

# Food for Thought: Examining the Consequences of Food Intake in the Presence of Television.

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Food intake, calorie consumption, and time spent watching television have all risen substantially across the United States over the past several decades. According to Lynch from the Business Insider in 2016, the average American adult watches TV for over 5 hours per day and consumes over 3600 calories. Therefore, combining these two activities by eating while watching TV is also likely becoming increasingly common. Consuming food while watching TV is a form of multitasking that can allow people to catch up on their favorite TV show during their lunch break. However, this behavior is also a distraction that draws attention away from food as well as internal hunger cues such as fullness (Francis et al., 2017). As a result, eating in front of the TV has been associated with increased eating and a rise in rates of obesity.

Although most people may not see much harm in snacking while watching TV, health psychology research has found evidence that doing so can lead to weight gain along with other unintended consequences. Early research on this topic examined how biological factors such as BMI and waist-hip ratio relate to the frequency of TV viewing and physical activity across genders and whether eating while watching TV mediated this relationship. More recent research has expanded on these topics by examining the impact of other types of distractions such as driving and social interaction on both current and

future food intake. Furthermore, several studies have attempted to narrow in on the specific forms of TV content that increase food intake the most. For example, how does a highly engaging TV program impact food consumption compared to a relatively boring program? Alternatively, how does watching a cooking show or viewing various kinds of food advertisements while snacking affect food intake? Finally, research has analyzed how the dietary habits of an individual can predict the quantity of a particular food they will consume while watching TV. This review will address all of these different areas of research and their implications. Critiques of research designs and suggestions for future research will also be discussed.

## **Methodology**

The literature search was conducted by accessing original research articles primarily through the PsycINFO and PubMed databases. Google Scholar was also used as a search engine for locating potential articles. Key words and phrases such as “television”, “food consumption”, “distraction”, and “obesity” were used in various combinations with each other to locate research articles. Articles were screened by examining the abstract to assess their alignment with the topic at hand and then reviewing the full text for articles not screened out. Furthermore, more recently published and widely cited research in high impact journals was prioritized over older research articles in lower impact journals for inclusion in this literature review. The goal of the literature review is to provide the reader with an overview of how different types of factors can impact the consequences of eating while watching TV. Therefore, eligible articles were eventually grouped together by their main findings to form the sections of the literature review.

## **Biological Variables, Gender, and TV Viewing**

Before examining the consequences of eating while watching TV on obesity, it is important to be aware of the general effects of watch-

ing TV without any food involved. To address this, Parsons et al. (2008) assessed the link between television viewing and obesity through a longitudinal study using people born in England, Scotland, and Wales in 1958. Participants reported how frequently they watched television at ages 11, 16, and 23 using categories such as 'often', 'sometimes', or 'never or hardly ever.' At age 45 participants were asked to estimate how many hours of television they watched per day over the last year. BMI was also calculated at each age using heights and weights and waist-hip ratio was taken at age 45. The study found that females who watched television more frequently at 11, 16, and 23 years old had faster BMI gains between 23 and 45 years old. This finding was less consistent for males. However, both males and females who watched TV at least 5 times per week at age 23 had a waist-hip ratio that was about 0.01 higher at age 45. Overall, the authors conclude that frequency of television viewing early in life is associated with larger gains in BMI and waist-hip ratio by age 45 and therefore TV viewing does contribute to obesity.

Due to gender differences observed in the association between TV viewing and health outcomes such as BMI, glucose metabolism, and risk of type 2 diabetes, researchers have analyzed gender differences in sedentary behaviors. Sugiyama et al. (2008) administered a questionnaire to men and women between the ages of 20 and 65. The questionnaires asked participants about the frequency and duration in which they watch television and engage in other sedentary behaviors such as reading, playing video games, talking on the phone, and driving in a car. Participants were also asked to report the amount and intensity of physical activity they undertook during their leisure-time. The study found that, for women, there was a positive association between time spent watching TV and other sedentary behaviors but a negative association with leisure-time physical activity. In contrast, no associations were found in men. These findings suggest that TV viewing is a better marker of a sedentary lifestyle in women than in men

which helps explain the higher BMI gains for women in Parsons et al. (2008). The authors suggest that women likely dedicate more time to doing house chores outside of their work hours while men often get more physical activity outside of work which could contribute to these effects.

Although television viewing has an impact on BMI across genders, food consumption while watching TV might also play an important mediating role. Cleland et al. (2008) propose two potential hypotheses for what drives the association between TV viewing and obesity: increased food intake while watching TV or reduced leisure-time physical activity. To answer this question, the authors conducted a cross-sectional study on adults between the ages of 26 and 36. Participants were instructed to report the total amount of time they watched TV during the past week as well as how often they consumed a meal, snack, or drink during this time. Waist circumference for each participant was also measured. The study found that women who watched TV for more than 3 hours a day had significantly higher rates of severe abdominal obesity compared to women who watched TV for less than an hour per day. This was also true for men except that men who watched lots of TV had higher rates of moderate (but not severe) abdominal obesity. Despite how food and drink consumption while watching TV was associated with larger waist circumference, it only partially explained the relationship between abdominal obesity and TV viewing. However, the relationship between leisure-time physical activity and TV viewing was weak so there is no support for this hypothesis. The authors conclude that the association between TV viewing and abdominal obesity is partially mediated by food and beverage intake but that other behaviors likely also contribute to this association.

## **The Impact of Distractions on Current and Future Food Intake**

Although everybody is aware that watching TV can be a distraction, fewer people realize that eating while watching TV affects both their current and subsequent food intake. Higgs and Woodward (2009) investigated this phenomenon using female college students. All participants were asked to consume the same 400 calorie lunch in a laboratory while either watching TV (experimental condition) or without watching TV (control condition). A few hours later, all participants were brought back for an afternoon snack of cookies and asked to rate how vividly they were able to remember the lunch they had consumed. The study found that participants who had eaten their lunch while watching TV ate significantly more cookies as a snack than participants in the control condition. Additionally, these participants in the experimental condition could less vividly recall what they ate for lunch which suggests that snack intake might be associated with reduced recollection of the lunch meal. More broadly, the authors propose that people use their memory of a previous meal to determine what they should eat in the future. Therefore, watching TV increases both current meal consumption and later food intake by impeding memory of what was consumed previously.

Although watching TV can easily distract individuals from other tasks, it is only one of the countless distractions that people are faced with on a near daily basis. Ogden et al. (2012) examined how different forms of distraction affect eating behavior. Female participants between 18 and 40 years of age were randomly assigned to one of four conditions which included television viewing, simulated driving, social interaction, or being alone (the non-distracting control condition). In all conditions, the experimenter gave participants a bowl of snack food and the study lasted for seven minutes. Each participant's food intake was recorded, and they were given questionnaires both before and after eating that assessed their desire to eat. The study found that those in the TV viewing condition consumed more food

than those in the other distraction conditions despite no increase in the desire to eat. To interpret these results the authors propose a model of mindless eating. They argue that, when distracted by external factors, individuals become distracted from internal cues such as hunger and satiety which leads them to eat mindlessly. However, individuals also need some level of cognitive capacity in order to eat. Therefore, the author's reason that those who watched TV ate the most because those individuals were distracted from their internal hunger cues but still retained the ability to eat meaning they ate mindlessly. Participants in the driving condition were distracted from their internal hunger cues but the driving task interfered with their ability to eat so they only ate a little bit of food. Those in the social interaction condition were distracted from eating in order to interact and may have felt social uneasiness which led them to consume less food. Finally, participants in the control condition were not distracted from their internal hunger cues and therefore consumed the snacks mindfully in moderation. In conclusion, only certain types of distractions that do not disrupt one's cognitive capacity appear to increase food consumption.

### **The Role of Television Content**

Although TV encourages food intake in general, research reveals that different types of TV content have differential effects on eating. For example, Chapman et al. (2014) investigated the relationship between TV content and food intake. Healthy female participants took part in each of three conditions spaced one week apart. These included an engaging TV condition in which participants viewed an episode of a comedy show, a boring TV condition in which participants watched an art lecture, and a control 'text' condition where participants read non-engaging reading material. During each condition, participants had access to a high calorie snack (M&Ms) and a low-calorie snack (grapes). The study found that boring TV significantly increased consumption of both types of snack foods relative to engag-

ing TV. Furthermore, engaging TV significantly reduced food intake compared to the text condition. Differences in consumption were primarily driven by the grapes which the authors attributed to the women in the sample having restrained eating habits. Finally, a participant questionnaire found a significant positive correlation between boredom and food intake. Therefore, the authors concluded that the emotional state caused by the television content modulates eating behavior with boring programs eliciting greater food intake.

Other studies have attempted to assess the impact of engaging and boring TV content on food consumption by manipulating engagement in other ways. Whereas Chapman et al. (2014) manipulated both the content of the TV programs and the task by having participants in the control condition read text, Mathur and Stevenson (2015) produced variations in engagement by manipulating content familiarity. This ensures that any observed differences in food intake are truly caused by differences in engagement as opposed to merely the type of task or TV program. To do so, they had female college students take part in each of two conditions. In the “different” condition, the participant watched two different episodes of the comedy *Friends*. In the “same” condition, the participant viewed a different episode of *Friends* twice in a row. In both conditions the participants were offered a variety of snack foods that they could only eat during the second episode. As expected, the study found that participants consumed significantly less snack food when watching a novel episode of *Friends* compared to when watching a familiar episode. The authors provide several interpretations of these findings. One explanation is that forcing participants to watch the same episode twice may have been irritating and negatively impacted their mood which could have driven up their food intake. Alternatively, the familiar episode was likely less distracting which could allow participants to spend more time eating as opposed to watching the screen. A highly engaging novel episode could also lead people to eat slower or to forget

about eating altogether. Overall, this study design allows for a better understanding of the factors that underlie the association between TV content and food intake.

Not only do boring and engaging TV content impact food consumption but specifically watching food related TV shows has its effects on food intake. Bodenlos and Wormuth (2012) assessed this by randomly assigning predominantly women participants to watch a 10-minute clip of either a cooking program on the Food Network (experimental condition) or the nature documentary *Planet Earth* (control condition). After viewing the clip, all participants were asked to do a taste testing experiment and were presented with snack bowls of cheese curls, chocolate covered candies, and carrots. The participants were left alone for 10-minutes and instructed to eat as much of each food as desired. The study found that once controlling for hunger and food preference, participants who viewed the cooking program ate significantly more chocolate covered candies than those who watched the nature program. However, there were no significant consumption differences of cheese curls and carrots or caloric intake overall. The authors suggest that priming may explain these findings. Specifically, a fruit tart dessert was the last food displayed in the Food Network clip and this may have activated a 'sweet food' mental representation that led participants to eat more sweet foods (such as chocolate covered candies) in the taste test that followed. In conclusion, watching food related TV programs likely impacts eating behavior in unique ways but more research is necessary to determine how and to what extent.

In addition to food related TV programs, advertising food on TV also impacts eating behavior through priming. To reach this conclusion, Harris and colleagues (2010) conducted a study with University students. All participants viewed a 16-minute comedy TV program (*Friends*) along with seven non-food commercials and four additional commercials that varied depending on condition. In one version the

four commercials had a snacking message focused on excitement and fun (such as fast-food products), in another they had a nutrition message (granola bars and oatmeal), and the last version had non-food commercials (control condition). Participants were then told that they would be testing and rating consumer products and were presented with five snack foods including very healthy, moderately healthy, calorie-dense, and nutrient-poor items and to eat as much as desired. The study found that participants who saw commercials with a snacking message consumed more of every food and those that saw the nutrition commercials consumed the least. Furthermore, the nutrition advertising had no impact on the type of food consumed. The authors believe that the advertising primed participants' automatic eating behaviors. Specifically, the snacking message encouraged unconscious consumption of all the snack options and the nutrition message discouraged consumption. This study demonstrates the impressive influence that advertising can have on eating behavior.

### **How Differences in Foods Consumed Influence Food Intake with TV**

All of the research in the previous section manipulated the content that participants watched on TV and assessed the subsequent effects on food intake. However, research has also begun to evaluate the impact of different food options and individual differences in dietary habits on eating while watching TV. Braude and Stevenson (2014) examined how TV impacts sensory specific satiety (SSS) which refers to the gradual reduction in satisfaction that arises after eating a food. They did so by randomly assigning female participants to either a group receiving a single snack food or a group receiving four different types of snack food (the variety food group). All participants attended two sessions one week apart where in one session they ate while watching a comedy show (*Friends*) and in another they ate without watching any TV. They also filled out questionnaires to report their liking of the snack foods and TV show. The study found

that participants in the single snack food group who watched TV had consistent ratings for how much they liked the snack foods both before and after the session and this was associated with higher food intake. Consistent liking ratings suggest that SSS did not develop for this group. For the other 3 groups (variety snack group with and without TV and the single snack group without TV) liking ratings declined which indicates that SSS did develop as expected. Additionally, the authors found that eating while watching TV required participants to eat more in order to reach the same amount of fullness. In conclusion, TV reduces attention to cues and internal states that regulate food intake but having more food options can lessen this effect.

How much an individual consumes a particular food can be predicted more broadly by that individual's history of consuming that type of food. Francis et al. (2017) examined this factor by sampling male and female college students and randomly assigning them to eat snacks of their choosing either with or without watching the TV comedy show *Friends*. There were six options for snacks which consisted of a mix of both processed and unprocessed foods. An hour after the snack phase, participants were presented with a lunch meal and completed more questionnaires about their eating and TV viewing habits. Finally, they were asked to recall the type and quantity of the foods they had consumed during the snack phase as well as how much they enjoyed them. The study found that men who had snacks with TV ate more food at lunch than men who snacked without TV. However, this effect was not found in women which contradicts the finding in Higgs and Woodward (2009). This contradiction can be explained by the type of TV content in that one gender may have been more engaged in the show than the other which led to differences in food consumption (see Mathur & Stevenson, 2015). Additionally, individuals that reported regularly consuming processed foods ate more of the snack foods than participants that reported hav-

ing diets low in processed foods. The authors suggest that individuals who regularly eat processed foods have higher impulsivity and a harder time resisting snack foods. Finally, the more food participants consumed, the less accurate they were at assessing how much they ate. Since TV increases food consumption, this finding helps justify why watching TV reduces food recall accuracy (as found in Higgs & Woodward, 2009). Overall, this research demonstrates how one's history of processed food consumption can significantly influence snack food intake.

### **Critiques of the Previous Research**

The previous research contains several limitations that are important to consider when reviewing the scope of the findings. First, many of the studies used exclusively female participants who tended to be healthy, young, and had low BMIs. A relatively homogenous population was used to better assess the impact of the experimental condition. For example, men consistently consume more food than women and this gender variation would make some results harder to analyze (Higgs & Woodward, 2009). As a result, the findings of many of these studies cannot be extended to male, children, elderly, or obese populations. Young women with low BMIs also often have more restrained eating habits and are more likely to select lower calorie food options (Chapman et al., 2014). This means that, for an average individual, the findings could easily be more pronounced than what previous research has found. In a study such as Higgs and Woodward (2009), the participants (all female) may actively try to not consume many of the cookies provided. Therefore, watching TV while eating cookies would likely not have as big of an effect on this population compared to a sample of children, for example.

Another limitation is that virtually all of the previous research studies rely on self-report surveys and questionnaires. This is particularly problematic given that many of the self-report measures involved

slightly sensitive topics yet were important to the studies findings. For example, people might not be honest about their dietary habits or how much TV they watch. Specifically, they may tend to report healthier eating habits and not watch much TV as they do in order to feel better about themselves or to be perceived more positively. For instance, Cleland et al. (2008) found that food intake partially mediates the association between TV viewing and obesity but relied substantially on the accuracy of these two self-report measures. Some studies such as Sugiyama et al. (2008) had participants self-report measures such as sedentary behavior which is also problematic because individuals may overestimate how active they are or feel embarrassed about their level of activity and misreport. Although designing experiments with self-report measures are often necessary, it is important to interpret the findings with caution when sensitive topics are involved.

In addition to the data collection limitations, certain aspects of many of the studies appear to be low in mundane realism. Specifically, eating behavior in a laboratory setting may not perfectly resemble eating behavior at home or wherever the participant is most comfortable (Chapman et al., 2014). People might eat differently in an unfamiliar environment and the presence of an unfamiliar experimenter could impact how much they eat. For example, participants might feel bad about not eating a portion of food that is provided to them and therefore may eat some of it when they would not have otherwise to avoid being negatively judged. Another instance in which some findings may not extend to the real world is with the social interaction condition in Ogden et al. (2012). In this condition, participants ate snack foods and were instructed to interact with the experimenter who was not eating at all which does not reflect many real-world situations and limits the scope of the findings.

A final weakness of this research is that the studies must involve specific TV content or particular foods. Most notably, a surprisingly large amount of the studies involved participants specifically

watching the comedy TV show *Friends* because this type of TV show tends to appeal to a young adult sample (Harris et al., 2010). However, this means that conclusions on the role of TV content in inducing eating cannot necessarily be extended to other television genres (Mathur & Stevenson, 2015). Additionally, something that is boring, engaging, or tasty to one person might not be for another. For example, the boring TV condition in Chapman et al. (2014) involved participants watching an art lecture but perhaps some people found this content engaging which could misrepresent the findings. Any of these factors could have influenced the findings of some studies which highlights the importance of additional research to be conducted on these topics.

### **Future Research Directions**

In addition to verifying previous findings, future research should investigate how eating while watching TV affects the intake of specific types of foods. Braude and Stevenson (2013) found that those who ate one type of snack with TV ate more than those who ate a variety of snacks. However, no research has specifically examined differences in consumption of one snack food compared to another. In a hypothetical study, participants would attend two sessions one week apart. In one session, they would eat healthy nuts such as almonds while watching an episode of a comedy show and in another, they would eat an unhealthy snack (M&M's) while watching a different episode of the comedy show. These specific foods were chosen because they are similar in weight and size. Participants would also fill out questionnaires to account for how much they like the snack foods and TV show. The hypothesis is that participants will eat more unhealthy snack (M&M's) than the healthy snack (nuts) because they will have more difficulty mindlessly eating healthy snacks. It is hypothesized that the less addictive nature of a healthy snack would draw slightly more attention away from the TV show and make participants pay more attention to their internal hunger cues which will get them to

stop eating sooner. The results of this study would reveal whether certain types of food provoke more mindless eating than others, making them especially dangerous to eat while watching TV.

Since people encounter many different distractions in their day to day lives, future research should further investigate the impact of distractions aside from watching TV on food consumption such as talking on the phone. According to the model of mindless eating proposed in Ogden et al. (2012), individuals will consume more when distracted by external factors but still retain the cognitive capacity to eat. Therefore, a future study could put this model to the test and examine the number of chips people consume when talking on a handheld phone compared to talking on a phone handsfree (such as on a speakerphone). The hypothesis would be that people consume more chips when talking on a hands-free phone than when talking on a handheld phone due to having more cognitive capacity available to eat. Specifically, talking on a handheld phone requires thinking about holding the phone to the ear as well as the process of how a chip will be grabbed and consumed. This study could have participants attend three sessions each one week apart. In one session they will be asked to talk on a handheld phone to an experimenter about various topics for 45 minutes, in another they will do the same on a hands-free phone, and the third session will not involve a phone conversation (control condition). In all three conditions a separate experimenter will provide the participant with a bowl of snack food (potato chips) and, at the end, measure how much food was consumed. A second hypothesis is that participants in the hands free (but not handheld) phone condition will consume significantly more potato chips over a longer period of time than those in the control condition. Specifically, it is expected that the phone conversation will distract participants from internal hunger cues without interfering with their ability to eat in the hands-free condition. The results of this study would provide insight into whether phone conversations similarly contribute to

obesity as TV viewing.

Given the prevalence of TV in the lives of Americans today, the research described throughout this review has many real-world implications. Although it is unlikely to entirely prevent people from watching TV while they eat, this research can lead to increased awareness about the consequences of doing so as well as the foods and TV content that are most likely to trigger excessive eating. This increased awareness could hopefully make people less susceptible to eating mindlessly in front of the TV. Finally, these topics have implications for obesity prevention. Specifically, obese individuals might not have ever considered that eating while watching TV could be contributing to their weight gain, but this research could help them learn more about this possibility.

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