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Brand expertise, impulsiveness and materialism aggravate unhealthy food products buying among young adults despite pricing and sin tax interventions

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ABSTRACT

Building upon the stimulus-organism-response (S-O-R) and the hedonic motivation theories, this study aims to assess the effects of consumer awareness variables viz. unhealthy product knowledge (PK), brand expertise (BE), perceived price and tax policy interventions (PTP), and personality traits variables viz. materialism (MT) and buying impulsiveness (BI) on consumers' purchase intention toward unhealthy products. The study used a between-subjects experimental design to form control ($n=341$) and experiment ($n=355$) groups before treating the experiment group with health warnings and persuasive audio-visual commercials. After stimuli creation, both groups were asked to fill a questionnaire. We employed CB-SEM in AMOS v.24.0 to assess the model's global fit indices, reliability and validity, hypotheses testing. The results affirm that the model meet the criteria of global fit indices and meet the assumptions of reliability (unidimensionality of the scales) and validity (convergence and divergence). Further, the results of hypotheses testing show that BE, MT, and BI increase purchase intention, demonstrating that hedonic motivations prevalent in youngsters override health warnings. Surprisingly, PTP and PK do not appear to influence purchasing intent, reinforcing impulsive buying and materialistic personality traits of respondents. The findings imply that companies counterbalance statutory health warnings with attractive advertising. Because PTP and PK have little effect on purchase intentions, the government can maximize revenue by taxing unhealthy products, thereby protecting public health. The findings provide valuable insights into consumer behavior for marketing academics, retailers, consumer marketing companies, and indirect tax policymakers.

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1. Introduction

Unhealthy products such as carbonated beverages, fast food, alcohol, etc. (Sin goods/unhealthy products hereafter) are always tricky to market due to their ingrained adverse health and social consequences (Allcott et al., 2019; Watt et al., 2023). These products are typically considered detrimental to society (Carruthers, 2015). Davidson (2003) asserts that marketing such products has been arduous for various reasons. At the macro-level, nations lay down socio-economic policies to guarantee minimum public health standards by ensuring sustainable production and sustainable consumption (Khan et al., 2022). The Goal 3 of the UNDP's Sustainable Development Goals (SDGs) is: 'Ensure healthy lives and promote well-being for all at all ages'. SDG 12 also emphasizes sustainable production and sustainable consumption (Al-Nuaimi & Al-Ghamdi, 2022; Figueroa-García et al., 2018). Similarly, the World Health Organization (WHO) suggested enforcing rigid restrictions on alcohol sponsorship, promotion, and advertising by

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increasing indirect taxes and pricing policies (Alam et al., 2022; Doyle, 2022). Due to these reasons, taxing unhealthy products and other regulatory interventions to dissuade unhealthy consumption attain significance across markets (Colombo et al., 2018; Hinnosaar, 2023). However, numerous empirical findings indicate that consumption of such unhealthy food products among all age groups has not significantly decreased despite the health warnings provided in advertisements/product packaging or tax policy interventions (Effertz et al., 2014, 2019; Pérez-Morón, 2023; Unger et al., 2003). Persuasive commercials of such unhealthy products play a key role in offsetting regulatory interventions. For instance, Effertz et al. (2014) discovered that positive visual cues in the advertisement of soft drinks are enough to provoke purchase intention among students.

Using a time-tested SLR review, Deshpande et al. (2023) found that advertising promotes unhealthy food consumption. Liu and Bailey (2020) argue that 'use cues', 'social cues', and 'repetitions' accompanying the fast-food advertisements instill and reinforce purchase intention among students. Bamfo et al. (2019) discovered that quality information, information intrusiveness and likable adverts have positive and significant impacts on children purchase behaviour. Likewise, Bailey (2017) points out that biological food cues in advertising and packaging alter eating behavior and motivate students to buy unhealthy fast foods. In another example, Eyal and Te'eni-Harari (2016) conducted a content analysis of Israeli television food advertising to check for the television-obesity link. They discovered that one-fourth of all television advertisements were for candies and sweetened beverages, promoting the economical purchase of the products. H.-J. Chang et al. (2011) noted that intensive advertising using different audio-visual cues could increase brand recognition and cause impulsive buying among youth. Further, prior television experience has also been found to predict unhealthy food preferences and diets in early adulthood, and perceived taste had the most direct relationship to healthy and unhealthy diets (Harris & Bargh, 2009). Likewise, Signorielli and Lears (1992) establish that television viewing was also associated with unhealthy food perceptions and incorrect knowledge of nutrition principles among fourth and fifth-grade students. Accordingly, it is integral to also mull over the public health communication aspects of persuasive advertising and promoting such unhealthy products.

Various studies in the Indian context have documented the increase in childhood and adolescent obesity. For instance, Misra et al. (2009) observed an upward trend of childhood obesity and abdominal obesity among schoolchildren in urban areas of India. Ranjani et al. (2016) also found that adolescent obesity was more prevalent in North India than South India, with a growing trend observed over the decade. In the same way, Gupta et al. (2018) discovered that over 30% of school-aged children in rural Himachal Pradesh, India, consumed junk foods daily, resulting in obesity and diet-related diseases. As a countermeasure, policymakers have historically used fiscal tools like taxation to raise the price of these goods and reduce their availability to consumers to daunt consumption and promote public health. For instance, John et al. (2019) found that imposing a high Goods and Services Tax (GST) on tobacco products in India helped decrease consumption. Despite these fiscal measures and policy interventions, the influence of persuasive advertising cues, particularly among young individuals, remains a significant concern. All this evidence leads us to the question: How do persuasive advertising cues of unhealthy food products impact the buying intentions of young adults despite health warnings and sin tax interventions?

There is abundant literature on personality traits such as impulsiveness, materialism, and hedonism that affect unhealthy buying. H.-J. Chang et al. (2011) contend that consumer buying behavior for some products is impulsive. Certain factors, such as advertisement cues (Signorielli & Lears, 1992), packaging labels (Effertz et al., 2014), retail environment (H.-J. Chang et al., 2011), etc., trigger hedonic motivations among students, which lead to impulsive buying. However, it is uncommon in the literature to impugn the role of persuasive advertising cues and stimuli that affect unhealthy product purchases, especially in a quasi-experimental setting. Additionally, Deshpande et al. (2023) bring out that the recurring persuasive advertisements of unhealthy products often hinder the objective of government interventions through taxation policies and pricing restrictions. The pricing and tax policy interventions by the regulatory authority and their perceived effects on purchase intention are not empirically well examined in the consumer behavior literature. Hence, we set out our broader intention of this research to identify the factors that cause unhealthy consumer behavior among students. Specifically, this study aims to discern whether persuasive advertising cues outweigh health warnings and sin taxes to entice students to

purchase such products. Thus, the central argument of this study is that advertising for unhealthy food products stimulates purchase intention despite the provisions for mandatory health warnings. Accordingly, we contend that two primary latent constructs spur purchase intent: (1) Consumer Awareness and (2) Personality Traits of young adults.

Deshpande et al. (2023), in their SLR review, proposed an S-O-R-based model to test the impact of advertising on unhealthy consumption. Hence, the authors ground the present study on the Stimulus-Organisms-Response (S-O-R) model (Mehrabian & Russell, 1974) and draw upon the hedonic motivation theory (Maslow, 1958) and Cue-theory of consumption (Laibson, 2001) as overarching theories that underpin the theoretical foundations for the proposed research model. First, we rise to argue that certain persuasive advertisement cues cause unhealthy product-buying behavior among students. That is, we consider the compelling advertisement cues as *Stimuli* and the anticipated joy and pleasure expected to receive after using them as the *Organisms* and the purchase intention as the *Response*. Adding to it, we propose that product knowledge (unhealthy aspects) and perceived tax and price policy interventions on unhealthy food products do not bother students and young adults while buying. Because their brand expertise and brand recall created through persuasive advertising trigger hedonic motivation, it significantly influences their decision to purchase such products. Our model also incorporates personality traits such as buying impulsiveness and materialism that affect unhealthy buying habits.

This study contributes significantly to the literature on consumer behavior by exploring the relationship between brand expertise, impulsiveness, and materialism on purchase intention of unhealthy food products among young adults in India. To our knowledge, this is the first study to examine this relationship in the Indian context. The results provide new insights into the factors driving unhealthy food product buying habits among young adults in India and have important implications for marketers, public health organizations, and future researchers. Furthermore, our findings contribute to a better understanding of the complex interplay between consumer characteristics, consumer behavior, health communications, and unhealthy food product consumption and can potentially inform interventions aimed at reducing unhealthy food product consumption in this population.

The remainder of the paper is organized as follows: after a brief review of the S-O-R theories and hedonic motivation literature, the study variables are discussed in greater detail; then, a concise statement of the hypotheses is framed. The methodology section that follows talks about methods and measurement. Then, the results and findings are presented and discussed, and the article concludes by sharing the theoretical and governmental implications of the work.

2. Theoretical background and hypotheses

The optimal taxation of unhealthy goods and the effectiveness of such sin taxes on unhealthy consumption are judiciously explored in the literature. Thus far, conceptualizing the impact of persuasive advertising cues on unhealthy food products using a quasi-experimental design, considering the tax and pricing policy interventions, personality traits, and consumer awareness as some of the predictor variables and their effects on consumption, are rare. To establish a conceptual framework, we reviewed the literature on the consumption/buying behavior for unhealthy products, carbonated beverages, fast food, cigarettes, and alcoholic beverages.

2.1. Stimulus organism response (SOR) theory and consumer buying behavior

The SOR framework was first developed by Mehrabian and Russell (1974), and it states that environmental stimulus (S) causes an emotional organism (O), which in turn encourages a behavioral response (R). Many academics from numerous fields, including the choice to purchase (Demangeot & Broderick, 2016; Lucia-Palacios et al., 2016), impulsive buying (H.-J. Chang et al., 2011; Deshpande et al., 2023), service fairness (Namkung & Jang, 2010), etc., have discussed its significance in the domain of consumer behavior research. Several SOR-based studies in the consumer behaviour and marketing environment support the association between emotional stimulus and customer response in terms of purchase intention, actual buying behavior, consultation, and return (Choi et al., 2018; Li & Kannan, 2014). In the world of

digital marketing, the stimulus reflects the factors that determine how effective ads are (such as the quality of the content and the medium in which the ad is shown); the organism reflects the psychological and emotional state of consumers (such as how trustworthy they feel) and acts as a mediating force that leads to specific behavioral Response (such as the intention to buy) (Manganari et al., 2011; Mummalaneni, 2005). Researchers like Ali (2016), Kim and Lennon (2013), Demangeot and Broderick (2016), and Manganari et al. (2011), amongst others, have lately used the SOR framework to analyse consumers' buying patterns. They all attempted to explore how consumers' emotional and behavioral reactions to marketing and advertising interventions aim to win consumers' trust and create intentions for making purchases.

2.2. Consumer awareness and advertisement

Consumer awareness of the product has been considered the central construct that would affect the purchasing intention of any product (Zafar et al., 2023). Hawkes (2009) emphasized that 'practically no attention has been paid to the impacts of sales promotions on dietary behaviors or how they could be used more effectively to promote healthy eating'. The research so far discovered that persuasive advertisement of unhealthy food products increases consumption among young people (see Effertz et al., 2014, 2019). Unger et al. (2003) showed a positive relationship between alcohol *brand recall* and alcohol consumption among adolescents. Likewise, Waiters et al. (2001) argue that children of all ages enjoy viewing *humorous beverage advertisements* and buying soft drinks. Effertz et al. (2014) show that a *positive visual cue* in the softdrinks advertisement is enough to provoke the purchase intention. They discover that advertising elements mitigate the effects of health warnings. Maclean and Buckell (2021) find that information sources influence the choice of adult e-cigarette smokers in the USA. Chen et al. (2005) found that persuasive advertisement elements (people characters, animal characters, music, story, and humour) significantly affect adolescent purchasing intention. Thus, enticing advertising for unhealthy food products may tempt consumers to consume unhealthy food products despite the mandatory warning provisions. Hence, we argue that two primary latent constructs trigger purchase intention: *consumer awareness* and *personality traits*. Thus, any advertisement of such unhealthy food products increases consumer awareness, which would cause a hedonic motivation to buy such products impulsively. First, we seek to comprehend the perception of high taxes and prices on such unhealthy food products due to government intervention (Elder et al., 2010). Secondly, using the Product Knowledge construct of Burton et al. (1999), we check for knowledge of 'harmful aspects' of a product we showed as the stimuli. Thirdly, their brand expertise with respect to these products was evaluated using conventional scales (Kleiser & Mantel, 1994).

2.2.1. Unhealthy product knowledge

A substantial body of research indicates that knowledge of the negative health effects of junk foods and unhealthy food products significantly impacts purchasing behavior. Worsley (2002) discovered a significant relationship between unhealthy knowledge and food intake. It indicates that product knowledge is important in explaining variations in food choices and healthy eating. Effertz et al. (2014) also outlined that the unhealthy aspects of product knowledge are the second most important factor in consumer socialisation and awareness. In their study, product knowledge demonstrates a thorough understanding of the nutritional value of a product. Moorman and Matulich (1993) contend that health literacy is fostered through the acquisition of health knowledge and effective communication, leading to more health-conscious behaviors. This view is supported by Ippolito and Mathios (1991), who posit that scientific information about a product can foster healthy behavior. For instance, Burton et al. (1999) illustrate how nutritional labelling on a product can influence purchasing decisions. Similarly, Li and Kannan (2014) found that consumers are more likely to try a product if they have a greater understanding of its daily nutritional value. Teisl et al. (1999) also emphasize the importance of education and information sources in raising consumer awareness of the relationship between diet and disease. Their research supports that consumer make healthier purchasing choices when they know the negative health impacts of consuming unhealthy food products. However, Effertz et al. (2014) found that product knowledge did not

significantly affect purchasing of unhealthy food products. Shepherd and Stockley (1987) posited that there is a positive relationship between nutritional knowledge, attitudes toward nutrition, and fat consumption in the United Kingdom. However, their research findings indicated no statistically significant correlation between nutritional knowledge and fat consumption in the UK. Therefore, we assume that unhealthy knowledge will bring restrictive health behavior among the buyers. Therefore, we hypothesize that:

H1: Unhealthy product knowledge negatively influences the purchase intention of unhealthy food products.

2.2.2. Brand expertise

Brand expertise correlates with brand selection and purchase intention (Kleiser & Mantel, 1994). Vieceli and Shaw (2010) proposed a knowledge, media consumption, and brand image model as antecedents of brand salience. In their study, respondents were asked to freely recall brands using category cues by quasi-experimental design, followed by multi-item assessments of brand knowledge, brand associations, and purchase behavior. The SEM analysis of the data supported an empirical model of brand salience, positing a correlation between brand salience and purchase probability. Broadly speaking, it underpins the cue theory of consumption by Laibson (2001). That is, advertisement cues increase the marginal utility of unhealthy food products.

The 'use cues' and 'social cues' embedded in the advertisement also reinforce the purchase intention among students (Liu & Bailey, 2020). Product placement and disclosure, along with age, are often considered effective in deterring addictive behavior (Uribe & Fuentes-García, 2020). However, most ads in India do not divulge the age-related risks when they promote unhealthy products. Instead, they all focus on increasing brand expertise and counterbalancing advertisements that can activate hedonic motivation and impulsive buying behaviour. Hence, using cues and social cues form social support and subsequent buying decisions among students. Such persuasive cues in advertisements increase product knowledge and brand expertise. Effertz et al. (2019) tested the fast-food preferences among Russian children by conducting an experiment exposing them to fast-food advertisements with real and imaginary brand logos and varying advertising claims. Their findings found a strong direct effect of brands on the food preferences of adolescents. They also found that the health warnings worked only for novel fast foods but not for established brands. Given the literature support, we assume:

H2: Brand expertise positively influences the purchase intention of unhealthy food products.

2.2.3. Perceived price and tax policy interventions

Policymakers often impose taxes on unhealthy products, which are called sin or vice taxes (Cowie et al., 2014; Watt et al., 2023), intending to discourage consumption (Hussain et al., 2023). Other interventional policies include nutritional subsidies and food vouchers (Griffith et al., 2018; Hinnosaar, 2023); restaurant food pricing and super-sizing ban (Dobson & Gerstner, 2010); mandatory nutritional labelling (Fichera & von Hinke, 2020). Prior studies have also indicated that an increase in the price of unhealthy foods and beverages may reduce the quantity purchased (Sacks et al., 2021). However, there is also evidence of consumption substitution for non-taxed unhealthy products (Sacks et al., 2021). Taxes on unhealthy products may discourage their consumption, particularly among those with limited disposable income (Effertz et al., 2014).

Sin tax imposition and price increases can discourage the consumption of socially unwelcome products. However, empirical evidence suggests and reflects mixed findings (Pérez-Morón, 2023). Such taxes can, at the very least, prevent the purchase intent of the student population with less pocket money per month (Effertz et al., 2014). Cowie et al. (2014) also base smokers quit smoking due to price hikes. John et al. (2019) argue that high-GST imposition on tobacco would help curb the consumption of Tobacco in India. In contrast, John and Dauchy (2021) recently found that the Good and Service Taxes (GST) transition has helped decrease the price of tobacco products in India. Cowie et al. (2014) also found that price hikes led to smokers quitting. In contrast, Law et al. (2021) found that GST imposition on aerated

drinks in India is not significantly changing the consumption pre- and post-GST regime. Instead, they found that the GST transition has helped decrease the price of tobacco products in India.

Similarly, Pérez-Morón (2023) found that sin taxes are not always effective in deterring unhealthy behavior, though they increase government revenue. John et al. (2022) showed that the Indian tax policy on Aerated or Sugar-sweetened Beverages (ASBs) has mostly been ineffective in raising the actual retail prices of ASBs, leading to a rise in ASB consumption. They also recommended taxing ASBs like sin goods such as tobacco and alcohol. They propose that sin tax should go up enough to keep up with general price inflation and income growth, making them less affordable. By treating tax and pricing policy awareness as a part of consumer awareness, we assume that tax increase on unhealthy goods discourages their purchase intention. Putting all of the antecedents of consumer awareness together, we hypothesize that:

H3: Perceived price and tax policy negatively influence the purchase intention of unhealthy food products.

2.3. Personality traits

Personality traits play a significant role in shaping an individual's behavior and decision-making. Among the various traits, materialism and impulsiveness have garnered attention in recent research due to their impact on consumer behavior and financial decisions. Materialism refers to an individual's preoccupation with acquiring material possessions and wealth (Rook, 1987), while impulsiveness refers to the tendency to act without considering the consequences of one's actions (Clover, 1950). This subheading examines the relationship between materialism and impulsiveness and their influence on unhealthy purchase intention. By exploring the link between these personality traits, this research hopes to provide insight into why some individuals are more prone to impulsive and materialistic choices.

2.3.1. Materialism

Materialism is another personality trait influencing consumer buying behavior (Moschis & Churchill, 1978). Inglehart (1981) states that materialists value worldly and spiritual accomplishments more. According to Richins and Rudmin (1994), Materialism is a system of personal values. They identify three materialist concepts: centrality, happiness, and success. Simply put, Materialism is a desire for wealth and material possessions without regard for moral or spiritual matters (Buijzen & Valkenburg, 2003). Rook (1987) shows that impulsive buying of products is often related to the materialism, sensation seeking, and recreational aspect of purchasing. Thourmrungrroje (2018) shows that a materialistic attitude leads to conspicuous consumption, consumer credit overuse, and impulsive buying. Effertz et al. (2014) report that a higher level of Materialism increased unhealthy food purchase intention among adolescents. Tarka (2020) also found that Materialism among young adults causes compulsive buying behavior in the Polish context. However, the co-variate exhibited a weak influence on explaining the purchase intention. Summarizing the existing literature evidence, we assume that:

H4: Materialism positively influences the purchase intention of unhealthy food products.

2.3.2. Buying impulsiveness

Buying impulsiveness simply means unplanned purchases (Clover, 1950; Singh et al., 2023). A customer makes an impulsive purchase without carefully considering it (Iyer et al., 2020; Wang et al., 2022). Zhang et al., 2010). Using a meta-analysis of impulsive buying literature, Iyer et al. (2020) brought that Traits (e.g. sensation-seeking, impulse buying tendency), motives (e.g. utilitarian, hedonic), consumer resources (e.g. time, money), and marketing stimuli emerge as key triggers of impulse buying. Advertisements as market-related stimuli, in general, can result in adolescents making riskier decisions if they have not yet learned how to control their emotions (Figner & Weber, 2011). According to the hedonic motivation theory (Maslow, 1958), consumers purchase products without considering long-term negative consequences. Like sin goods, eating calorie-dense foods typically leads to immediate pleasure or relief from

displeasure (Williams, 2018). In such cases, people are often motivated to engage in these behaviors despite their association with negative health outcomes. Such impulsive purchasing is prompted by hedonic motivation when such products are seen or given as cues (H.-J. Chang et al., 2011). Ochsner and Gross (2005) and Schreiber et al. (2012) point out that positive emotions elicited by advertisements should be more significant for younger recipients when potential health risks are not adequately disclosed, as they stimulate uncontrolled and impulsive decision-making. From a health perspective, C. Chang (2007) discovered that high school students possess self-smoker image congruency among 'smoking' students. Self-smoker image congruency was higher for smokers than for non-smokers; hence, attitudes toward cigarette advertising were linked to this. Previous literature shows smokers consider smoking more masculine, adventurous, pleasure-loving, and sociable. Hence, unhealthy cigarette-buying decisions often become impulsive and irrational. We propose the following hypothesis:

H5: Buying impulsiveness positively influences the purchase intention of unhealthy food products.

Summing up, all of the theoretical and literary support led us to develop this model below (Figure 1).

3. Methodology

3.1. Experimental design

The current adopts a 1×2 between-subjects experimental design wherein two groups (control and experiment groups) of the respondents were created. We divided the sample into two equal parts and randomly assigned them to Group-1 (control group) and Group-2 (experiment group). For stimuli creation, the study used audio-visual persuasive advertising videos (see Appendix A) of soft drinks and junk foods (hedonic motivations) as the treatment for the experimental group, while printed health warnings on the products were shown to both control and experiment groups. These advertisements were shown as the stimulus for the anticipated joy and pleasure of using such unhealthy food products, as hedonic motivations can sometimes override health warnings and lead to buying intentions when people are driven by the desire to experience pleasure or happiness.

3.2. Survey design and measures

The survey contained two phases similar to Effertz et al. (2014). In the first phase, we created the stimuli by showing the printed health warnings to both groups, i.e. the control group and experiment group, followed by showing the persuasive advertisement videos (audio-visual) of soft drinks and junk foods as

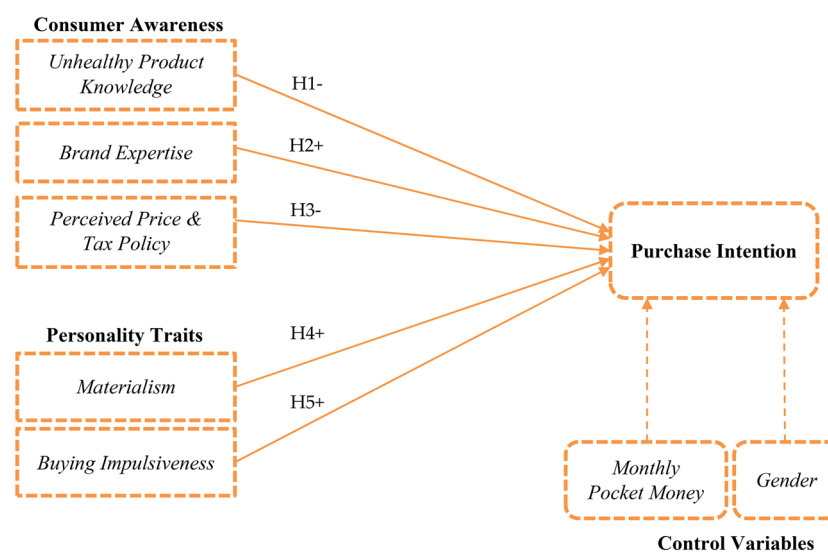


Figure 1. Hypothesized model.

a treatment to trigger hedonic motivation in the experiment group. In the second phase, we rolled out the questionnaire, which consisted of two sections: the first for capturing demographics and the second for measuring six latent variables used in the study. The survey instrument was developed by adopting multiple-item scales from published articles using a 5-point Likert-type scale (1=Strongly Disagree; 5=Strongly Agree). The study used six latent variables. To represent consumer awareness, we used unhealthy product knowledge, perceived price and tax policy intervention, and brand expertise, while impulsiveness and materialism were used to represent consumers' personality traits. To measure purchase intention, which is the dependent variable, we modified the scale of Baker and Churchill (1977) to suit the context of unhealthy purchase intention. We adopted the Burton et al. (1999) scale for product knowledge, while we cited Elder et al. (2010) to measure perceived price and tax policy intervention. Likewise, to capture brand expertise, we adapted a scale from Kleiser and Mantel (1994). We, respectively, cited Moschis and Churchill (1978) and Effertz et al. (2014) to measure materialism. The well-established Buying Impulsiveness Scale developed by Rook and Fisher (1995) was used to estimate the children's propensity to make purchases without prior consideration. Scale items with their sources are shown in Table 4.

3.3. Piloting

Initially, the questionnaire scales underwent scrutiny for subjectivity and linguistic accuracy before proceeding to the pilot survey (Podsakoff et al., 2012; Saunders et al., 2016). Subsequently, the questionnaire was reviewed by five researchers specializing in marketing and consumer psychology, along with ten students from the target sample, to evaluate its quality and linguistic correctness. To enhance the questionnaire's validity, their suggestions regarding the subjectivity and unidimensionality of the measurement scales were considered. In alignment with qualitative remedial guidelines suggested by Podsakoff et al. (2012), each questionnaire item's wording was refined to be clear, straightforward, single-faceted, and devoid of errors, eliminating double-barrelled questions. Following the qualitative evaluation of the questionnaire scales, a pilot study involving 58 students from the target sample was conducted to assess the internal consistency and reliability of the measurement scales using Cronbach's alpha. The results of the pilot study confirmed that the scale items demonstrated satisfactory internal consistency (i.e. $\alpha > 0.70$).

3.4. Participants and main survey

We recruited university students (Generation-Z participants) who were born between 1995 and 2004, thereby ensuring participants' adulthood status. Before recruiting the participants for the study, we asked three screening questions showing photos of junk foods and aerated drinks. The questions are (1) are you aware of these products? (2) have you ever purchased these products, and (3) have you ever consumed these products? We chose only those who answered 'Yes' to these questions. In November 2022, precisely, we approached 987 students from three private universities in South India, with a diverse student population, and asked them the above screening questions. 841 students consented to participate in the survey and responded positively to these questions; thus, they were recruited to the final survey and asked to scan a QR code to access an online consent form. The consent form also asked the respondents to create a unique response ID, a combination of student enrolment ID and the first three letters of their last name. The unique respondent ID was used for data randomization and the creation of the control and experiment groups. We randomized the data in MS Excel using the RAND formula and assigned group 1 (control group) to respondents having randomized scores ≤ 0.50 and group 2 (experiment group) to respondents having randomized scores ≥ 0.51 . Henceforth, we created the control (414 randomized participants) and experiment (427 randomized participants) groups. Before rolling out the survey instrument, we created stimuli by showing printed health warnings to both groups separately in their classrooms, followed by projecting audio-visual persuasive advertising videos to trigger hedonic motivations among the participants in the experiment group. Following the stimuli creation process, we asked the respondents from both groups to fill in the survey instrument that contained measurement scales to capture six latent variables. Among 841 participants (combined from control and experiment

groups) who consented to participate, we considered only 775 filled in the questionnaires (control group = 382 respondents; experiment group = 393 respondents) and processed the data for cleaning and preparation procedures.

3.5. Data preparation

We checked the data for unengaged and outlier responses in both groups before proceeding with the homogeneity test and group comparison (control vs. experiment). Upon examination, we found 14 questionnaires in the control group and 17 questionnaires in the experiment group with inappropriate responses; thus, they were removed from the dataset. We also dealt with statistical outliers using Cook's distance approach. We decided the threshold for an outlier response using the following formula $Di = 4 / (N - K - 1)$ where, the sample size is represented by 'N' while 'K' represents the number of independent variables in the study (Pituch & Stevens, 2015). Following the above formula, the outlier threshold was determined to be 0.11 for both the control and experiment groups. Upon observation, we found 27 responses from the control group and 21 responses from the control group, breaching the threshold of 0.11; thus, they were also discarded from the sample. The final sample size left for the control group was 341 respondents comprising 182 males and 159 females, while for the experiment group, the final sample was 355, comprising 203 males and 152 females. Table 1 demonstrates the respondents' demographic profiles.

3.6. Method bias

We applied the full-collinearity test suggested by Kock (2015) to test for common method bias in our dataset. Following the recommendations, we calculated the Variation Inflation Factor (VIFs) by iteratively making each latent variable an outcome variable. The results showed that the VIFs were all below the cut-off limit of 3.3 (Kock, 2015), indicating the absence of method bias in the dataset.

3.7. Homogeneity check and post-treatment group comparison (control vs. experiment)

To ensure that both control and experiment groups are homogeneous regarding respondents' demographics, we applied an independent sample *t*-test. The *t*-test results confirmed that respondents of the control and experiment groups were statistically indifferent regarding their demographic properties, gender, and monthly pocket money. Moreover, to check the treatment effect on the experiment group, we also compared mean values (using a *t*-test) of all six variables across control and experiment groups. The results affirmed that the perceived levels of buying impulsiveness, materialism, and purchase intention were significantly higher among the participants of the experiment group, while the levels of variables representing consumer awareness remained statistically indifferent across the control and experiment groups. These results coincide with the phenomenon of 'health discounting', inferring that hedonic motivation is likely to trigger buying impulsiveness and materialism among consumers, which may lead to the formation of purchase intention toward unhealthy food products despite being aware of health warnings.

Table 1. Respondent's demographic profile.

Demographic variable	Control group N=341		Experiment group N=355	
	Frequency	Percentage (%)	Frequency	Percentage (%)
<i>Gender</i>				
Male	182	53.40	203	57.20
Female	159	46.60	152	42.80
<i>Monthly pocket money (INR)</i>				
₹ <3000	84	24.60	90	25.40
₹ 3001–5000	139	40.80	151	42.50
₹ >5000	118	34.60	114	32.10

Table 2. CFA and SEM model fit indices.

Model	CMIN/DF	GFI	TLI	CFI	RMSEA
Study model	1.806	0.932	0.980	0.984	0.052
Recommended value	Acceptable 1–4 Wheaton (1987)	≥ 0.90 Shevlin and Miles (1998)	≥ 0.95 Hu and Bentler (1999)	≥ 0.95 Hu and Bentler (1999)	< 0.07 MacCallum et al. (1996)

4. Results

We employed covariance based structural equation modeling (CB-SEM), a combination of model measurement (i.e. assessment of model's global fit indices, reliability and validity) and hypotheses testing, to ensure that the data is valid and reliable for hypotheses testing (Kline, 2015). Using AMOS v.24.0, first we established the measurement model to check whether the data meet the criteria for global fit indices, and reliability (internal consistency of the measurement scales) and validity (convergence and divergence).

4.1. Measurement model assessment

The study moved ahead with the final sample of the experiment group ($N=355$) after confirming the effect of stimuli creation treatment by comparing means scores of all six latent variables across control and experiment groups. The study proposes a hypothesized model that comprises six latent constructs, viz. perceived price & tax policy intervention, unhealthy product knowledge, and brand expertise representing consumer awareness dimension, followed by buying impulsiveness and materialism representing consumers' personality trait dimension. At the same time, purchase intention was the outcome variable of the study. The data were analyzed with structural equation modelling (SEM) using AMOS. SEM is an expansion of multiple regressions and factor analysis, a powerful, all-encompassing technique for examining multiple variables and hypotheses, their connections, and interconnectedness (Hair et al., 2010). The study evaluated the measurement model (model fit, convergence, and divergence) before testing the structural model by drawing a CFA model in AMOS v23.0 that included all six latent constructs (Kline, 2015). The results in Table 3 show that the measurement model has excellent global fit indices. Finally, we tested the hypotheses using structural equation modelling while controlling for demographic variables, gender, and monthly pocket money.

In addition to global fit indices, the measurement model verifies convergent and discriminant validity and scale internal consistency (Kline, 2015). The study confirms the measurement model's convergent validity using CFA loadings and average variance extracted (AVE). A construct holds good convergence when the average standardized CFA loading is at least 0.708 and AVE (squared value of average CFA loading) is at least 0.50 (Hair et al., 2010; Henseler et al., 2012). Table 4 confirms that average CFA loading and AVE values for each latent construct are well above the cut-off limits, and the study's measurement models converge. Moreover, Cronbach's alpha and composite reliability were utilized to determine the internal consistency of the measurement scales (CR). For each latent variable, Cronbach's alpha and CR statistics (see Table 4) were greater than 0.70 (Bagozzi & Yi, 1988; Hair et al., 2010). Moreover, all the scales used to capture latent constructs demonstrate sufficient internal consistency with Cronbach's alpha (α) and composite (CR) reliability values exceeding the 0.70 thresholds (Stevens, 2012).

The study evaluated the discriminant validity of the measurement model using the criteria of Fornell and Larcker (1981) and the HTMT ratios approach (Henseler et al., 2012). According to Fornell and Larcker (1981), discriminant validity is established when the square root of the AVEs (represented by the bold diagonal values in Table 4) is greater than the below-diagonal correlation coefficients. Table 5 shows that the bold diagonal values are higher than the below-diagonal correlation coefficients for each latent construct, implying that the model possesses discriminant validity. Table 6 also provides descriptive statistics, mean and standard deviation. The correlations between latent constructs are consistent with the hypotheses.

Additionally, the discriminant validity of the model is confirmed using the HTMT ratio method. Table 5 shows that the HTMT ratios for the latent components are all less than 0.85, meeting the threshold for discriminant validity set by the research (Henseler et al., 2015).

Table 3. CFA loadings, Cronbach's alpha, CR, and AVE.

Variable name	Item code	CFA Loading	Alpha (α)	CR	AVE
Purchase intention (PI) Source: Baker and Churchill (1977)			0.862	0.865	0.699
'I would support the consumption of this product'.	PI1	0.813			
'I would like to try this product'.	PI2	0.879			
'I would buy this product if I happened to see this at a store'.	PI3	0.801			
'I would actively seek out these products to purchase them'.	PI4	0.853			
Unhealthy product knowledge (PK) Source: Effertz et al. (2014)			0.847	0.851	0.670
'I know that this product is harmful to my health and well-being'.	PK1	0.771			
'Compared to others, I am reasonably informed about this product'.	PK2	0.812			
'Long-term consumption of this product can cause serious negative consequences'.	PK3	0.873			
Brand expertise (BE) Source: Kleiser and Mantel (1994)			0.867	0.870	0.618
'I automatically know which brands of these products to buy'.	BE1	0.751			
'Without much effort, I can identify my brand at the store'.	BE2	0.772			
'I know most of the existing brands of these products'.	BE3	0.801			
'I can recognize all of the brands of these products'.	BE4	0.821			
Perceived price and tax policy intervention (PTP) Source: Elder et al. (2010)			0.838	0.841	0.571
'I know that these products are costly due to additional taxes.'	PTP1	0.721			
'Government imposes additional taxes to discourage the consumption of these products'.	PTP2	0.752			
'I anticipate that the price of these products would go further up'.	PTP3	0.793			
Materialism (MT) Source: Moschis and Churchill (1978)			0.816	0.822	0.623
'Money can indeed buy happiness'.	MT1	0.774			
'My dream in life is to own expensive things'.	MT2	0.781			
'I buy some things hoping to impress others'.	MT3	0.813			
Buying impulsiveness (BI) Source: Rook and Fisher (1995)			0.833	0.838	0.631
'Others judge me based on the products and brands I use'.	BI1	0.802			
'Sometimes, I feel like buying things head over heels'.	BI2	0.821			
'I often buy products without even thinking'.	BI3	0.813			
'I carefully plan most of my purchases'.	BI4	0.741			

Note. AVE=Average variance extracted; CR=Composite reliability.

4.2. Hypotheses testing (direct effects)

The study ran an SEM model to test the hypotheses related to the direct effect of the predictor variables: unhealthy product knowledge (PK), brand expertise (BE), perceived price & tax policy intervention (PTP), materialism (MT), and buying impulsiveness (BI) on the outcome variable purchase intention (PI). The study proposes hypotheses H1 and H3, proposing that PK and PTP negatively influence consumers' purchase intention. However, the results from Table 6 affirm otherwise. PK ($\beta = -0.108$; CR = -1.521; p -value > 0.05) and PTP ($\beta = -0.126$; CR = -1.880; p -value > 0.05) were found to have an insignificant negative effect on consumers' PI, thereby hypotheses H1 and H3 were not accepted. Further, the study also proposes that BE (H2), MT (H4), and BI (H5) positively influence consumers' PI. The results are found in conformity with the hypotheses affirming that BE ($\beta = 0.229$; C.R. = 3.470; p -value < 0.01), MT ($\beta = 0.307$; CR = 3.655; p -value < 0.01), and BI ($\beta = 0.295$; CR = 3.734; p -value < 0.01) significantly enhance PI; thus, hypotheses H2, H4, and H5 stand supported. However, both the control variables, viz. gender and monthly pocket income, were found insignificant; therefore, they were excluded from the final model.

Table 4. Descriptive statistics, correlations, and discriminant validity.

Variable name	M	SD	PI	PK	BE	PTP	MT	BI
Purchase intention	5.131	1.661	0.836					
Unhealthy product knowledge	4.883	1.093	0.262**	0.818				
Brand expertise	5.110	1.161	0.381**	0.447**	0.786			
Perceived price and Tax policy intervention	4.952	1.445	0.223*	0.308**	0.231**	0.756		
Materialism	4.664	1.203	0.495**	0.542**	0.411**	0.218*	0.789	
Buying impulsiveness	4.601	1.334	0.428**	0.459**	0.407**	0.296**	0.481**	0.794

Note: Correlations are significant at 1% level** and 5% level*; M=Mean; SD=Standard Deviation PI=Purchase intention; PK=Unhealthy product knowledge; BE=Brand Expertise; PTP=Perceived price and tax policy intervention; MT=Materialism; BI=Buying Impulsiveness. Bold diagonal values represent the squared root of AVE for discriminant validity.

Table 5. Discriminate validity.

Variable name	PI	PK	BE	PTP	MT	BI
Purchase intention						
Unhealthy product knowledge	0.583					
Brand expertise	0.721	0.651				
Perceived price and Tax policy intervention	0.602	0.763	0.734			
Materialism	0.689	0.638	0.720	0.667		
Buying impulsiveness					0.693	

PI=Purchase intention; PK=Unhealthy product knowledge; BE=Brand Expertise; PTP=Perceived price and tax policy intervention; MT=Materialism; BI=Buying Impulsiveness. Bold diagonal values represent the squared root of AVE for discriminant validity.

Table 6. Standardized direct effects.

Hypothesis (Path)	Std. estimate	SE	CR	p-Value	Decision
H1: PK → PI	−0.08 ^{NS}	0.71	−1.521	0.29	Not supported
H2: BE → PI	0.29***	0.66	3.470	<0.01	Supported
H3: PTP → PI	−0.26	0.67	−1.880	0.61	Not supported
H4: MT → PI	0.07***	0.84	3.655	<0.01	Supported
H5: BI → PI	0.95***	0.79	3.734	<0.01	Supported
Adjusted R ² = 0.341 (34.10%)					

Note: ***p-value < 0.01; ^{NS}p-value > 0.05; S.E. = Standard Error; CR=Critical Ratio; PI=Purchase intention; PK=Unhealthy product knowledge; BE=Brand Expertise; PTP=Perceived price & tax policy intervention; MT=Materialism; BI=Buying Impulsiveness.

5. Findings and discussion

The purpose of this paper is to examine the impact of consumer awareness (unhealthy product knowledge, brand expertise, and perceived Price and Tax policy interventions) and personality traits (buying impulsiveness and materialism) on purchase intention of unhealthy food and beverage products, as well as explore opportunities for advancing health communication and consumer behavior literature and policy impact. An experimental group of 355 adults was first shown audio-visual advertisements of unhealthy food products. Subsequently, we asked them to fill out the questionnaire. The findings of the study throw light on the existing body of consumer behavior literature. Firstly, the students knew that a substantial amount of additional taxes are included in the purchase price of the unhealthy goods they purchase. In addition, they anticipate that the price will increase further. However, it surprisingly does not statistically significantly affect their unhealthy food product buying. It must be due to their impulsive behavior when they see such unhealthy food products. Thus, H1 of the relationship between perceived tax policy intervention and buying choice does not hold. The finding supports the empirical discovery of Pérez-Morón (2023) while it contradicts the empirical findings of Sacks et al. (2021). Thus, this result suggests that increasing taxes to discourage consumption has not been effective. Moreover, the result shows no control effect of the student's gender and monthly pocket money.

Second, the unhealthy Product knowledge does not appear to significantly impact unhealthy buying behavior despite the health warnings and nutritional facts in the product package. Evidence suggests that most respondents know the adverse health effects of the products (M=5.11 and SD = 1.16). Still, they do not change their plans to buy unhealthy food products. The relationship between product knowledge (unhealthy aspects) and buying intention is insignificant (see Figure 2). This finding replicates

the results of Kleiser and Mantel (1994) and Viecei and Shaw (2010). As shown in the beverage experiment (Teisl et al., 1999), making students aware of the link between diet and disease did not work here either. Similarly, Burton et al. (1999) demonstrate that compelling advertising cues induce purchase intent among students.

Third, brand expertise also turned out to be influencing unhealthy buying. We find that brand expertise has a positive and significant impact on the unhealthy buying decisions of students - supporting the notion that persuasive advertising cues effectively generate hedonic motivation and, subsequently, the purchase intent. It indicates that students are familiar with the brands they will likely purchase when seeking unhealthy food products for diet or leisure purposes. Again, respondents are familiar with most brands in these product categories. Despite being aware of the negative health consequences, students still choose such products. Thus, it suggests that neither the restrictive health behavior mentioned by Moorman and Matulich (1993) nor the positive health behavior of Ippolito and Mathios (1991) is present among most sampled students.

Finally, the student personality traits play a crucial role in their decision to purchase unhealthy food products. The current study results show a strong correlation between impulsive buying behavior and materialism and the purchasing behavior of unhealthy food products. Persuasive advertising cues for junk foods and sugary drinks have been shown to cause students' impulsive responses, leading them to make unhealthy choices. Again, the materialistic approach to life intensifies such purchasing decisions. Their hedonic motivation shoots up when they see soft drinks and junk food advertisements. Materialistic and impulsive students are more likely to disregard health warnings and the negative consequences of unhealthy food products and continue to consume them. Previous literature by Moschis and Churchill (1978) and Rook and Fisher (1995), along with many recent findings examining the impact of materialism and impulsive buying, resembles our findings.

The Cue theory of consumption by Laibson (2001) contends that cues with impulsive and materialistic attributes can eventually form a habit of consuming unhealthy food products and increase marginal utility for unhealthy food products – which is concerning from a public health standpoint. Similarly, the findings indicate that hedonic motivation to purchase sin products is prevalent. That is, similar to SOR theory, when they see attractive advertising cues, pleasure receptors activate, and students prefer to impulsively buy unhealthy food products, ignoring the long-term consequences of unhealthy consumption. Overall, advertising cues effectively act as stimuli, triggering positive organisms in memory and ultimately leading to students' purchase response of unnecessary products.

6. Theoretical and practical implications

Our findings provide implications for consumer policy, especially for protecting children and young adults. Health warnings fail, and health risk discounting happens when producers can respond to

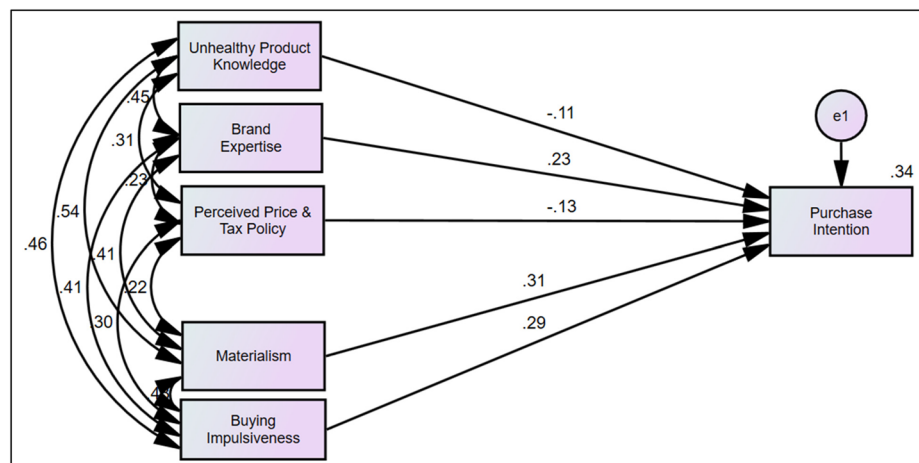


Figure 2. Tested model.

mandatory warnings by creating counterbalancing advertisements. Adding to it, imposing extra taxes on such products has also not been of help in discouraging unhealthy buying among the student population. Often, the intended purpose and the actual result of regulation are quite different; this is the case here. It also indicates that unhealthy products marketers are flexible in dealing with mandatory health warnings with persuasive advertising cues. Finally, the findings could also explain why the results in the health warning literature aren't entirely consistent with one another. The primary recommendation from our investigations is that those in charge of making decisions regarding public health should investigate how such big players in the sinful industry are counterbalancing the health warnings.

Several recommendations can be proposed to mitigate the harmful effects of unhealthy product consumption and encourage healthier choices. Firstly, governments and businesses can invest in promoting healthier alternatives, such as fruits and vegetables (special nutritional programs), and educate consumers on their benefits. It can increase the demand for these healthier options and make it easier for consumers to make informed choices. Furthermore, subsidies can be provided to lower costs and increase accessibility to these healthier alternatives. For example, similar to Hinnosaars (2023) findings, this finding would aid in analyzing the impact of the Special Supplemental Nutrition Program for Young Adults and measuring non-persistence in long-term healthy behavior among the young population. To balance out unhealthy diets and promote sustainable consumption among youngsters, this study can help identify the products that nutritional subsidy programmes could be introduced to support.

Similarly, it would help identify the unhealthy products that need to be regulated through mandatory health warnings, mandatory nutritional labelling, and sin tax interventions. Indian governments may consider implementing even stricter policies to reduce the negative consequences of unhealthy product consumption, such as increasing taxes and pricing regulations on unhealthy food products or restrictions on their availability. For example, Watt et al. (2023) suggested removing the price discounts to regulate and reduce the purchase volume of unhealthy products in the UK context. Similarly, a ban on super-sizing and low pricing of unhealthy products is also proposed (Dobson & Gerstner, 2010). This result also provides ample room for future research on the optimal sin tax structure. Taxing unhealthy foods and beverages is a promising strategy to improve public diets. From a revenue viewpoint, the government can alleviate the budgetary pressure and crisis by increasing sin taxes to the optimal level and treating them as an additional revenue source. Law et al. (2021) highlight that no comprehensive analysis exists on the relationship between GST/indirect reforms, industry practices, and individual behavioral choices. Thus, it also highlights room for further research to examine the impact of indirect tax reforms on public health services. Such tax interventions can serve as a deterrent against consumers and reduce the demand for these products.

Similarly, labelling requirements can be introduced to provide consumers with calorie information and ingredient lists, enabling informed decision-making. King et al. (2021) recommend retaining visual juxtaposition examples in soft drink advertising, which consists of two images placed next to one another in a single visual presentation, to improve public communication of the health risks associated with unhealthy food products. Likewise, Uribe and Fuentes-García (2020) uncovered that product placement disclosure and promotion increase the awareness and recall of the unhealthy aspects of fast foods. Disclosure of age restrictions in advertisements and on-product labels might help combat this unhealthy consumption behavior among students. Governments and businesses may also consider implementing measures that promote self-regulation and encourage informed decision-making to counteract the influence of hedonic motivation. This can be achieved through health education campaigns, providing health warnings on packaging, and other awareness-raising activities. Additionally, governments may consider restricting the marketing and availability of unhealthy food products, particularly to children, and limiting their availability in certain public spaces such as schools and parks. Also, we suggest disentangling the warning from the other components of the advertisement, such as by broadcasting it in advance or allocating the warning an appropriate space in print media, which is one of the possible mechanisms that could be used to ensure that warnings are effective. The advertising of unhealthy food products may also be banned, especially to children, to reduce exposure and demand for such products.

7. Conclusion

The study examined the overriding effects of persuasive advertisements for unhealthy food products, like junk foods and carbonated beverages. This study integrated the Stimulus-Organisms-Response (SOR) model with the Hedonic Motivation theory and the Cue-theory of consumption to examine the influence of consumer awareness and personality traits variables on purchase intention of unhealthy food products among generation-z consumers of India. Using experimental and control groups, we projected printed health warnings and advertising videos to the control and experiment groups. After that, a structured questionnaire was administered to both groups.

The results affirm that brand expertise, materialism and impulsive buying enhance unhealthy purchase intention, thus confirming that hedonic motivations override the effect of health warnings since PK and PTP fail to reduce purchase intention. The findings suggest that mandatory health warnings could fail to discourage consumers from buying unhealthy food products when companies respond with counterbalancing persuasive advertisement cues. Though health warnings and sin taxes are imposed to discourage the consumption of these products, they seem ineffective. Government agencies could use the study's findings to optimize revenue collection and protect public health by increasing taxes on these harmful products.

7.1. Limitations and future research directions

Like any other study, the current study also has a few limitations. First, the study was undertaken in India; thus, one must exercise caution when extrapolating the study's findings to other contexts or settings. The quasi-experimental design does not establish causality as strongly as randomized controlled trials, even though our study variables, such as brand expertise, impulsiveness, and materialism, are turning out to be significant. There might have occurred a social desirability bias and limited the accuracy of the data as the relationship turned out to be based on self-reported measures.

Similar to Akram et al. (2018), future studies can also explore the impulsive online buying of unhealthy food in a social commerce environment. Future research could examine how confounding factors like accessibility, affordability, cultural norms, and individual preferences influence unhealthy food choices. Future research might also replicate the study and apply it to a larger and more diverse sample of young adults in India to validate the generalizability. Future research can also help to expand the 'psychopath behavior' literature of Forster and Lund (2018) by linking such behavior among young adults with the persuasive advertising-induced consumption of sin goods such as cigarettes and unhealthy alcoholic products. Similar to Shuai et al.'s (2022) study, future studies can examine the time-of-day effect (morning vs evening) influencing unhealthy purchase behavior by using follow-up eye-tracking experiments at point-of-sale data. A longitudinal examination of the relationship between the significant variables is also possible. Following that, an intervention study aimed at promoting healthy food choices among young adults in India can be conducted. For example, designing a nutrition education programme for young adults and evaluating the program's impact on food choice is an option. Similarly, a cross-country comparison can be performed to identify the unique factors influencing different factors using a mixed-method approach (interviews and focus groups) to understand unhealthy diet habits better. Future research can investigate the mediating effects of impulsiveness and/or materialistic personality traits while examining the relationship between consumer awareness and intention to buy unhealthy food products. Future research could include moderators such as age, pocket money, socio-economic status, and gender.

Ethics statement

Data were anonymized, and no personal information like contact numbers or/and email addresses were solicited; therefore, the Research Ethics Committee approval was exempted for this study. Informed consent was obtained from all individual participants included in the study. Their participation was voluntary, and they could withdraw from the study at any point. No minor participants were recruited for the survey.

Disclosure statement

The authors declare no conflict of interest. The funders had no role in the design of the study, in the collection, analyses, or interpretation of data, in the writing of the manuscript, or in the decision to publish the results.

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Data availability statement

The data will be made available upon reasonable request.

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Appendix A



Soft Drink Health Warning

Figure A1. KFC chicken and Pepsi drink. **Visual Advertisement Cues:** Link: KFC IndiaPopcorn Chicken TV Commercial 2011 – YouTube.



Soft Drink Health Warning

Figure A2. McDonald meals and Coca Cola drink. **Visual Advertisement Cues:** Link: Indulge in the NEW McCheese Burger only at McDonald's India – YouTube.