|---|---|
| *−**1.79*** | *1.04* | *0.46* | *2.21* | *.02* | *0.13* | *1.9* |
| *−**1.63*** | *1* | *0.43* | *2.28* | *.01* | *0.15* | *1.79* |
| *−**1.46*** | *0.94* | *0.39* | *2.36* | *.02* | *0.17* | *1.68* |
| *−**1.3*** | *0.91* | *0.36* | *2.44* | *.03* | *0.19* | *1.58* |
| *−**1.14*** | *0.86* | *0.33* | *2.53* | *.02* | *0.2* | *1.47* |
| *−**0.98*** | *0.82* | *0.31* | *2.63* | *.01* | *0.21* | *1.37* |
| *−**0.81*** | *0.77* | *0.28* | *2.73* | *.03* | *0.22* | *1.28* |
| *−**0.65*** | *0.74* | *0.25* | *2.78* | *.01* | *0.22* | *1.19* |
| *−**0.49*** | *0.69* | *0.23* | *2.83* | *.02* | *0.21* | *1.1* |
| *−**0.33*** | *0.65* | *0.21* | *2.83* | *.02* | *0.2* | *1.03* |
| *−**0.22*** | *0.6* | *0.2* | *2.78* | *.01* | *18* | *0.96* |
| *−**0.06*** | *0.56* | *0.2* | *2.72* | *.01* | *0.16* | *0.91* |
| ***0.1*** | *0.51* | *0.2* | *2.43* | *.02* | *0.15* | *0.88* |
| ***0.18*** | *0.47* | *0.21* | *2.31* | *.02* | *0.1* | *0.85* |
| ***0.26*** | *0.45* | *0.22* | *2.26* | *.3* | *0.07* | *0.84* |
| ***0.43*** | *0.42* | *0.23* | *2.19* | *.3* | *0.06* | *0.84* |
| ***0.59*** | *0.38* | *0.25* | *2.18* | *.03* | *0.05* | *0.83* |
| 0.75 | 0.33 | 0.27 | 1.56 | .12 | −0.02 | 0.83 |
| 0.91 | 0.29 | 0.3 | 1.21 | .19 | −0.19 | 0.84 |
| 1.08 | 0.24 | 0.33 | 0.96 | .38 | −0.29 | 0.85 |
| 1.24 | 0.2 | 0.36 | 0.82 | .49 | −0.42 | 0.86 |
| 1.4 | 0.15 | 0.39 | 0.35 | .67 | −0.58 | 0.88 |

*Note*: To investigate the interaction of fast-food addiction (FFA) and food waste (FW) on Fast-Food Anti-consumption behaviour (FFAC), the PROCESS MACRO incorporating the Johnson–Neyman technique was utilised, using arbitrary points of the moderator (i.e., FW). The results reveal all ranges of the moderator in which the focal predictor (FFA) is a significant predictor of the outcome (i.e., FFAC). Highlighted values in italic indicate that the conditional effect was a significant predictor of FFAC.
Bolded numbers are significant results up to 0.59.

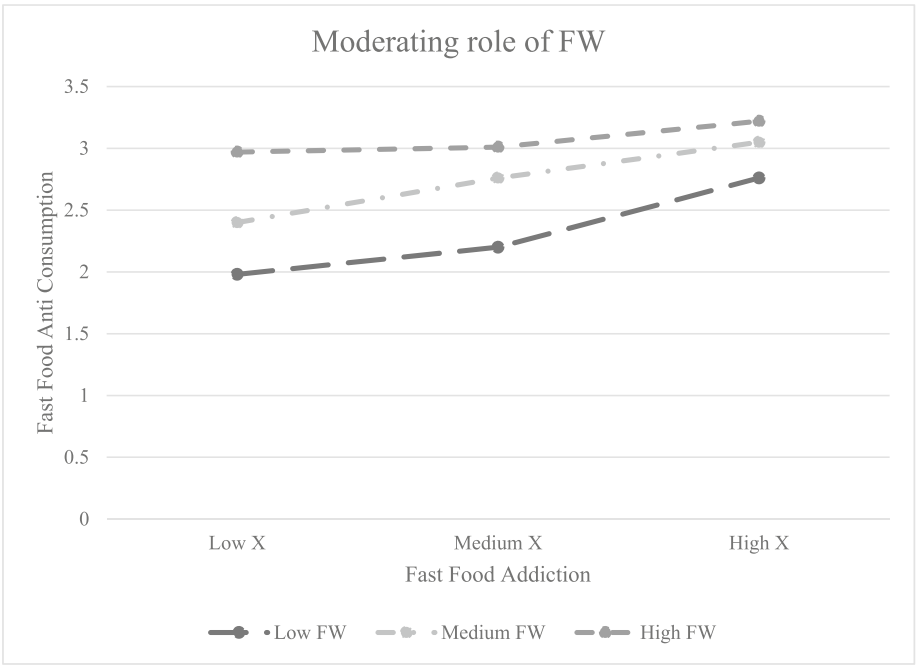


**FIGURE 3** A plot of fast-food addiction (FFA) on fast-food anti-consumption (FFAC) versus the moderator (FW) with fast-food. X represents moderator (food waste)

**Note- X represents moderator (food waste).**

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**TABLE 7** Conditional effect of FFA on FFAC at different value levels of the moderator (FW)

| Conditional direct effects | W | Effect | SE | t | p | LLCI | ULCI |
|---|---|---|---|---|---|---|---|
| Low FW | 2.9241 | 0.78 | 0.31 | 2.81 | .01 | 0.17 | 1.42 |
| Average FW | 3.1241 | 0.52 | 0.21 | 2.62 | .01 | 0.12 | 0.91 |
| High FW | 3.6519 | 0.27 | 0.29 | 1.14 | .19 | −0.17 | 0.88 |

*Note*: FFA, fast-food addiction; FFAC, fast-food anti-consumption; FW, food waste.

the relationship between health concerns and FFAC is significant and positive.

Path c represents the presence of a mediator between the independent variable FFA and the independent variable FFAC. The values ($\beta = 0.040$, $t = 0.930$, $p < .313$) indicate an insignificant relationship in the presence of a mediator. However, the values of indirect effect ($\beta = 0.12$, LL 99% CI = 0.02, UL 99% CI = 0.14) show that mediation of health concerns exists between the main effect relationship of FFA and FFAC. Based on the findings of path $c'$ and indirect effects, H6 is accepted.

Health concerns mediate the relationship between FFA and FFAC and show that individuals with high addiction tendencies will have high health concerns that will turn into restrained food consumption behaviour. Results indicate Path a as the full effect, Path b as significant but Path c as insignificant and the indirect effect is significant with no zero value in the lower- and upper-limit confidence intervals. Based on the results, the mediation is fully valid and in line with the assumptions of Hayes (2017). The insignificant Path $c'$ indicates that consumers tend to reduce overconsumption due to health concerns and fully supports the assumption of mediation.

Hayes' (2017) Process macro, Model 1, in SPSS 21.0 was used to analyse the moderating effect of FW behaviour. The following statistics were produced by the regression model: $R^2 = 0.16$; $F$ (2,259) = 5.10, $p = .001$. Results have shown the following indices with significant FFA*FW interaction FFAC ($R^2$-chng = 0.01; $b = 0.01$, $F = 3.81$, $p = .05$). The resulting values of indirect and direct effects of FW on FFAC (H6) are presented in Table 7. Low and medium levels of FW have a positive significant indirect effect (indirect effect [low] = 0.78, 95% CI = 0.17, 1.42; and indirect effect [medium] = 0.52, 95% CI = 0.12, 0.91). Conversely, for higher values of CSR, there is an insignificant relation (indirect effect [high] = 0.27, 95% CI = −0.17, 0.88) for H6. The conditional indirect effect is positive but declines as FW increases. The values given in Figure 3 show indirect and direct effects (FAA and FFAC) at changing levels of FW with a 95% confidence interval. The result of Figure 3 proposes that the indirect effect between FFA and FFAC is conditional upon the level of FW, such that at a certain level of FW, FFAC motives decrease. The Johnson–Neyman technique results are shown in Table 6. Results suggest that the relationship between FFA and FFAC are significant only up to a certain level (i.e., 0.59 and bolded in Table 6), beyond which the relationship becomes insignificant.

## 4 | DISCUSSION

According to the results, consumers' personal beliefs, that is, availability and attitudes regarding fast-food have positive and significant relation with FFA and these results are in line with Ehsan (2012) and Khalid et al. (2019). In their studies, they found that craving and impulsiveness are predictors of FFA. This study confirmed that due to the consumer lifestyle and hedonic characteristics (Ehsan, 2012) a consumer is more likely to consume fast-food if in the absence of basic starvation (H1). Interestingly, the results show that consumer personal factors are a strong predictor of FFA. Craving fast-food and consumer impulsiveness are drives that stimulate FFA and can be considered personality traits (Khalid et al., 2019).

The state of craving tends to exhibit addictive behaviour and generates a feeling of satisfaction among consumers (Mathur & Patodiya, 2016). Our study has confirmed the findings of available literature where consumer personal desires and urges drive FFA in different contexts (Khalid et al., 2019).

Consumers cravings and impulsiveness drive food addiction where accessibility and affordability make fast-food highly acceptable to consumers in today's fast-paced society (Strack & Deutsch, 2006). Marketing prompts craving and impulsiveness through their advertising hence stimulating addictive tendencies (Joyner et al., 2015). Hereafter, excessive consumption of fast-food is reflective of mild eating disorders as they exceed the consumers' cognitive control. Consumer research on addiction reports that stressors, such as the threat of obesity due to excessive consumption of junk food, increase the saliency of undesirable outcomes such as illness. Such saliency then stimulates some consumers to strive for more control over such eating disorders (Baker et al., 2004).

Our results are in line with theories of planned behaviour and the theory of reasoned actions (Ajzen, 1991; Sheppard et al., 1988).

Recently attention has been paid to FW and restrained-consumption behaviour. Our study has confirmed consumers who are more concerned about FW and its impact on society and human well-being will restrict themselves to some extent (Sudbury-Riley & Kohlbacher, 2018). Our study contributes to the understanding of FW behaviours when analysed by FFAC. The results show that binge eating can lead to FW. Equally, concern for consumer welfare is an individual characteristic that pushes consumers to pursue less wasteful behaviours. Psychological theories when analysed with attitude and behaviour theories can help in understanding mechanisms consumers use to reduce their waste behaviour. For instance, our study showed feelings of guilt reduce excess consumption among addicted consumers, motivating them to reduce FW.

According to the results, binge eating sometimes leads to negative health outcomes thus generating intentions to avoid fast-food. This study confirmed that FFA leads to FFAC, whereby a consumer is more likely to stop consuming fast-food if obesity and health risks are seen as high (H5).

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The results of our study have diverse importance for the field of marketing and consumer psychology, related FFA, food consumption and behavioural effects. The study has new implications for consumers, especially young consumers, and revealed that FFA is largely associated with consumer personal, social and advertising practices (Bogueva et al., 2017).

Our results have shown that health concerns, triggered by FFA, evoke an intention to avoid fast-food. Empirical evidence established that health concerns associated with addictive behaviour affect the consumption of fast-food. Fast-food has gained a lot of market share recently due to its taste and convenience (Ehsan, 2012). Moreover, consumer lifestyles, social eating/drinking, and advertising, all encourage FFA. Our study discovered the younger generations' eating behaviours and answered important questions about what restricts them from binge eating.

FFA is a modern problem prevalent among the younger generation that has physical and physiological effects. Our study has found that FFA is positively related to restrained consumption because of the saliency of health concerns. We found that if a consumer is health-conscious, they will be able to control food craving impulses from personal, social, or advertising stimuli, leading to restrained-consumption behaviour. Obesity and chronic disease saliency enhanced negative feelings, pushing consumers to find ways out of such states. As a result, consumers exhibit restrained-consumption behaviours to overcome undesirable mental states.

## 4.1 | Contribution

Earlier studies established that consumers' motives and preferences affect fast-food consumption and thus FFA (Islam & Ullah, 2010). This study is designed to discover stimuli other than personal motives which can affect fast-food consumption and revealed advertising practices as strong predictors of FFA (Farah & Shahzad, 2020). This study argues that FFA impacts motivation towards consumption of fast-food due to its negative health outcomes and eventually results in restrained-consumption behaviour. The consumer's health concerns intervene in the relationship between FFA and restrained consumption. The existing outcomes demonstrate that FFA and FFAC motives are linked through health concerns. The research also makes contributions to the literature on FW and FFAC, with our analysis supporting a link between FFAC and consumer well-being.

This study offers several theoretical and practical implications. Initially, it provides a comprehensive understanding of the food anti-consumption phenomenon in the under-researched (yet growing) Chinese fast-food context and identified distinct factors linked to FFA behaviour. This study also serves as a practical guide for policymakers and food marketers who can use health related marketing appeals to limit binge eating of unhealthy food. Since the occurrence of obesity has increased in China due to the increased acceptance of fast-food products, awareness of FFA and factors that attenuate it are important (Wu et al., 2021).

Food marketers and policymakers may find the findings of our study useful and recognise the dissonance created by FFA tendencies. These tendencies foster health concerns and, as a result, consumers exhibit anti-consumption behaviour to resist fast-food. Essentially, FFA may paradoxically lead to increased health consciousness among modern consumers, actually resulting in controlled behaviour.

To summarise, we find that personal attitudes, that explain individuals' behaviours, thoughts, and emotions, are supportive of the FFA model proposed in previous research. Nonetheless, this study indicates that FFA is also the result of advertising and socio-cultural factors that stimulate addiction tendencies. These findings are in line with recent findings by (Farah & Shahzad, 2020) which show that food advertising and social interaction among university students drive FFA. Furthermore, research reveals that FW moderates and strengthens the relationship between FFA and FFAC (Porpino et al., 2016). Consumers take into consideration the negative effects caused by FW and thus restrict themselves to some extent (Secondi et al., 2015). Studies on hand also support the phenomenon that the rapid growth of consumer well-being further allows consumers to act more proactively in food consumption behaviour (Balderjahn et al., 2020). To achieve well-being consumers care about food consumption practices that help them to achieve health (Chen et al., 2020).

## 4.2 | Conclusion, limitations and future research

Overall, our research demonstrates that health concerns are an intervening force among fast-food consumers, which then leads to the anti-consumption of fast-food. Thus, our research contributes to both RT and anti-consumption literature.

However, our study utilises a cross-sectional research design, thus, other methods such as a time-lagged study would provide additional insights. The role of demographic factors is not measured and they have been treated as control variables. A cross-cultural design across various countries would also be insightful. Future studies could examine other food groups, categories, and brands. Finally, our study required natural settings so an experimental design was not possible, this is another limitation that future research could address.

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### CONFLICT OF INTEREST

The authors declare no conflict of interest.

### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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