

DOES WATCHING MUKBANGS HELP YOU DIET?
THE EFFECT OF THE MUKBANG ON THE
DESIRE TO EAT

A Thesis

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ABSTRACT

While previous literature suggests that food videos motivate people to eat more, many Asian women watch the mukbang, an online eating broadcast where the host consumes large amounts of food, to diet and might get vicarious satiation. The current study is designed to find the effect of the mukbang on dieters. Two randomized controlled studies were conducted and female participants were randomly selected to watch either a mukbang or a non-food related video. A third study assigned participants to watch one of three videos: a mukbang, a cooking show or a non-food content video. All studies found that women who watched the mukbang reported lower satiation level and higher desire to eat the food shown in the mukbang compared to people who watched non-food content videos. Mukbangs made people feel less satiation compared to cooking shows. Dieters had less interest in eating after watching videos compared to non-dieters. Overall, however, all studies found that mukbangs caused dieting women to have a stronger desire to consume food. Moreover, although people who used mukbangs to diet had stronger self-control compared to others and held stronger beliefs that mukbangs could influence their control of their appetites, I found no evidence that their desire to eat foods decreased after mukbang viewing.

BIOGRAPHICAL SKETCH

Wenzhuo Xu was born in Yantai, China. Before coming to Cornell, she completed her undergraduate degree in Lanzhou University in 2017, majoring in economics.

This document is dedicated to all Cornell graduate students.

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CHAPTER 1

INTRODUCTION

The Mukbang is an online eating broadcast where a host (Asian mukbangs generally feature a young and slim female host) consumes a large amount of food while chatting with audiences (Cha, 2014). Beginning in 2010 in South Korea, the mukbang has become increasingly popular globally and top mukbang hosts can earn \$10000 a month (Balandies, 2016).

Mukbangs are quite different from other kinds of food content programs such as food and travel shows, cooking shows and eating contests. Mukbangs focus on showing the enjoyment of eating foods using gustatory expressions and the online communication of the mukbang can provide an interactive experience (Choe, 2019). Moreover, the figure of the mukbang host matters and thin models could lead to body dissatisfaction and influence eating behaviors (Hawkins et al., 2004; Stice et al., 1994). Unlike general food videos with hosts of different BMI levels, mukbang hosts are overwhelmingly slim and young.

Why do people watch others eating and enjoying large amount of food? A few explanations have been suggested in the literature, including loneliness (Cha, 2014), or releasing the mental stress of calorie control (Cha, 2014). Some dieters regard the vicarious consumption as a substitute for high calorie food and claim to derive satiation from the experience (Cha, 2014; McCarthy, 2017).

Is watching mukbangs an efficient diet strategy? It might be surprising to think that watching other people eating food online can inhibit the viewers intention to eat. In fact, research studies find that food cues such as watching others eat, could induce more calorie intake (Weingarten, 1985; Harris et al.,

2009; Bodenlos & Wormuth, 2013). Moreover, high calorie food cues trigger stronger motivational and emotional responses for obese people compared to normal weight people (Stoeckel et al., 2008).

Given the concern that mukbangs could increase high calorie food intake, the South Korea's Ministry of Health and Welfare announced in July, 2018 that it would create guidelines and regulate mukbang production by launching the "National Obesity Management Comprehensive Measures" (Wikipedia, 2019). While the government restricted mukbang production with the purpose of fighting against obesity, controversy merged and some people doubted the effectiveness of that regulation and worried that the government used its "visible hand" too much (Chu, 2019). Although the Health Ministry later said that cracking down on mukbangs was impossible, the common public still have divisive opinions toward the relationship between viewing mukbangs and obesity (Jin, 2019).

With the growing popularity of the mukbang and the concern of its influence on food consumption, it is worthwhile to investigate the effect of mukbangs on eating behaviors. In this paper, the following questions are addressed: 1) what is the effect of mukbangs on viewer's desire to eat, especially for dieters; 2) does watching mukbangs help control calorie intake among those who believe that watching mukbang is an effective diet aid; 3) is the effect of mukbangs specific to viewing people eating food, or do cooking videos without eating have a similar effect.

To find the effect of the mukbang and test whether the mukbang is a substitute for high calorie food, I conducted two in-person and one online randomized treatment and control trials. In the first two studies (one in-person and one

online), female participants were recruited and randomized to watch either a non-food content video or a mukbang. The third study added a third option: participants could also be randomized to watch a cooking show. In all studies, each participant completed a survey, evaluated their gustatorial state including satiation and disgust by a 7-point liker scale and reported their desire to eat by a scale from 0 to 10.

Using the self-report data, I found that although dieters were less motivated to eat the food appearing in the mukbang, overall, the effect of mukbangs on dieters was to increase their food intake. The level of satiation also decreased for people watching the mukbang. I did not find strong evidence that dieters obtained satiation through watching the mukbang. The online study further compared the effects of different food stimuli in mukbangs and showed that people only increased their desire to eat the foods viewed in the mukbang in addition to fruit. The third study extended the basic study design by comparing the effects of the mukbang and the cooking show. The results suggested that both types of food videos increased people's desire to eat and decreased their satiation level. The Mukbang had modestly larger effect on decreasing satiation while smaller effect on decreasing the desire to eat. Moreover, although mukbangs could increase satiation, this change did not inhibit the intention to consume food. Although some restrained eaters regarded watching mukbang as a way to consume food vicariously, the current study did not find evidence to support the notion that watching the mukbang is an effective diet strategy.

The current study contributes to the existing literature in the following two ways. First, the paper examines the effect of mukbangs on dieters and investigates the difference between mukbangs and cooking shows. Although many

researchers have studied the effect of food cues, the empirical work on the mukbang is still limited. Tu & Fishbach (2017) find that people can get vicarious satiation both watching mukbangs and regard other's consumption as their own and decrease the desire to eat. However, as suggested by our pilot study, the choice of mukbang food matters and various food content could generate different response¹ Tu & Fishbach (2017) use the political view to indicate the viewer-host similarity, while they do not discuss the interaction between host and viewers and the figure of the host, which are important factors that make mukbangs distinguish from other food content videos. Moreover, when comparing the mukbang with a general cooking show, I find that the intention to eat triggered by mukbangs is stronger than that of a cooking show. In fact, the difference between mukbangs and other kinds of food content shows is worth studying. The vividness and enjoyment of mukbangs are associated with high food craving intensity (Tiggemann & Kemps, 2005). Gustatory expressions like "mmm" show pleasure of eating (Wiggins, 2002) and conversation can urge and emphasize the sensory experience of eating food (Wiggins et al., 2001). Additionally, thin models could lead viewers to feel body dissatisfaction and inhibit people's food intake (Hawkins et al., 2004; Stice et al., 1994).

Second, this paper sheds insight on the behavioral phenomenon in which people intentionally view food cues to control their appetites. Previous research assumes that the health outcome is a by-product of media consumption (DellaVigna & La Ferrara, 2015), for example, children are exposed to food advertisements when they watch cartoons and their food choice could be influenced by the unexpected stimuli. However, some dieters may regard the mukbang as

¹The pilot study used cheesecake and fried chicken burgers and many participants reported that they feel disgust. However, the feeling of disgust is less severe after watching dim sum and ramen mukbang.

a substitute for high calorie food and they watch the mukbang with the hope to control their appetites. In other words, the eating behavior is a planned result: people hold beliefs regarding the mukbang's effect and then watch the media to obtain the expected outcome. Actually, some participants in our studies reported that they had used mukbangs to diet in our survey. People rely on the feeling of satiation to control appetite and some people even seek disgust when watching mukbangs. The results suggest that dieters with lower self-control levels have a misconception: dieters that perceive that the mukbang is a substitute for foods behave as if they are indeed complements in consumption. Moreover, there is a gap between attitudinal perception and action. Although mukbangs could increase satiety and some dieters are able to predict this effect correctly, the satiation does not lead to less intention to eat. Nevertheless, successful restrained eaters with high self-control levels are able to diet by mukbang viewing.

The research also has important public health policy implications. Mukbangs are becoming increasingly popular around the world. For example, when I finish this paper in October 2019, one of the most popular mukbang host Yuka Kinoshita (whose mukbangs are used in this study) has 5.35 millions of subscribers on Youtube, which is relatively large amount of viewers, compared to 35.9 millions subscribers of the famous singer Taylor Swift. Many worry that making binge eating videos could mislead the public and encourage people to eat more. Mukbangs provide entertainment, but also make eating high calorie food more socially acceptable. The social trend of pursuing a slim figure has led to an increased number of people under the pressure of diet control. The mukbang, contrary to this social pressure, emphasizes the enjoyment of eating food without worrying about weight control. Thus, mukbangs provide a justi-

fication for the audience to enjoy high calorie foods and even makes the food taste better (Poor et al., 2013). On the other hand, mukbangs could make people increase their desire to eat and give audiences a misconception that eating large amounts of food is not harmful. Given many popular mukbang hosts are slim and even muscular, viewers could be misguided and think that they can easily maintain a healthy weight even if they eat without control. Testing the effects of mukbangs on the desire to eat could help us to understand this new type of food porn's consequences.

The remainder of the paper is organized as follows. Section 2 is the literature review. Section 3 presents hypotheses and theoretical model which explains why dieters intentionally watch mukbangs to control their appetites. Section 4 reports the design and empirical results of the three studies. Section 5 is the conclusion.

CHAPTER 2

LITERATURE REVIEW

The current study builds on theory and evidence for the relationship between food cues and eating behaviors. Previous studies show that watching eating behaviors tends to induce imitation (Dijksterhuis & Bargh, 2001; McFerran et al., 2009) and exposure to food related stimuli can trigger the desire to consume the cued food (Weingarten, 1985). For example, both food advertisements (Harris et al., 2009) and food videos (Bodenlos & Wormuth, 2013) can significantly increase food consumption. However, there are other studies providing evidence that food cues generate satiety through vicarious consumption (Spence et al., 2016; Boswell & Kober, 2016). Tu & Fishbach (2017) use pizza and M&M chocolate mukbangs and their results suggest that people treat other's consumption as their own. Neuroscience studies show that both viewing food images and the actual consumption activate gustatory processing regions in the brain (Simmons et al., 2005). Morewedge et al. (2010) find that direct viewing and mental imagery overlap within modalities and find that imagining M&M chocolate inhibits the desire to obtain it.

The effects of food cues on dieters is mixed and complicated. Restrained eaters pay more attention to food cues (Papies et al., 2008a) and salivate more after exposure to olfactory food stimuli than unrestrained eaters (LeGoff & Spigelman, 1987). Additionally, restrained eaters are more likely to increase their appetites and consume the cued food compared to unrestrained eaters (Fedoroff et al., 2003).

However, food cues can also trigger the self-regulation process. The counteractive-control theory claims that people can recognize potential temp-

tation which threatens their long term goal and use counteractive strategies to achieve self-control (Trope & Fishbach, 2000). There are some experiments which confirm this theory (Nederkoorn & Jansen, 2002; Kroese et al., 2009; van Nee et al., 2016). However, whether the self-control is only triggered by the food cue instead of the non-food cue is not clear. For example, Fletcher et al. (2007) find that dieters experience higher levels of guilt after exposure to both a chocolate image and a non-food image compared to non-dieters. They do not find a significant interaction effect and the guilt experience difference is not affected by different stimuli.

Under what conditions do dieters successfully restrain their appetites when exposed to food cues? Some researchers argue that the level of self-control matters and that food cues prevent food intake only for successful restrained eaters (Papies et al., 2008b; Ouwehand & Papies, 2010). Other studies emphasize the importance of the “preload” process. Dieters exposed to food stimuli, or who are required to anticipate or consume food, could lose their self-control and eat more than non-dieters. This phenomenon is called counterregulation (Jansen & Van den Hout, 1991). Jansen & Van den Hout (1991) confirm the existence of counterregulation and find that dieters can restrain food intake without the preload process. The visual salience of food cues for dieters could also result from the preload process. Papies et al. (2008a) find that unlike non-dieters, dieters have attention bias towards hedonic foods only when they are pre-exposed to food stimuli and this attention bias could be eliminated when they are reminded of their diet goal.

Moreover, the slim figures of mukbang hosts could remind restrained eaters of their calorie control goals. The thin model could increase body dissatisfaction

and induce eating disorders (Stice et al., 1994; Hawkins et al., 2004). Restrained and unrestrained eaters' reactions to body image are not clear. Anschutz et al. (2008) finds that restrained eaters have less food intake when exposed to neutral models, while unrestrained eaters eat less when exposed to thin models. However, some researchers find that thin model exposure influences dieters and leads them to eat less than non-dieters (Morry & Staska, 2001).

Previous literature provides contradictory results in which food cues could increase the desire to eat as well as the feeling of satiation. The motivation of eating triggered by food cues has been demonstrated in empirical studies, though several research studies find the opposite: food cues also remind people of their calorie control goal and individuals could directly obtain satiation by viewing or smelling the food. The counteractive-control theory which suggests that food cues trigger a self-regulation process (Trobe & Fishbach, 2000) and the neurological evidence of vicarious consumption (Simmons et al., 2005; Morewedge et al., 2010) provide theoretical support for our analysis of the mukbang-diet strategy. Moreover, studies in the food intake difference between dieters with different levels of self-control (Papies et al., 2008b; Ouwehand & Papies, 2010) provide some insights on the effectiveness of viewing the mukbang.

The existing literature focuses on the appearance and characteristics of the food cue. Absent from the literature is a study of how differentiated cues may induce different eating intentions. Different from food cues which solely introduce the food, the mukbang emphasizes the interaction between the host and the audience. Whether or not the figure of the host and his/her chat with audience change the perception of food and the desire to eat is an unanswered question. Additionally, since previous works have found evidence that food

cues reduce calorie intake, it is valuable to make an extension of this work to test whether or not people successfully control their appetites by intentionally viewing food cues such as mukbangs.

CHAPTER 3

HYPOTHESIS AND MODEL

One key point of differentiation for the current study is examining the individual's intent in watching food content videos. In simple economic terms, we are interested in whether the mukbang serves as a substitute or a complement for high calorie food in consumption. Beyond this, however, the social phenomenon makes clear that many perceive the mukbang to serve as a substitute. If mukbangs are indeed complements, it would be important to determine how or why one might develop this misperception. To understand whether mukbangs and food are complements or substitutes, I divide the mukbang viewers into two types and discuss them separately.

3.1 Special Case: A Motivated Viewer

3.1.1 The Motivation of the Mukbang-Diet Strategy

Although food cues could trigger the desire to eat (Weingarten, 1985; McFerran et al., 2009), mukbangs have been used as a diet strategy which controls one's appetite. In our Mturk study in the US, 24.8% participants reported that they have viewed mukbangs to diet and 56% of them agree it is a useful diet strategy (see table 4.12). In the China study, 19.2% reported that they tried it before and 46.7% of these motivated dieters found it effective (see table 4.19).

Why do people believe viewing mukbangs to be useful for dieting? According to both our participants' self-report and media coverage (Cha, 2014; McCarthy, 2017), people have the conception that watching mukbangs could sub-

stitute actual consumption by changing their level of satiation or disgust. Table 4.12 and table 4.19 report people's attitudes towards the mukbang-diet strategy. Interestingly, people who have tried the mukbang-diet strategy are more likely to agree that watching the mukbang increases satiation, while people who have not tried before are more likely to believe the feeling of disgust plays an important role. Nevertheless, it is possible for dieters to obtain the expected feeling of disgust through mukbang viewing. In the first study conducted at Cornell University, one participant reported in the open question, "I had been watching mukbangs to obtain the feeling of disgust everyday in the past two years, in order to lose weight".

Is the mukbang-diet strategy effective for all dieters? Consistent with existing literature on self-control and food cues (Papies et al., 2008b; Ouweland & Papies, 2010), successful mukbang-diet users have a higher level of self-control. Compared to people who failed to use the mukbang-diet strategy, successful users control night meals more frequently and are more likely to feel guilt after overeating (see table 4.12 and table 4.19).

To sum up, motivated dieters watch mukbangs with the expectation to change their level of disgust or satiation, while only people with strong self-control could successfully achieve this goal. To explain the behavior, the following sections develop a theoretical model which incorporates time-inconsistency with the shift in reference point.

3.1.2 Misconception and the Shift of Reference Point

Tversky & Kahneman (1991) introduce the notion of a reference point into eval-

uation of utility. They suggest that the utility of actual consumption is adjusted by the reference point (e.g., previous anticipated level of consumption). For example, in the stock market, the utility of profit would be based on both the actual profit and the expectation people formed prior to realization. If one investor already expects to get \$100 while it turns out that he only gets \$90, then the positive profit leaves him feeling as if he experienced a loss. Moreover, he feels worse than he would if he had expected a \$90 profit and realized the same \$90 profit.

Hoch & Loewenstein (1991) use reference dependent utility to explain why people have inconsistent preferences across times. Consider the utility of consumption function:

$$V = \alpha(U(x) - r) + \beta r \quad (3.1)$$

Here the total utility, V , is a linear combination of utility of consumption, $U(\cdot)$ as a function of actual consumption and a reference of consumption r . Shifting the reference point r in a previous period changes one's utility in the next period. The actual utility of consumption has weight α and the reference point utility has weight β . In particular, if $\beta > \alpha$, then increasing the reference point r will increase the total utility V . Alternatively, if $\alpha > \beta$, then increasing the reference point will decrease total utility.

In the case of a motivated dieter, the question is how the mukbang may function as a substitute for food, where it acts as a complement for everyone else. Let the reference point for the utility of consumption be set by the amount of mukbangs the consumer watches in the first period. Motivated viewers assume $\beta > \alpha$ and thereby, believe that viewing mukbangs in the first period will increase their overall utility. Under some additional assumptions (described

in the next section) dieters project that viewing the mukbang will satisfy their craving for food, and lead them to desire less food in the next period. Therefore dieters believe viewing mukbangs could substitute for actual food consumption by reducing the marginal utility of eating.

The time inconsistent behavior (i.e., expecting to use mukbangs to diet but then eating food in the second period) results from optimization over the two periods using backward induction. According to O'Donoghue & Rabin (1999), naive consumers do not consider how their desire for current consumption over future consumption will persist as the time frame advances. In other words, they can convince themselves that tomorrow they will be more patient than they were today. But this projection fails each time a new time period is realized and the same preference for consumption persists. For the case of mukbang viewing, individuals in the first period set their level of mukbang viewing in order to reduce their consumption of food in the second period. However, once in the second period, they consider only the marginal utility of consumption and not the overall utility that was maximized in period one.

The following two assumptions demonstrate the two key sources of time-inconsistency, which will be the keys for our model:

Assumption 1: For motivated dieters with the expectation of viewing mukbangs to diet, we have $\beta > \alpha$.

Assumption 2: People use backward induction to make decisions.

3.1.3 Self-Control

The time-inconsistency could explain why some dieters fail to use the mukbang-diet strategy. However, as suggested by our studies and existing literature (Papies et al., 2008b; Ouweland & Papies, 2010), dieters with strong self-control could obtain vicarious satiation as well as reduction in calorie intake. The intuition behind this is that, individuals could have a self-control bar and they are unable to control their appetite if the level of temptation goes beyond that threshold. For dieters with a higher level of self-control, they are able to resist a higher level of temptation such as the mukbang.

Parameter m' represents the critical level of consumption at which self-control is overcome and m represents the amount of mukbangs that viewers consume. The utility of calorie intake c adjusted by m in period 2 is $U_2(m - m', c)$. Assumption 3 below demonstrates the role of self-control.

Assumption 3: If $m > m'$, mukbangs and high-calorie food are complements ($\frac{\partial^2 U_2}{\partial(m-m')\partial c^*} > 0$). If $m < m'$, then mukbangs and high-calorie food are substitutes ($\frac{\partial^2 U_2}{\partial(m-m')\partial c^*} < 0$).

Assumption 3 suggests that people can only use mukbangs to substitute food intake when they can resist the temptation of the food cues shown in mukbangs. Alternatively, one can treat the adjusted mukbang consumption level $\hat{m} := m - m'$ and food c as complementary goods ($\frac{\partial^2 U_2}{\partial \hat{m} \partial c^*} > 0$) when individuals consume more than the critical amount of mukbangs, leading them to eat more when they view more. However, $\frac{\partial^2 U_2}{\partial \hat{m} \partial c^*} < 0$ when they consume less than the self-control threshold, in which case watching more will lead to eating less.

3.1.4 Model

Now we can develop our theoretical model to explain how the mukbang-diet strategy could work and when it fails. In the two-period world, individuals only consume mukbangs in the first period and only consume food in the second period. In other word, there is no food consumption in the first period and no mukbang consumption in the second period. For motivated dieters, they decide the amount of mukbangs to view /or are assuming there is no binding constraint on time. The total utility V is a linear combination of their first period's mukbang consumption $U_1(m)$ and the second period's calorie intake utility $U_2(m - m', c)$:

$$\begin{aligned} V &= U_1(m) + \alpha(U_2(m - m', c) - m) + \beta m \\ &= U_1(m) + \alpha U_2(m - m', c) + (\beta - \alpha)m \end{aligned} \quad (3.2)$$

Using backward induction (assumption 2), decision makers consider the second period at first:

$$\max V = \max_m \{U_1(m) + \max_c \alpha(U_2(m - m', c) - m) + \beta m\} \quad (3.3)$$

The first order condition for the second period is

$$\frac{\partial}{\partial c} (\alpha(U_2(m - m', c) - m) + \beta m) = 0 \quad \Rightarrow c^* = c^*(m - m') \quad (3.4)$$

Now consider the first period. Individuals decide the amount of mukbangs to view/or are assuming there is no binding constraint on time. Mukbangs are typically 5 to 10 minutes long, which is relatively a short time period compared to 24 hours per day. Another way to justify this is to consider that the individual already experiences slack time and is simply trading off mukbang viewing with

other online viewing that would yield a numeraire utility of 0. I also assume that the budget constraint for food is not binding, i.e., consumers have enough money to buy more food than they would like to eat and their concerns about enjoyment of consumption and health dwarf any concern about constraints ¹. After setting up the problem, I can derive the first claim:

Claim 1: The belief that viewing mukbangs is effective in reducing food consumption (mukbang viewing increases total utility, i.e., $\beta > \alpha$ by assumption 1) motivates people to watch more mukbangs.

Proof: Take the derivative of V with respect to m

$$\begin{aligned}\frac{\partial V}{\partial m} &= \frac{dU_1}{dm} + \frac{\partial}{\partial c}(\alpha(U_2(m - m', c) - m) + \beta m) \\ &= \frac{dU_1}{dm} + \frac{\partial U_2}{\partial(m - m')} + (\beta - \alpha)\end{aligned}\tag{3.5}$$

Since $\frac{dU_1}{dm} + \frac{\partial U_2}{\partial(m - m')} \geq 0$ and by assumption 1, then $K := \frac{\partial V}{\partial m} > 0$ and individuals always watch mukbangs until the sum of two periods' marginal utility declines to 0. \square

As m increases, the dieter may cross the point m^* . Claim 1 shows that belief in the mukbang-dieting strategy may place dieters at the risk of viewing beyond their self-control level. Moreover, assumption 1 explains why the belief of viewing mukbangs does not contribute to the utility maximization in the second period. Since $\frac{d(\beta - \alpha)m}{dc} = 0$, the first order condition above is the same as

$$\frac{\partial U_2(m - m', c)}{\partial c} = 0 \quad \Rightarrow \quad c^* = c^*(m - m')\tag{3.6}$$

Let's further consider how optimal mukbang consumption m^* increases the

¹These assumptions are not realistic for a field setting. However, in an experimental setting, the monetary and time trade-offs do not exist. This is what motivates us to consider these simplifications.

likelihood of food consumption. The second claim follows:

Claim 2: As the level of optimal mukbang consumption increases, motivated dieters are more likely to increase their calorie intake while dieters with a high level of self-control are less likely to consume more calorie.

Proof: Totally differentiating equation $\frac{\partial V}{\partial m} = K$ yields

$$\frac{d^2 U_1}{dm^{*2}} dm^* + \frac{\partial^2 U_2}{\partial(m^* - m')^2} dm^* + \frac{\partial^2 U_2}{\partial(m^* - m')\partial c^*} dc^* = 0 \quad (3.7)$$

or,

$$\frac{dc^*}{dm^*} = -\frac{\frac{d^2 U_1}{dm^{*2}} + \frac{\partial^2 U_2}{\partial(m^* - m')^2}}{\frac{\partial^2 U_2}{\partial(m^* - m')\partial c^*}} \quad (3.8)$$

Since $\frac{d^2 U_1}{dm^2} + \frac{\partial^2 U_2}{\partial(m - m')^2} < 0$ to ensure the second order condition, then the sign of $\frac{dc^*}{dm^*}$ is the same as $\frac{\partial^2 U_2}{\partial(m^* - m')\partial c^*}$. As m^* increases and becomes closer to m' , one is more likely to consume mukbangs beyond his self-control level (i.e., $\frac{\partial^2 U_2}{\partial(m^* - m')\partial c^*} > 0$) and thus $\frac{dc^*}{dm^*}$ is more likely to be positive. Higher level of m' also makes m^* less likely to go beyond self-control threshold and thus makes individuals less likely to overconsume food. \square

It would be interesting to see the role of self-control when dieters have consumed mukbangs beyond the critical threshold. Let's consider the case in which $\frac{\partial^2 U_2}{\partial(m^* - m')\partial c^*} > 0$ and $\frac{dc^*}{dm^*} > 0$, i.e., motivated dieters have consumed beyond the self-control level and mukbang viewing has begun to lead to more calorie intake. In order to demonstrate, we must make an assumption regarding the third derivative of $U(m - m', c)$:

Assumption 4: $\partial \frac{\partial^3 U_2}{\partial(m - m')^2 \partial c^*} / \partial |m - m'| < 0$ and $\frac{\partial^3 U_2}{\partial(m - m')^3} < 0$.

Here $\partial \frac{\partial^3 U_2}{\partial(m - m')^2 \partial c^*} / \partial |m - m'| < 0$ suggests that larger gap between muk-

bang consumption m^* and the self-control threshold m' makes the substitute/complement relationship between the mukbang and food weaker. The diminishing relationship between the mukbang and food with respect to the threshold m' , is analogous to that of the diminishing marginal rate depending on the reference level (Tversky & Kahneman, 1991).

Claim 3: If assumption 4 holds and the optimal consumption level m^* is already beyond the self-control level m' , as m' increases, people tend to decrease their consumption.

Proof: Take the derivative for equation 3.8 with respect to the self-control threshold m' ,

$$\partial \frac{dc^*}{dm^*} / \partial m' = \frac{\partial \frac{\partial^3 U_2}{\partial(m-m')^2 \partial c^*} / \partial m' \times \left(\frac{d^2 U_1}{dm^{*2}} + \frac{\partial^2 U_2}{\partial(m^*-m')^2} \right) - \frac{\partial^2 U_2}{\partial(m^*-m') \partial c^*} \times \frac{\partial^3 U_2}{\partial^3(m^*-m')}}{\left(\frac{\partial^2 U_2}{\partial(m^*-m') \partial c^*} \right)^2} \quad (3.9)$$

By assumption 4, $\frac{\partial^3 U_2}{\partial(m-m')^3} < 0$ and thus $\frac{\partial^3 U_2}{\partial(m-m')^3} > 0$ when we take derivatives with respect to m' . Since $m^* > m'$ and the gap $m^* - m'$ becomes smaller as m' increases, then $\partial \frac{\partial^3 U_2}{\partial(m-m')^2 \partial c^*} / \partial m' < 0$. Therefore, although $\frac{dc^*}{dm^*} > 0$, we have $\frac{dc^*}{dm^*}$ decreases as m' increases. Figure 3.1 visualizes this result. \square

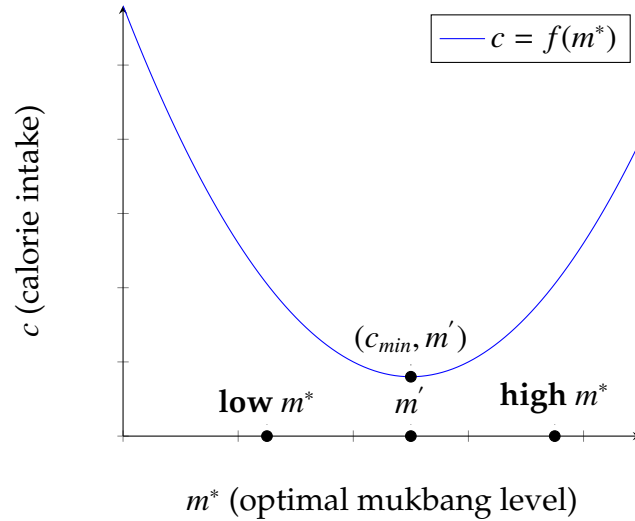


Figure 3.1: The Effect of Self-Control on Calorie Intake

3.2 General Case: Mukbangs' Effect on Eating Behaviors

The special case shows that mukbangs could lead to overconsumption for motivated dieters with low-self control level. However, it is hard to figure out the motivated dieters from others first and then randomly assign them to different groups in experiment settings. Moreover, there are many viewers watching mukbangs for fun or simply watching it to kill time. Even motivated dieters are “unintentioned” in the beginning and decide whether or not to use the mukbang-diet strategy after their first exposure. Therefore, we also consider the generally case of a viewer who is randomly assigned to watch a mukbang without the intention to use the mukbang as a substitute for food. The food consumption and feelings triggered by the stimuli are by-products of watching the video, which might be out of the viewer’s expectation. The hypotheses of both cases are discussed below.

3.3 Hypotheses

We discuss the testable hypotheses for the randomized control experiment first. Based on previous literature, food cues can induce food intake and increase hunger (Weingarten, 1985; Harris et al., 2009; Bodenlos & Wormuth, 2013). Therefore, I propose the following hypothesis to test in the experiments:

H_1 : Mukbangs, like other food-related videos, decreases people's satiation level and increases the desire to eat food.

Moreover, according to the counteractive-control theory, dieters' self-regulation processes are triggered by food cues (Trope & Fishbach, 2000). This is supported by several empirical findings of successful dieters eating less after food exposure (Papies et al., 2008b; Ouweland & Papies, 2010). I propose the second hypothesis which links diet behavior with food cues:

H_2 : Compared to non-dieters, dieters feel more satiety and they are less likely to consume high calorie food when exposed to the mukbang.

The correlation (not causality) between the belief of mukbang-diet strategy and the desire to eat could also be tested. For the special case, the model shows that the belief that mukbangs increase total utility and simultaneously decrease the marginal utility for food can turn out to make people eat more. If motivated dieters consider both periods and aggregate their consumption of mukbangs and food while segregating when considering only food consumption, then watching mukbangs makes people more likely to consume beyond their self-control level m' and the planned substitutes becomes complements. The optimal amount of mukbang consumption is less likely to go beyond the self-control

threshold for dieters with a higher level of self-control and thus makes people increase their satiation and decrease calorie intake at the same time. Therefore, I propose the additional hypothesis:

H₃: The actual food intake depends on the level of self-control. People with higher self-control are more likely to successfully control their appetites by viewing mukbangs and eat less food.

CHAPTER 4

EMPIRICAL STUDIES

I conducted two experiments in the U.S. and one experiment in China. Participants were randomized to watch either a mukbang or a non-food content video in the two U.S. studies. The China study added one cooking show as the third option. Since many mukbang audiences and restrained eaters are women, only women were recruited in all studies. The first study conducted at Cornell University compared the difference between food intentions after viewing a mukbang and a non-food content video. The second study was conducted online and further compared the effect of different food types in mukbangs. A third study conducted in China compared the effects of the mukbang with that of a cooking show.

In all studies, participants reported their satiety and disgust level and the desire to eat specific foods. Self reports may be subject to substantial bias that could perhaps be overcome by providing foods to people at the conclusion of viewing and measuring their consumption directly. However, a pilot study revealed that the laboratory eating environment was too artificial, with many people reported that they simply ignoring the food available in the laboratory. Therefore, like Ferriday & Brunstrom (2008), I used the self-reported desire to eat to represent intended food intake.

The satiation and disgust after viewing are estimated by equation 4.5 and 4.2. The dependent variable Y corresponds to either the satiation or disgust level, reported in a 7-point likert scale and the indicator function $\mathbf{1}_{\text{Mukbang}}$ indicates whether the individual was assigned to watch the mukbang and $\mathbf{1}_{\text{Dieter}}$ indicates whether the participant was on a diet. The interaction term

$\mathbf{1}_{\text{Mukbang}} \times \mathbf{1}_{\text{Dieter}}$ equals to 1 if the participant was a dieter and was assigned to watch mukbang. The set of control variables X includes age, BMI, race and the time when did the study. I use both OLS and ordered logistic regression (ologit) to estimate and the ologit model is tested by aggregating the likert scale responses into three categories: i.e., disagree, feel neutral and agree with the feeling.

$$Y = \alpha + \beta_1 \mathbf{1}_{\text{Mukbang}} + \beta_2 \mathbf{1}_{\text{Dieter}} + \gamma X + \epsilon \quad (4.1)$$

$$Y = \alpha + \beta_1 \mathbf{1}_{\text{Mukbang}} + \beta_2 \mathbf{1}_{\text{Dieter}} + \beta_3 \mathbf{1}_{\text{Mukbang}} \times \mathbf{1}_{\text{Dieter}} + \gamma X + \epsilon \quad (4.2)$$

The desire to eat after viewing is estimated by equation 4.3 and 4.6. For the Cornell study, the *Eat* corresponds to the self-report desire to eat after viewing videos. The desire to eat is measured in a scale from 0 (do not want to eat at all) to 10 (strong desire to eat). For the Mturk study and China study, the *Eat* corresponds to the change of desire to eat. The change of desire to eat is the difference between the desire to eat before and after viewing the video, both are measured on a scale from 0 to 10. Besides OLS, the ordered logistic regression (ologit) is also used. The desire to eat and change of desire to eat are aggregated into three categories for the ologit model: i.e., < 0 , $= 0$ and > 0 .

$$\text{Eat} = \alpha + \beta_1 \mathbf{1}_{\text{Mukbang}} + \beta_2 \mathbf{1}_{\text{Dieter}} + \gamma X + \epsilon \quad (4.3)$$

$$\text{Eat} = \alpha + \beta_1 \mathbf{1}_{\text{Mukbang}} + \beta_2 \mathbf{1}_{\text{Dieter}} + \beta_3 \mathbf{1}_{\text{Mukbang}} \times \mathbf{1}_{\text{Dieter}} + \gamma X + \epsilon \quad (4.4)$$

To investigate the case when dieters hold the belief that the mukbang is a

substitute for food, I asked participants to report their experience of using mukbangs to diet and whether watching mukbangs successfully controlled their appetites in the online Mturk study and the China study. I compared the self-control level and beliefs regarding the mukbang’s effect on satiety and disgust among two pairs of people: people who had tried mukbangs to diet before and who did not, and successful mukbang-diet strategy users and people who failed to use mukbangs to control their appetites. Moreover, the correlation between experience and satiation, disgust, and the desire to eat is tested by the models below:

$$Y = \alpha + \beta_1 \mathbf{1}_{Mukbang} + \beta_2 \mathbf{1}_{Dieter} + \beta_3 \mathbf{1}_{Experience} + \gamma X + \epsilon \quad (4.5)$$

$$Eat = \alpha + \beta_1 \mathbf{1}_{Mukbang} + \beta_2 \mathbf{1}_{Dieter} + \beta_3 \mathbf{1}_{Experience} + \gamma X + \epsilon \quad (4.6)$$

Here the indicator function of experience is the experience of using the mukbang-diet strategy. I use the “used the mukbang-diet strategy before” and “used the mukbang-diet strategy before and agree it to be useful” as indicators in separate models.

4.1 Cornell Study: Mukbang versus Non-Food Content Video

4.1.1 Study Design

The first study randomly assigned participants to either watch a mukbang or to watch a non-food video. This allows us to test the baseline effect of the mukbang on satiety, disgust and eating intentions. The selected mukbang was a dim

sum mukbang by a famous host, Peggie Neo¹. The non-food content video was the Big Bang Theory, The Euclid Alternative². Both videos were 3 minutes and were inserted in a Qualtrics survey³. After finishing the video, participants answered several questions including their satiation and disgust level, desire to eat specific foods, eating habits and demographic questions (see appendix A.1 for the survey). The study recruited 144 women by randomly inviting people in the library and sending emails to students from the Applied Economics and Management department. Every participant took the study individually in a study room at Cornell University. All sessions were conducted between 1:30 pm to 6:30 pm. The study took 8 to 10 minutes to finish and each participant received \$5 as compensation. Since the pilot study suggested that native language played a big role in the perception of the video and influenced food choice, only native English speakers were recruited and both the mukbang and the non-food content video were in English.

4.1.2 Descriptive Statistics

Table 4.1 presents the descriptive statistics of the collected data. There were 75 women in the mukbang group and 69 women in the non-food content video group. The two groups were balanced with respect to demographics and the frequency in mukbang viewing. The summary statistics show that people assigned to watch the mukbang had lower satiation and more desire to eat foods. Additionally, since our participants in the U.S. seldom viewed mukbangs and

¹<https://youtu.be/2dRf535eAPK> (Accessed: 2018-9-12); the short version edited by the author could be found at <https://youtu.be/Quc4XmoBiiE> (Accessed: 2018-9-30)

² <https://youtu.be/V8kUL9owk6Q> (Accessed: 2018-9-12); the short version edited by the author can be found at <https://youtu.be/OiotvMtekpY> (Accessed: 2018-9-30)

³Qualtrics is a web-based survey tool to conduct survey research and collect data.

Table 4.1: Descriptive Statistics (Cornell Study, $n = 144$)

Variables	mukbang group (N=75)		non-food group (N=69)		difference (1)-(2)	
	mean	Std. Dev.	mean	Std. Dev.	mean	Std. Dev.
satiation level	0.09	(1.48)	0.78	(1.41)	-0.69 [‡]	(0.24)
disgust level	-1.15	(1.61)	-1.58	(1.32)	0.43 [†]	(0.25)
desire to eat dim sum after video	0.63	(1.34)	-1.75	(1.18)	2.38 [‡]	(0.21)
desire to eat fruit or vegetable after video	-0.37	(1.09)	-1.32	(1.45)	0.95 [‡]	(0.22)
watched mukbangs before=1	0.2	(0.05)	0.13	(0.04)	0.07	(0.06)
ate dim sum before=1	0.43	(0.06)	0.41	(0.06)	0.02	(0.08)
eat fruit or vegetable almost everyday=1	0.73	(0.05)	0.74	(0.05)	-0.006	(0.07)
diet now=1	0.23	(0.42)	0.13	(0.34)	0.1	(0.06)
age	20.19	(3.18)	19.84	(2.45)	0.35	(0.47)
BMI	22.86	(4.13)	22.96	(3.59)	-0.1	(0.64)
White=1	0.49	(0.5)	0.41	(0.49)	0.09	(0.08)
Asian=1	0.31	(0.46)	0.29	(0.46)	0.02	(0.08)
Black=1	0.12	(0.33)	0.14	(0.35)	-0.02	(0.06)
did the study at 3pm-5pm=1	0.55	(0.5)	0.48	(0.5)	0.07	(0.08)

Note: Descriptive statistics, Cornell study ($n = 144$). Standard errors are in parentheses, significance levels are indicated as [‡] $p < 0.01$, [†] $p < 0.05$, * $p < 0.1$.

rarely consumed the featured Asian food, dim sum, the frequency of watching mukbangs and eating dim sum are coded as binary variables which equals 1 when the participant had tried mukbangs and dim sum before, respectively.

4.1.3 Empirical Results

Satiation and Disgust

Table 4.2 reports the OLS regression results which regard the satiation and disgust level as continuous dependent variables. Mukbang viewers had 105.2 % lower (0.824 unit less) satiation level compared to people assigned to watch the non-food video while the effect of the mukbang on disgust was not statistically significant. Dieters felt 212 % higher (0.702 unit more) satiation level compared to non-dieters. However, overall, dieters watched the mukbang had 15.9% lower (0.122 unit less) satiation level after viewing the mukbang, compared to dieters who watched the non-food video. Table 4.4 reports the predicted margins calculated by ordered logistic regression. The result of satiation is not included here since it violates the proportional odds assumption. Unlike the insignificant results in the OLS estimation, I found that dieters was 8% more likely to feel disgust than non-dieters, regardless of the content of the video.

Table 4.2: OLS Estimation for Satiation and Disgust (Cornell Study, $n = 144$)

	satiation		disgust	
	(1)	(2)	(3)	(4)
mukbang=1	-0.824 [‡]	-0.951 [‡]	0.397	0.282
	(0.236)	(0.256)	(0.252)	(0.274)
diet now=1	0.702 [†]	0.203	0.0583	-0.396
	(0.307)	(0.498)	(0.328)	(0.534)
mukbang×diet now=1		0.803		0.731
		(0.632)		(0.677)
watched mukbangs before=1	-0.25	-0.295	-0.396	-0.437
	(0.325)	(0.326)	(0.348)	(0.350)
R-squared	0.197	0.206	0.084	0.092

Note: OLS estimation for satiation and disgust, Cornell study ($n = 144$). Standard errors are in parentheses, significance levels are indicated as [‡] $p < 0.01$, [†] $p < 0.05$, * $p < 0.1$. All regression models controlled age, BMI, race and time when did the study.

The Desire to Eat Food

Table 4.3 (OLS estimation) and table 4.4 (ordered logistic regression) present the regression results with the desire to eat as the dependent variable. Both models show that the mukbang increased the desire eat dim sum as well as fruits or vegetables and that dieters had less desire to eat. The mukbang increased the desire to eat dim sum by 2.36 units (which is 135 % less compared to the control group) and increased the probability of having the desire to eat dim sum by 55.8%; dieters' desire to eat dim sum was 155.7 % (0.739 unit) lower than that of non-dieters and dieters were 18.9% less likely to report positive level of desire to eat. Similar to the overall effect of satiation, dieters viewing the mukbang

Table 4.3: OLS Estimation for the Desire to Eat (Cornell Study, $n = 144$)

	dim sum		fruit or vegetable	
	(1)	(2)	(3)	(4)
watch mukbang=1	2.360 [‡] (0.204)	2.332 [‡] (0.223)	0.955 [‡] (0.223)	0.927 [‡] (0.243)
diet now=1	-0.739 [‡] (0.267)	-0.853 [*] (0.435)	-0.156 (0.292)	-0.266 (0.472)
watch mukbang×diet now=1		0.183 (0.551)		0.179 (0.601)
watched mukbangs before=1	0.673 [†] (0.283)	0.663 [†] (0.285)	-0.299 (0.307)	-0.31 (0.31)
R-squared	0.563	0.563	0.148	0.149

Note: OLS estimation for the desire to eat, Cornell study ($n = 144$). Standard errors are in parentheses, significance levels are indicated as [‡] $p < 0.01$, [†] $p < 0.05$, ^{*} $p < 0.1$. All regression models controlled age, BMI, race, time when did the study and the frequency to eat the corresponding food.

had 63.4 % higher (1.621 units more) desire to eat dim sum than dieters in the control group. In our Cornell sample, dieters' frequency of feeling guilt after overeating was 40.5% more than non-dieters, which could help to explain the desire to eat difference between them. Some participants reported that they felt thirsty after watching others eating high-calorie food, which could contribute to the intention to eat fruits. Moreover, the predicted marginal effects show that the mukbang increased the desire to eat dim sum among dieters by 38.8% while this effect was 20.8% smaller than that among non-dieters.

Table 4.4: Predicted Margins (Cornell Study, $n = 144$)

	disgust level			dim sum			fruit or vegetable		
	disagree	neutral	agree	< 0	= 0	> 0	< 0	= 0	> 0
mukbang=1	-0.107 (0.069)	0.040 (0.027)	0.068 (0.044)	-0.634‡ (0.056)	0.076‡ (0.028)	0.558‡ (0.053)	-0.200‡ (0.077)	0.079† (0.035)	0.121† (0.048)
diet now=1	0.134* (0.076)	-0.054 (0.035)	-0.080* (0.044)	0.194‡ (0.063)	-0.005 (0.011)	-0.189‡ (0.058)	-0.034 (0.100)	0.012 (0.034)	0.022 (0.067)
compare the effect between the mukbang and the non-food video									
effect difference for dieters	-0.060 (0.026)	0.028 (0.021)	0.032 (0.045)	-0.512‡ (0.077)	0.124‡ (0.039)	0.388‡ (0.075)	-0.202‡ (0.078)	0.070* (0.040)	0.132† (0.055)
difference in difference: dieters versus non-dieters	0.058 (0.050)	-0.014 (0.015)	-0.043 (0.036)	0.149† (0.069)	0.059* (0.036)	-0.208† (0.082)	-0.003 (0.012)	-0.010 (0.023)	0.013 (0.033)

Note: Ordered logistic estimation for disgust and the desire to eat, Cornell study ($n = 144$). Satiation is not estimated because it violates the proportional odds assumption. Standard errors are in parentheses, significance levels are indicated as ‡ $p < 0.01$, † $p < 0.05$, * $p < 0$. All regression models controlled age, BMI, race and time when did the study. The desire to eat regression also controlled the frequency of eating the corresponding food.

4.2 Mturk Study: Effect of Different Food Stimuli

4.2.1 Study Design

To further investigate effects of different food stimuli in mukbangs, the second study used an online survey and recruited 286 workers from Amazon Mechanical Turk (Mturk)⁴. There were two treatment groups (with participants assigned

⁴Mturk is a website run by Amazon and has a virtual labor market where registered workers complete online Human Intelligence Tasks (HITs) for pay. Mturk is widely used to recruit participants for online research involving survey.

to view either a ramen mukbang ⁵ or a donut mukbang ⁶ by Yuka Kinoshita, a popular Japanese mukbang host with about 5 million subscribers in Youtube. A control group watched a silent documentary introducing the Palace Museum by China Central Television (CCTV) ⁷. All videos were 2 minutes and the survey is in appendix A.2.

The key question for the second study is whether the donut and the ramen mukbang differ in their impact on participants' desire to eat different foods. The Mturk study was not time restricted, allowed participants to watch the mukbang whenever they want. Since some dieters like to watch mukbangs in the late night, collecting late night observations could be helpful to understand the effect of mukbangs.

4.2.2 Descriptive Statistics

There were 286 observations in total with 98, 97 and 91 women respectively assigned to watch the ramen mukbang, the donut mukbang and the non-food content video. Following the design of the Cornell Study, participants reported their satiation and disgust level on a 7-point likert scale. Unlike the basic study, participants in this study evaluated their desire to eat specific foods both before and after watching the video on a scale from 0 to 10. The change in desire to eat is the difference between the two evaluations. Many participants in this sample knew and had watched mukbangs before, thus I use a binary variable which is

⁵<https://youtu.be/ArPaid2Iuck> (Accessed: 2018-10-12), the short version edited by the author could be found at https://youtu.be/AJ47A1_0t1o (Accessed: 2018-10-15).

⁶<https://youtu.be/ntMT2y0MgHk> (Accessed: 2018-10-12), the short version edited by the author could be found at https://youtu.be/_wpQJun0oVM (Accessed: 2018-10-15).

⁷<https://youtu.be/hWnm1BQOTZY> (Accessed: 2018-10-12), the short version edited by author could be found at <https://youtu.be/0WdfnJQC3j8> (Accessed: 2018-10-15).

equal to 1 to indicate participants who watched mukbangs at least 5 times per week. Frequently eating ramen, donuts and fruit are also coded into binary variables in this way. Participants reported their hunger level before watching the video, on a scale from 0 to 10⁸. Table 4.5 and 4.6 provide descriptive statistics. The demographics, eating behaviors and the time when people took the survey were balanced except that people in the ramen mukbang group ate donuts more frequently than people in the donut mukbang group. The basic summary statistics show that people who watched the ramen mukbang were more likely to feel satiation than the donut mukbang viewers and that participants in both treatments were more willing to eat the food they saw in the mukbang.

⁸Hunger levels are coded to be 8 if the level was 8 or higher.

Table 4.5: Descriptive Statistics (Mturk Study, $n = 286$)

	group			difference		
	ramen (N=98)	donut (N=97)	control (N=91)	(1)-(3)	(2)-(3)	(1)-(2)
satiation level	0.62 (0.17)	0.14 (0.18)	0.82 (0.17)	-0.21 (0.24)	-0.68‡ (0.24)	0.48‡ (0.25)
disgust level	-0.82 (0.18)	-0.9 (0.19)	-1.15 (0.18)	0.33 (0.26)	0.26 (0.26)	0.07 (0.26)
change of desire to eat donut	-0.24 (0.15)	0.71 (0.27)	-0.57 (0.20)	0.33 (0.25)	1.29‡ (0.34)	-0.95‡ (0.31)
change of desire to eat ramen	0.84 (0.24)	-0.33 (0.16)	-0.26 (0.15)	1.10‡ (0.28)	-0.06 (0.22)	1.16‡ (0.29)
change of desire to eat fruits	-0.31 (0.17)	-0.36 (0.18)	-0.73 (0.21)	0.42 (0.27)	0.37 (0.28)	0.05 (0.25)
watch mukbang ≥ 5 times/week=1	0.15 (0.04)	0.09 (0.03)	0.16 (0.04)	-0.01 (0.05)	-0.07 (0.05)	0.06 (0.05)
eat donut ≥ 5 times/week=1	0.18 (0.04)	0.09 (0.03)	0.16 (0.04)	0.01 (0.06)	-0.07 (0.05)	0.08* (0.05)
eat ramen ≥ 5 times/week=1	0.21 (0.04)	0.12 (0.03)	0.20 (0.04)	0.008 (0.06)	-0.08 (0.05)	0.08 (0.05)
eat fruits ≥ 5 times/week=1	0.60 (0.05)	0.63 (0.05)	0.66 (0.05)	-0.06 (0.07)	-0.03 (0.07)	-0.03 (0.07)
diet now=1	0.28 (0.05)	0.35 (0.05)	0.3 (0.05)	-0.02 (0.07)	0.05 (0.07)	-0.07 (0.07)

Note: Descriptive statistics, Mturk study ($n = 286$). Standard errors are in parentheses, significance levels are indicated as ‡ $p < 0.01$, † $p < 0.05$, * $p < 0.1$.

Table 4.6: Descriptive Statistics, Continued (Mturk Study, $n = 286$)

Variables	group			difference		
	ramen (N=98)	donut (N=97)	control (N=91)	(1)-(3)	(2)-(3)	(1)-(2)
age	28.76 (0.55)	27.91 (0.45)	27.99 (0.51)	0.77 (0.75)	-0.08 (0.68)	0.86 (0.71)
BMI	24.48 (0.62)	25.95 (0.89)	24.33 (0.70)	0.16 (0.94)	1.62 (1.13)	-1.46 (1.09)
White=1	0.59 (0.05)	0.6 (0.05)	0.55 (0.05)	0.04 (0.07)	0.05 (0.07)	-0.01 (0.07)
Asian=1	0.2 (0.04)	0.24 (0.04)	0.25 (0.05)	-0.06 (0.06)	-0.008 (0.06)	-0.05 (0.06)
Black=1	0.09 (0.03)	0.05 (0.02)	0.09 (0.03)	0.005 (0.04)	-0.04 (0.04)	0.04 (0.04)
hunger level before video	4.02 (0.28)	3.73 (0.27)	3.68 (0.28)	0.34 (0.40)	0.05 (0.39)	0.29 (0.39)
did the study at 12:00pm-6:00pm=1	0.50 (0.051)	0.47 (0.051)	0.45 (0.052)	0.04 (0.07)	0.02 (0.07)	0.03 (0.07)
did the study at 6:00pm-9:00pm=1	0.21 (0.04)	0.26 (0.04)	0.20 (0.04)	0.01 (0.06)	0.06 (0.06)	-0.05 (0.06)
did the study at 9:00pm-6:00am=1	0.19 (0.04)	0.14 (0.04)	0.24 (0.05)	-0.06 (0.06)	-0.10* (0.06)	0.04 (0.05)

Note: Descriptive statistics, Mturk study ($n = 286$). Standard errors are in parentheses, significance levels are indicated as ‡ $p < 0.01$, † $p < 0.05$, * $p < 0.1$.

4.2.3 Empirical Results

Satiation and Disgust

Table 4.7 reports the OLS estimation for mukbangs' effect on satiation and disgust. Watching the donut mukbang significantly decreased the satiation level by 67.2% (0.554 unit) compared to the non-food video, but the ramen mukbang did not have this effect. Regardless the content of the video, dieters felt 104.3% higher (0.485 unit more) satiation and 47.9% higher (0.571 unit more) disgust than non-dieters. In addition, the frequency of watching mukbangs played a significant role and led participants to report an increased level of both satiation and disgust. Although the diet stage was not randomly assigned and we can not infer causality from the interaction term, regression model (2) suggests that dieters who were assigned watch the ramen mukbang had 139.8% higher (0.776 unit more) satiation level than dieters watched the non-food video.

The predict margins based on ordered logistic regression (table 4.9) also suggest that the donut mukbang decreased the probability to feel satiation by 16.2% and dieters were 10.4% more likely to feel satiation. Unlike the OLS estimation, the ordered logistic regression shows that the ramen mukbang increased the probability to feel disgust by 9.7% and donut mukbang's increase in disgust is 9.6%. Dieters had 14.1% higher probability to feel disgust compared to non-dieters.

Table 4.7: OLS Estimation for Satiation and Disgust (Mturk Study, $n = 286$)

	satiation		disgust	
	(1)	(2)	(3)	(4)
ramen mukbang=1	-0.0555 (0.216)	-0.391 (0.256)	0.377 (0.251)	0.211 (0.300)
donut mukbang=1	-0.554 [†] (0.219)	-0.640 [†] (0.262)	0.353 (0.254)	0.378 (0.307)
diet now=1	0.485 [†] (0.208)	0.00342 (0.352)	0.571 [†] (0.241)	0.407 (0.412)
ramen mukbang \times diet=1		1.167 [†] (0.481)		0.588 (0.563)
donut mukbang \times diet=1		0.292 (0.461)		-0.0623 (0.540)
watch mukbang \geq 5 times/week=1	1.095 [‡] (0.305)	1.052 [‡] (0.303)	1.429 [‡] (0.354)	1.402 [‡] (0.355)
R-squared	0.292	0.308	0.122	0.128

Note: OLS estimation for satiation and disgust, Mturk study ($n = 286$). Standard errors are in parentheses, significance levels are indicated as [‡] $p < 0.01$, [†] $p < 0.05$, ^{*} $p < 0.1$. All regression models controlled age, BMI, race, time when did the study and the hunger level before video.

Change of the Desire to Eat

To measure the change in the desire to eat specific foods, I use the difference of the desire to eat before and after watching the video. Table 4.8 reports the OLS estimation results. Watching mukbang increased the desire to eat the food shown in the video as well as fruits, which is consistent with the finding in the first basic study at Cornell. For example, the ramen mukbang increased the desire to eat ramen by 1.113 units, which represents 428% increase compared to that of the non-food content video. The donut mukbang increased the desire to eat donut by 1.301 units, which presents 228% increase compared to that of the non-food content video. Moreover, I did not find evidence that the ramen mukbang influenced the desire to eat donut and vice versa. Although dieters reported lower level of desire to eat all kinds of foods, the magnitude of these effects were not distinguishable from zero.

Table 4.9 also reports the predicted margins for the desire to eat. Estimation for the change of desire to eat ramen and donut are not reported since their regression violates the proportional odds assumption. I did not find evidence that mukbang affected the desire to eat fruits.

Table 4.8: OLS Estimation for the Change of Desire to Eat (Mturk Study, $n = 286$)

	ramen		donut		fruit	
	(1)	(2)	(3)	(4)	(5)	(6)
ramen mukbang=1	1.113‡	1.137‡	0.341	0.159	0.454*	0.461
	(0.272)	(0.324)	(0.311)	(0.372)	(0.266)	(0.318)
donut mukbang=1	-0.0703	-0.365	1.301‡	1.205‡	0.461*	0.213
	(0.275)	(0.331)	(0.314)	(0.380)	(0.268)	(0.324)
diet now=1	-0.436	-0.743	0.0702	-0.248	-0.0997	-0.367
	(0.265)	(0.451)	(0.300)	(0.514)	(0.255)	(0.435)
ramen mukbang \times diet=1		-0.127		0.627		-0.0636
		(0.609)		(0.698)		(0.595)
donut mukbang \times diet=1		0.916		0.312		0.768
		(0.585)		(0.672)		(0.571)
watch mukbang \geq 5 times/week=1	0.124	0.133	-0.334	-0.359	0.438	0.465
	(0.417)	(0.417)	(0.482)	(0.484)	(0.376)	(0.377)
R-squared	0.106	0.119	0.098	0.100	0.054	0.064

Note: OLS estimation for the change of desire to eat, Mturk study ($n = 286$). Ramen is not reported since the regression violates the proportional odds assumption. Standard errors are in parentheses, significance levels are indicated as ‡ $p < 0.01$, † $p < 0.05$, * $p < 0.1$. All regression models controlled age, BMI, race, time when did the study, hunger level before video and the frequency to eat the corresponding food.

Table 4.9: Predicted Margins (Mturk Study, $n = 286$)

	satiation			disgust			fruits		
	disagree	neutral	agree	disagree	neutral	agree	< 0	= 0	> 0
ramen mukbang=1	-0.026 (0.051)	-0.004 (0.009)	-0.030 (0.059)	-0.121* (0.066)	0.024* (0.012)	0.097* (0.055)	-0.048 (0.053)	0.011 (0.011)	0.037 (0.043)
donut mukbang=1	0.143‡ (0.053)	0.018† (0.007)	-0.162‡ (0.059)	-0.120* (0.066)	0.024* (0.013)	0.096* (0.054)	-0.076 (0.052)	0.016 (0.011)	0.060 (0.045)
diet now=1	-0.088* (0.05)	-0.016 (0.01)	0.104* (0.06)	-0.175‡ (0.064)	0.035‡ (0.013)	0.141‡ (0.054)	0.017 (0.054)	-0.005 (0.015)	-0.012 (0.039)
compare the effect between ramen mukbang and the non-food video									
effect difference for dieters	-0.025 (0.049)	-0.005 (0.010)	0.030 (0.059)	-0.129* (0.068)	-0.004 (0.007)	0.125* (0.068)	-0.046 (0.051)	0.007 (0.010)	0.038 (0.045)
difference in difference: dieters versus non-dieters	0.001 (0.003)	-0.001 (0.002)	-0.0004 (0.001)	-0.011 (0.008)	-0.029 (0.019)	-0.040 (0.022)	0.003 (0.006)	-0.005 (0.012)	0.002 (0.006)
compare the effect between donut mukbang and the non-food video									
effect difference for dieters	0.137‡ (0.052)	0.023† (0.012)	-0.161‡ (0.060)	-0.127* (0.068)	0.006 (0.007)	0.121* (0.065)	-0.073 (0.051)	0.012 (0.015)	0.061 (0.045)
difference in difference dieters versus non-dieters	-0.008 (0.011)	0.007 (0.010)	0.001 (0.006)	-0.010 (0.007)	-0.026* (0.016)	0.036* (0.019)	0.003 (0.008)	-0.006 (0.016)	0.002 (0.008)

Note: The predicted margin is calculated by ordered logistic model for satiation, disgust and the change of the desire to eat fruit, Mturk study ($n = 286$). Standard errors are in parentheses, significance: ‡ $p < 0.01$, † $p < 0.05$, * $p < 0$. All regression models controlled age, BMI, time when did the study, hunger level before video and the frequency of watching mukbang.

The Beliefs and Experience of Using Mukbang to Diet

This subsection provides analysis for the special case when viewers have the expectation that watching a mukbang will substitute for food consumption. In reality, the desire to eat and actual consumption are not only the by-product of food cues, but also planned results for mukbang-diet strategy users. As discussed in chapter 3, we can only get correlation between mukbang viewing experience and the desire to eat, rather than causality. Nevertheless, the empirical findings are valuable since many dieters intentionally watch mukbangs to control their appetites (Cha, 2014; McCarthy, 2017).

I first test the effect of using mukbangs to diet on satiation, disgust and the desire to eat. The results suggest that the experience of using mukbangs to diet, regardless of perceptions of effectiveness, was associated with 202% higher (0.717 unit more) satiation level and 78.3% higher (0.977 unit more) disgust level (see table 4.10). The successful mukbang-diet experience was associated with 132.3% (0.896 unit) and 188.7% (1.521 units) higher level of satiation and disgust respectively. However, increasing satiety and disgust did not lead the experienced mukbang viewers to decrease their intention to eat the mukbang food. Successful mukbang-diet strategy users even had 0.668 unit more desire to eat fruit, which represents 9.7% increase compared to the mean of the baseline (see table 4.11).

Table 4.12 further investigates special features of the experienced mukbang users. Two pairs of comparisons are made. I compare participants who had used mukbangs to diet previously (N=71) with participants who did not (N=215) and participants who reported successfully using mukbangs to diet (N=40) to those who reported having failed (N=30). Results show that women

who had used mukbangs to diet had a higher degree of self-control and felt guilt after overeating more often. These women also reported that they were able to control their food intake in the night 1.054 days more. Additionally, experienced mukbang viewers, no matter whether their mukbang-diet strategy worked or not, were more likely to agree that the mukbang increases their satiation level, which helps them diet. Successful mukbang dieters also had 3.263 units lower BMI, which could result from a higher level of self-control.

Table 4.10: Mukbang Experience and Satiation and Disgust (Mturk Study, $n = 286$)

	satiation		disgust	
	(1)	(2)	(3)	(4)
ramen mukbang=1	-0.121 (0.221)	-0.0907 (0.220)	0.303 (0.254)	0.337 (0.250)
donut mukbang=1	-0.589‡ (0.222)	-0.587‡ (0.222)	0.337 (0.256)	0.357 (0.252)
diet now=1	0.344 (0.222)	0.363* (0.219)	0.384 (0.255)	0.351 (0.248)
watch mukbang to diet before=1	0.717‡ (0.246)		0.977‡ (0.283)	
successfully watch mukbang to diet=1		0.896‡ (0.299)		1.521‡ (0.339)
R-squared	0.266	0.268	0.109	0.134

Note: OLS estimation for satiation and disgust, with the experience of using mukbang to diet, Mturk study ($n = 286$). Standard errors are in parentheses, significance levels are indicated as ‡ $p < 0.01$, † $p < 0.05$, * $p < 0.1$. All regression models controlled age, BMI, race, time when did the study and hunger level before video.

Table 4.11: Mukbang Experience and the Change of Desire to Eat (Mturk Study, $n = 286$)

	ramen		donut		fruit	
	(1)	(2)	(3)	(4)	(5)	(6)
ramen mukbang=1	1.095 [‡]	1.103 [‡]	0.373	0.350	0.418	0.440*
	(0.273)	(0.272)	(0.312)	(0.311)	(0.266)	(0.265)
donut mukbang=1	-0.0610	-0.0566	1.294 [‡]	1.306 [‡]	0.468*	0.476*
	(0.275)	(0.275)	(0.314)	(0.315)	(0.267)	(0.267)
diet now=1	-0.495*	-0.502*	0.164	0.107	-0.204	-0.209
	(0.275)	(0.273)	(0.313)	(0.310)	(0.267)	(0.263)
watch mukbang to diet before=1	0.233		-0.370		0.461	
	(0.309)		(0.353)		(0.297)	
successfully watch mukbang to diet=1		0.356		-0.208		0.668*
		(0.373)		(0.431)		(0.359)
R-squared	0.108	0.109	0.099	0.096	0.058	0.062

Note: OLS estimation for the desire to eat, with the experience of using mukbang to diet, Mturk study ($n = 286$). Standard errors are in parentheses, significance levels are indicated as [‡] $p < 0.01$, [†] $p < 0.05$, * $p < 0.1$. All regression models controlled age, BMI, race, time when did the study, hunger level before video and the frequency to eat the corresponding food.

Table 4.12: Comparison Between Different Types of Mukbang Viewers (Mturk Study, $n = 286$)

	compare used before			compare agree or not		
	used before (N=71)	not used (N=215)	difference	agree (N=40)	not agree (N=31)	difference
BMI	23.293 (0.739)	25.490 (0.518)	-2.198 [†] (0.903)	21.888 (0.747)	25.151 (1.348)	-3.263 [†] (1.542)
guilt after overeating	1.694 (0.085)	1.369 (0.064)	0.325 [‡] (0.106)	1.683 (0.107)	1.710 (0.141)	-0.027 (0.177)
not eat in the evening	2.694 (0.139)	1.640 (0.119)	1.054 [‡] (0.183)	2.732 (0.168)	2.645 (0.239)	0.087 (0.292)
agree satiation	0.528 (0.059)	0.210 (0.028)	0.317 [‡] (0.065)	0.634 (0.076)	0.387 (0.089)	0.247 [†] (0.117)
agree disgust	0.222 (0.049)	0.327 (0.032)	-0.105 [*] (0.059)	0.244 (0.068)	0.194 (0.072)	0.050 (0.099)

Note: Comparison between people tried mukbang to diet before and who did not and between people successfully used mukbang to diet and people who failed, Mturk study ($n = 286$). Standard errors are in parentheses, significance levels are indicated as ‡ $p < 0.01$, † $p < 0.05$, * $p < 0.1$. The frequency of guilt after overeating is measure by a 4-point scale (never/rarely/often/always) and the frequency of not eating in the evening is measure by a 6-point scale (never or less than once per month/1-3 times per month/1 time per week/2-4 times week/5-6 times per week/everyday).

4.3 China Study: Mukbang versus Cooking Show

4.3.1 Study Design

The third study is aimed to test whether watching an individual eat has a perceptibly different effect than other food oriented videos. We make this comparison using a cooking show in which food is prepared but not eaten. As discussed in the introduction, mukbang emphasizes the enjoyment of eating and the interaction with its audience, which differs from traditional cooking shows which are investigated by previous literature.

The study, conducted in China, randomly assigned participants to watch one of the following videos: a hotpot mukbang, a hotpot cooking show and a non-food content video introducing Cornell University. Both food content videos used hotpot as their theme. For the hotpot mukbang, a popular host, Alun, was selected ⁹. Her show generally consists of her introducing the food and her enjoyment while eating well. The hotpot cooking show used was the Cat's Kitchen ¹⁰. The Cat's Kitchen emphasized the procedure of cooking and did not show the chef's face. The chef did not speak or interact with his audience, while viewers enjoyed the music and the sound created by cooking. A video introducing Cornell University was used for the non-food content video ¹¹. All videos were two-minute long.

The study was conducted in Jinan, China. Participants were students and

⁹ <https://youtu.be/QCTOo9UGZD8> (Accessed: 2018-11-29), the short version edited by the author could be found at <https://youtu.be/jKDNbnHCiok> (Accessed: 2019-1-2).

¹⁰ <https://youtu.be/EH5Ei-sMP60> (Accessed: 2018-11-29), the short version edited by the author could be found at <https://youtu.be/60Reec2IJ0A> (Accessed: 2019-1-2).

¹¹ <https://youtu.be/GuM8vTq0jd4> (Accessed: 2018-11-29), the short version edited by the author could be found at <https://youtu.be/wxCMZexHN5Y> (Accessed: 2019-1-2).

staffs at Shandong University. Participants were recruited by public intercept¹² and 234 women took part in the study. The survey is in appendix A.3.

4.3.2 Descriptive Statistics

Table 4.13 reports the descriptive statistics for the China study. There were 79, 76 and 79 female participants randomly assigned to watch the mukbang, the cooking show or the non-food video respectively. The demographic statistics were balanced across groups. The average BMI (20.6) in the sample was relatively lower compared to our two studies in the US. The frequency of eating hotpot is coded as a binary variable which takes on the value 1 when people eat hotpot at least once a month. The frequency of eating fruits, watching mukbangs and watching cooking shows are coded as a binary variable which takes on the value 1 when people did the specific activity more than 5 times per week. Participants reported their hunger level before watching the video, on a scale from 0 to 10¹³. The unconditional comparison shows that people assigned to watch the hotpot mukbang and the cooking show both reported lower satiation and disgust levels though the mukbang's effect was significantly larger. Viewers of both hotpot videos also increased their intention to eat hotpot though the difference between the two groups of viewers was not significant.

¹²Participants were recruited by the author's friends, they helped to invite their classmates, roommates and colleagues to join the study.

¹³ Hunger levels are coded to be 6 if the level was 6 or higher.

Table 4.13: Descriptive Statistics (China Study, $n = 234$)

Variables	group			difference		
	mukbang (N=79)	cook show (N=76)	control (N=79)	(1)-(3)	(2)-(3)	(1)-(2)
satiation level	-0.48 (1.77)	0.12 (1.73)	0.71 (1.85)	-1.19 [‡] (0.29)	0.59 [†] (0.29)	-0.6 [†] (0.28)
disgust level	-1.81 (0.16)	-1.33 (0.18)	-1.52 (0.16)	-0.29 (0.22)	0.19 (0.24)	-0.48 [†] (0.24)
change of desire to eat hotpot	0.77 (0.21)	0.86 (0.21)	-0.32 (0.15)	1.09 [‡] (0.26)	1.17 [‡] (0.26)	-0.08 (0.30)
change of desire to eat fruit	-0.2 (0.22)	-0.63 (0.20)	-0.58 (0.21)	0.38 (0.31)	-0.05 (0.29)	0.43 (0.30)
watch mukbang ≥ 5 times/week=1	0.06 (0.03)	0.09 (0.03)	0.05 (0.02)	0.01 (0.04)	0.04 (0.04)	-0.03 (0.04)
eat fruits ≥ 5 times/week=1	0.53 (0.06)	0.43 (0.06)	0.48 (0.06)	0.05 (0.08)	-0.05 (0.08)	0.1 (0.08)
eat hotpot ≥ 1 time/month=1	0.49 (0.06)	0.47 (0.06)	0.52 (0.06)	-0.03 (0.08)	-0.05 (0.08)	0.2 (0.08)
diet now=1	0.1 (0.03)	0.07 (0.03)	0.14 (0.04)	-0.04 (0.05)	-0.07 (0.05)	0.04 (0.04)
age	22.35 (0.45)	21.71 (0.40)	22.08 (0.44)	0.28 (0.63)	-0.37 (0.59)	0.64 (0.60)
BMI	20.3 (0.27)	20.62 (0.25)	20.77 (0.28)	-0.47 (0.39)	-0.15 (0.38)	-0.32 (0.37)
hunger level before video	2.32 (0.26)	1.93 (0.26)	1.97 (0.23)	0.42 (0.35)	-0.04 (0.34)	0.46 (0.37)
did the study at 2:00pm-6:00pm=1	0.70 (0.05)	0.63 (0.05)	0.62 (0.05)	0.08 (0.08)	0.01 (0.08)	0.06 (0.08)
did the study at 7:00pm-11:00pm=1	0.27 (0.05)	0.28 (0.05)	0.29 (0.05)	-0.03 (0.07)	-0.01 (0.07)	-0.01 (0.07)

Note: Descriptive statistics, China study ($n = 234$). Standard errors are in parentheses, significance levels are indicated as [‡] $p < 0.01$, [†] $p < 0.05$, * $p < 0.1$.

4.3.3 Empirical Results

Satiation and Disgust

The OLS estimation for satiation and disgust is reported in table 4.14. The results suggest that watching the mukbang increased the desire to eat hotpot by 326% (1.042 units) compared to that of the non-food video. The cooking show increased the desire to eat hotpot by 366% (1.170 units) compared to that of the non-food video. Their effect difference on the change of desire to eat hotpot was significant ($F(2, 223) = 11.04, Prob > F = 0.0000$). The effects of both food videos on disgust were not statistically distinguishable from zero. However, the large and significant effect of diet control was not found in the China sample. Interviews with our Chinese participants suggested that they were quite familiar with mukbangs and got used to being exposed to food temptation shown in food videos when they were hungry. The cultural difference might lead to this difference, though further research is necessary to make this determination. In addition, unlike the Mturk study, the frequency of watching mukbangs did not play a significant role here.

Table 4.14: OLS Estimation for Satiation and Disgust (China Study, $n = 234$)

	satiation		disgust	
	(1)	(2)	(3)	(4)
mukbang=1	-0.983 [‡]	-1.032 [‡]	-0.235	-0.212
	(0.250)	(0.269)	(0.229)	(0.246)
cooking show=1	-0.556 [†]	-0.646 [†]	0.202	0.117
	(0.250)	(0.264)	(0.230)	(0.241)
diet now=1	0.351	0.0367	0.127	-0.009
	(0.340)	(0.510)	(0.312)	(0.467)
mukbang×diet=1		0.299		-0.326
		(0.787)		(0.719)
cook show × diet=1		1.027		1.164
		(0.907)		(0.829)
watch mukbang >= 5 times/week=1	-0.296	-0.283	-0.164	-0.150
	(0.405)	(0.405)	(0.372)	(0.371)
R-squared	0.326	0.329	0.103	0.116

Note: OLS estimation for satiation and disgust, China study ($n = 234$).

Standard errors are in parentheses, significance levels are indicated as

[‡] $p < 0.01$, [†] $p < 0.05$, * $p < 0.1$. All regression models controlled age, BMI,

time when did the study and hunger level before video.

Change of the Desire to Eat

Table 4.15 reports the change of the desire to eat specific foods. Following the design of the Mturk study, I use the difference of the desire to eat before and after video viewing. Our results suggest that watching the mukbang increased the desire to eat hotpot by 1.042 units, which is 326% more increase than that of the non-food video. The cooking show increased the desire to eat hotpot by 1.170 units, which is 366% more increase than that of the non-

food video. Interestingly, although mukbang had stronger effect on decreasing satiation, the cooking show had bigger effect on the desire to eat hotpot ($F(2, 223) = 11.04, Prob > F = 0.0000$). The desire to eat could depend on both the attractiveness of the food presented in video and the interactive and enjoyment features. Moreover, the predicted marginal results (table 4.16) suggest that compared to dieters who were assigned to watch non-food video, dieters were 28.1% more 31.7% more likely to increase their desire to eat hotpot when they were exposed to mukbang and cooking show respectively.

The Beliefs and Experience of Using Mukbangs to Diet

In the Chinese sample, there were 45 participants who had used mukbangs to diet previously and 189 participants who did not. Among the 45 experienced participants, 21 of them reported that they had successfully used mukbangs to diet. Unlike the Mturk study, the experiment in China did not provide strong evidence to support the notion that mukbangs can influence satiation, disgust and the desire to eat (table 4.17 and table 4.18). Nevertheless, participants who reported having tried to watch mukbangs to diet held stronger beliefs that mukbangs could increase their satiety and decrease disgust compared to others (table 4.19). For example, 60% people tried the strategy before agreed it increase their satiation, while this proportion was only 17.5% for people had not tried before. On the contrary, 2.2% mukbang-diet strategy users believed that mukbangs could make people disgust and thereby help them diet, while 10.1% inexperienced people held such belief. Additionally, consistent with the Mturk study, the Chinese sample also show that people who used mukbangs to diet before and successfully achieved weight loss had a higher level of self-control.

Table 4.15: OLS Estimation for the Change of Desire to Eat (China Study, $n = 234$)

	hotpot		fruit	
	(1)	(2)	(3)	(4)
mukbang=1	1.042 [‡]	1.038 [‡]	0.444	0.434
	(0.274)	(0.295)	(0.304)	(0.329)
cooking show=1	1.170 [‡]	1.248 [‡]	-0.0586	-0.0533
	(0.275)	(0.290)	(0.305)	(0.323)
diet now=1	-0.300	-0.143	-0.294	-0.306
	(0.372)	(0.560)	(0.415)	(0.624)
mukbang×diet=1		0.155		0.0976
		(0.867)		(0.966)
cook show × diet=1		-1.000		-0.0976
		(0.996)		(1.109)
watch mukbang ≥ 5 times/week=1	-0.274	-0.288	-0.579	-0.579
	(0.444)	(0.445)	(0.495)	(0.498)
R-squared	0.119	0.124	0.032	0.032

Note: OLS estimation for the change of desire to eat, China study ($n = 234$). Standard errors are in parentheses, significance levels are indicated as [‡] $p < 0.01$, [†] $p < 0.05$, * $p < 0.1$. All regression models controlled age, BMI, time when did the study, hunger level before video and the frequency to eat the corresponding food.

Table 4.16: Predicted Margins (China Study, $n = 234$)

Variables	satiation			hotpot			fruits		
	disagree	neutral	agree	< 0	= 0	> 0	< 0	= 0	> 0
mukbang=1	0.245‡ (0.063)	-0.004 (0.008)	-0.241‡ (0.060)	-0.157‡ (0.035)	-0.128‡ (0.037)	0.285‡ (0.060)	-0.126† (0.059)	0.026* (0.016)	0.100* (0.052)
cooking show=1	0.125† (0.064)	0.003 (0.004)	-0.128† (0.063)	-0.171‡ (0.034)	-0.155‡ (0.040)	0.326‡ (0.060)	0.037 (0.066)	-0.011 (0.022)	-0.026 (0.045)
diet now=1	-0.117 (0.078)	-0.009 (0.011)	0.126 (0.088)	0.014 (0.058)	0.009 (0.034)	-0.023 (0.092)	0.126 (0.101)	-0.052 (0.054)	-0.074 (0.048)
compare the effect between mukbang and the non-food video									
effect difference for dieters	0.240‡ (0.071)	0.031 (0.025)	-0.271‡ (0.070)	-0.189‡ (0.059)	-0.092 (0.080)	0.281‡ (0.070)	-0.146† (0.070)	0.070 (0.047)	0.076* (0.045)
difference in difference: dieters versus non-dieters	-0.006 (0.030)	0.038 (0.028)	-0.032† (0.016)	-0.035 (0.047)	-0.035 (0.078)	0.040 (0.032)	-0.022 (0.020)	0.049 (0.046)	-0.027 (0.027)
compare the effect between cooking show and the non-food video									
effect difference for dieters	0.130* (0.068)	0.016 (0.016)	-0.146† (0.070)	-0.191† (0.055)	-0.126* (0.075)	0.317‡ (0.064)	0.041 (0.074)	-0.022 (0.043)	-0.019 (0.033)
difference in difference dieters versus non-dieters	0.006 (0.018)	0.014 (0.015)	-0.020* (0.012)	-0.022 (0.048)	0.032 (0.070)	-0.011 (0.023)	0.005 (0.010)	-0.013 (0.025)	0.007 (0.015)

Note: The predicted margin is calculated by ordered logistic model for satiation and the change of desire to eat hotpot and fruit, China study ($n = 234$). Standard errors are in parentheses, significance: ‡ $p < 0.01$, † $p < 0.05$, * $p < 0$. All regression models controlled age, BMI, time when did the study, hunger level before video and the frequency of watching mukbangs.

Table 4.17: Mukbang Experience and Satiation and Disgust (China Study, $n = 234$)

	satiation		disgust	
	(1)	(2)	(3)	(4)
mukbang=1	-0.993‡ (0.249)	-0.985‡ (0.250)	-0.246 (0.228)	-0.234 (0.229)
cooking show=1	-0.596† (0.251)	-0.568† (0.252)	0.159 (0.230)	0.185 (0.231)
diet now=1	0.297 (0.345)	0.369 (0.343)	0.0427 (0.316)	0.117 (0.315)
watch mukbang to diet before=1	0.287 (0.267)		0.365 (0.244)	
successfully watch mukbang to diet=1		0.0274 (0.366)		0.147 (0.336)
R-squared	0.327	0.324	0.112	0.103

Note: OLS estimation for satiation and disgust, with the experience of using mukbangs to diet, China study ($n = 234$). Standard errors are in parentheses, significance levels are indicated as ‡ $p < 0.01$, † $p < 0.05$, * $p < 0.1$. All regression models controlled age, BMI, time when did the study and hunger level before video.

Table 4.18: Mukbang Experience and the Desire to Eat (China Study, $n = 234$)

	hotpot		fruit	
	(1)	(2)	(3)	(4)
mukbang=1	1.034 [‡] (0.274)	1.041 [‡] (0.274)	0.447 (0.305)	0.434 (0.305)
cooking show=1	1.138 [‡] (0.276)	1.154 [‡] (0.276)	-0.0522 (0.307)	-0.0504 (0.308)
diet now=1	-0.338 (0.379)	-0.293 (0.376)	-0.183 (0.422)	-0.197 (0.419)
watch mukbang to diet before=1	0.218 (0.293)		-0.260 (0.327)	
successfully watch mukbang to diet=1		0.0806 (0.401)		-0.351 (0.448)
normally eat the corresponding food=1	-0.141 (0.224)	-0.128 (0.224)	-0.286 (0.263)	-0.288 (0.263)
R-squared	0.120	0.118	0.029	0.029

Note: OLS estimation for the desire to eat, with the experience of using mukbangs to diet, China study ($n = 234$). Standard errors are in parentheses, significance levels are indicated as [‡] $p < 0.01$, [†] $p < 0.05$, * $p < 0.1$. All regression models controlled age, BMI, time when did the study, hunger level before video and the frequency to eat the corresponding food.

Table 4.19: Comparison Between Different Types of Mukbang Viewers (China Study, $n = 234$)

	compare used before			compare agree or not		
	used before	not used	difference	agree	not agree	difference
	(N=45)	(N=189)		(N=21)	(N=24)	
BMI	20.997 (0.334)	20.460 (0.173)	0.536 (0.376)	21.171 (0.508)	20.845 (0.449)	0.326 (0.678)
guilt after overeating	1.667 (0.135)	0.947 (0.061)	0.720 [‡] (0.148)	1.952 (0.189)	1.417 (0.180)	0.536 [†] (0.261)
not eat in the evening	1.600 (0.212)	0.767 (0.083)	0.833 [‡] (0.227)	1.667 (0.279)	1.542 (0.318)	0.125 (0.423)
agree satiation	0.600 (0.074)	0.175 (0.028)	0.425 [‡] (0.079)	0.905 (0.066)	0.333 (0.098)	0.571 [‡] (0.118)
agree disgust	0.022 (0.022)	0.101 (0.022)	-0.078 [†] (0.031)	0.048 (0.048)	0.000 omit	0.048 (0.048)

Note: Comparison between people tried mukbang to diet before and who did not and between people successfully used mukbang to diet and people who failed, China study ($n = 234$). Standard errors are in parentheses, significance levels are indicated as [‡] $p < 0.01$, [†] $p < 0.05$, * $p < 0.1$. The frequency of guilt after overeating is measure by a 4-point scale (never/rarely/often/always) and the frequency of not eating in the evening is measure by a 6-point scale (never or less than once per month/1-3 times per month/1 time per week/2-4 times week/5-6 times per week/everyday)

CHAPTER 5

CONCLUSION

Although some people regard watching mukbangs as a way to obtain vicarious satiation, all three randomized controlled studies found that mukbang viewing led to less satiety and increased likelihood of eating the food shown in the mukbang. The results are consistent with previous findings which show that food cues increase food intake and physical reactivity (Harris et al., 2009; Bodenlos & Wormuth, 2013; Weingarten, 1985; Fedoroff et al., 2003). Moreover, although dieters had less desire to eat compared to non-dieters, the food temptation's increase in the desire to eat was so large that self-regulation did not mean dieters eat less. Since mukbang hosts usually eat high-calorie and unhealthy foods, mukbang audiences might be misled into underestimating the consequences of such indulgence.

Besides the basic comparison between the mukbang and non-food content videos, two studies also tested the effect of different types of food videos. The Mturk study compared the effects of two different mukbangs: a ramen mukbang and a donut mukbang. It turned out that participants specially increased their desire to eat the food they saw in the mukbang as well as fruit. Additionally, the sweet donut exposure made people feel less satiation than the ramen mukbang. Given the specific effect of mukbangs on food preference, more research is needed to test whether some particular types of mukbangs might be useful for dieting and whether mukbangs with fast food or sweet foods is the most harmful given these likely increase unhealthy food intake. The China study compared mukbang viewing with cooking shows. The results suggested that both the mukbang and the cooking show decreased the satiation level and

increased the desire to eat the featured food, hotpot. The mukbang had significantly stronger effects on satiation than the cooking show but weaker effect on the change of desire to eat. However, since the cooking show and the mukbang are different in both the interactive feature and the attractiveness of food, more research is needed to distinguish the effect of enjoyment and interaction from the appearance of the food.

This study also investigated whether people who believe mukbangs are effective in dieting react differently to viewing. Although the experience and the belief of using mukbangs to diet could not be randomly manipulated and test its causality in experiment, I use the summary statistics and correlation regression to illustrate it. I found that people who reported having tried this strategy and specifically those who reported successfully controlling their appetites by watching mukbangs had a stronger level of self-control: they felt guilt after overeating and control their evening food intake more frequently than others. The experienced mukbang audiences also held stronger beliefs of the mukbang's effect on eating and agreed that mukbangs could help them to achieve their goal of diet by increasing satiation and disgust level. However, the observed increase in satiety and disgust reaction did not translate into a reduced desire to eat: the empirical results did not find supportive evidence for the mukbang usage experience decreasing their intention to eat. On the contrary, the mukbang had a larger effect on such dieters and motivated such participants to eat more fruits. In addition, although the Mturk study provided evidence that the experience of using mukbangs to diet was associated with higher level of satiation and disgust, this correlation was not significant in the China study.

The current study sheds insights on the government's regulation of the muk-

bang. The origin of mukbang, South Korea, has announced to regulate mukbang production and fight against obesity (Wikipedia, 2019) while the common public is still debating on the health consequences brought by the mukbang Chu (2019). Our randomized controlled studies prove the casual effect of watching mukbangs on the desire to eat, which could lead to more calorie intake and thereby, obesity. Moreover, since the mukbang does not decrease the desire to eat for dieters believing in the mukbang-diet strategy, viewing mukbang could generally encourage dieters with the expectation to diet to eat more food. However, our findings are inconsistent with (Tu & Fishbach, 2017), which to the best of our knowledge, is the only randomized controlled trail to test the effect of mukbangs. Although (Tu & Fishbach, 2017) show that the mukbang decreases calorie consumption, they do not test different food stimuli in mukbangs and as suggested by our pilot study, junk food (they use pizza) is likely to make people feel disgust and control their appetites. They use the political view as a link between the host the and audiences, while they do not discuss the figure and appearance of the hosts as well as the interactive nature which makes mukbangs different from general food shows. More work is needed to address the interactive feature, the figure of the host and the food stimuli in mukbangs.

Dieters use their past experience and their beliefs to decide how many mukbangs they would like to watch. However, the mukbang consumption level in the current study was randomly assigned to be either 0 or 1, which makes it difficult to directly test the effect of “optimal” mukbang consumption. It would be interesting to study the case in which dieters decide the amount of mukbang consumption by themselves and the consequences of mukbang viewing. Moreover, the present study shows the effect of exposure to a mukbang for one time and no more than 3 minutes. It is unclear how watching mukbangs on a regular

basis influences calorie intake and subsequent weight change. The difference between one time exposure and long term dieting strategy might be the reason that some dieters watch mukbangs to control calorie intake. Understanding how mukbangs influence eating behaviors in the long run is an important step for future research in this area.

APPENDIX A

APPENDIX

A.1 Questionnaire for Cornell Study

Q1. Time when you did the study.

Q2. On a scale from -5 to 5, evaluate how your level of hunger changed (-5= my hunger level decreases a lot, 0= my hunger level is not changed at all, 5=my hunger level increases a lot).

Q3. Please use (very strongly disagree/strongly disagree/disagree/neutral/agree/strongly agree/very strongly agree) to evaluate the following items: I feel satisfied and do not need to eat. I feel disgust of the thought of eating. The video motivates me to eat dim sum. The video motivates me to eat fruit or vegetable. The video motivates me to drink water. The video motivates me to drink sugar-sweetened soda or sports drinks. The video motivates me to eat sweets (cookies, cakes, ice cream, candy). The video motivates me to eat potato chips or other salty snacks.

Q4. What is your age?

Q5. Please specify your race. (White/Hispanic or Latino/Black or African American/Native American or American Indian/Asian or pacific islander/other)

Q6. Whats your height?

Q7. Whats your weight?

Q8. Have you ever watched the following types of videos before? muk-

bang, cooking show, food related video apart from mukbang and cooking show.
(Yes/No)

Q9. Whats your frequency of watching the following types of videos? mukbang, cooking show, food related video apart from mukbang and cooking show (for each item, choose from: never, or less than once per month/1-3 per month/1 per week/2-4 per week/5-6 per week/1 per day/2-3 per day/4-5 per day/6+ per day).

Q10. Whats your frequency of eating the following food? Potato chips or other salty snacks, Sweets (cookies, cakes, ice cream, candy), Sugar-sweetened soda or sports drinks, Fried chicken, french fries or other fast food, Fruits, Vegetable, Dim sum (for each item, choose from: never, or less than once per month/1-3 per month/1 per week/2-4 per week/5-6 per week/1 per day/2-3 per day/4-5 per day/6+ per day).

Q11. Are you dieting now? (Yes/No)

Q12. Would a weight fluctuation of 5 lb affect the way you live your life? (Not at all/slightly/moderately/very much)

Q13. Do you have feelings of guilt after overeating? (Never/rarely/often/always)

Q14. (Open question) What reason do you think that some people enjoy watching others eating?

o The dim sum mukbang by Peggie Neo, <https://youtu.be/2dRf535eAPk>,
the short version edited by the author: <https://youtu.be/Quc4XmoBiiE>

- Big Bang Theory, The Euclid Alternative, the short version edited by the author: <https://youtu.be/OiotvMtekpY>

A.2 Questionnaire for Mturk Study

Q1 Time when you do this survey: (morning (6:00 am - 12:00 pm)/afternoon (12:00 pm-6:00 pm)/evening (6:00 pm-9:00 pm)/late night (9:00 pm - 6:00 am))

Q2 How much time has passed since your last food consumption? (within 30 minutes/30-60 minutes/1-2 hours/more than 2 hours)

Q3 On a scale from 0 to 10, evaluate your hunger level.

Q4 Please evaluate your willingness to eat donut, ramen, fruit on a scale from 0 to 10. (0=not want to eat at all; 10=extremely want to eat)

[Watch the video]

Q5 On a scale from 0 to 10, evaluate your hunger level after watching that video.

Q6 Please evaluate your willingness to eat donut, ramen, fruit after watching that video, on a scale from 0 to 10. (0=not want to eat at all; 10=extremely want to eat)

Q7 Please evaluate your emotional feeling using (very strongly disagree/strongly disagree/strongly disagree/neutral/agree/strongly agree/very strongly agree): I feel satisfied and dont need to eat. I feel disgust of the thought of eating.

Q8 What is your age?

Q9 Please specify your race. (White/Asian or pacific islander/Black or African American/Native American or American Indian/Hispanic or Latino/Other)

Q10 Whats your height?

Q11 What's your weight in pounds?

Q12 Whats your frequency of eating donut, ramen, fruit? (for each item, choose from: never, or less than once per month/1-3 per month/1 per week/2-4 per week/5-6 per week/1 per day/2-3 per day/4-5 per day/6+ per day).

Q13. Have you ever watched the following types of videos before? mukbang, cooking show, food related video apart from mukbang and cooking show. (Yes/No)

Q14 Whats your frequency of watching the following types of videos? mukbang, cooking show, food related video apart from mukbang and cooking show (for each item, choose from: never, or less than once per month/1-3 per month/1 per week/2-4 per week/5-6 per week/1 per day/2-3 per day/4-5 per day/6+ per day)

Q15 Are you dieting now? (Yes/No)

Q16 Do you have feelings of guilt after overeating? (Never/Rarely/Often/Always)

Q17 How often in the evening do you try not to eat because you are watching your weight? (never or less than once per month/1-3 times per month/1 time per week/2-4 times week/5-6 times per week/everyday)

Q18 Have you ever watched mukbang when you are dieting? (Yes/No)

Q19 Do you think watching mukbang could help you control calorie intake?
(very strongly disagree/strongly disagree/strongly disagree/neutral/agree/strongly agree/very strongly agree)

Q20 Through which channel do you think that mukbang help dieters to control calorie intake? (making people feel disgust/making people feel satisfied and dont need to eat the food by themselves/other channel, please specify)

◦ The ramen mukbang by Yuka Kinoshita, <https://youtu.be/ArPaid2Iuck>

the short version edited by the author: <https://youtu.be/AJ47A1.0t1o>

◦ The donut mukbang by Yuka Kinoshita, <https://youtu.be/ntMT2y0MgHk>,

the short version edited by the author: https://youtu.be/_wpQJun0oVM

◦ The documentary by TheLiyihang <https://www.youtube.com/watch?v=hWnm1BQOTZY>,

the short version edited by the author: <https://youtu.be/0WdfnJQC3j8>

A.3 Questionnaire for China Study

Q1 Time when you do this survey: (morning (6:00 am - 12:00 pm)/afternoon (12:00 pm-6:00 pm)/evening (6:00 pm-9:00 pm)/late night (9:00 pm - 6:00 am))

Q2 How much time has passed since your last food consumption? (within 30 minutes/30-60 minutes/1-2 hours/more than 2 hours)

Q3 On a scale from 0 to 10, evaluate your hunger level.

Q4 Please evaluate your willingness to eat hotpot, grill, fruit on a scale from 0 to 10. (0=not want to eat at all; 10=extremely want to eat)

[Watch the video]

Q5 On a scale from 0 to 10, evaluate your hunger level after watching that video.

Q6 Please evaluate your willingness to eat hotpot, grill, fruit after watching that video, on a scale from 0 to 10. (0=not want to eat at all; 10=extremely want to eat)

Q7 Please evaluate your emotional feeling using (very strongly disagree/strongly disagree/strongly disagree/neutral/agree/strongly agree/very strongly agree): I feel satisfied and dont need to eat. I feel disgust of the thought of eating.

Q8 What is your age?

Q9 Whats your height?

Q10 What's your weight in kg?

Q11 Whats your frequency of eating hotpot, grill, fruit? (for each item, choose from: never, or less than once per month/1-3 per month/1 per week/2-4 per week/5-6 per week/1 per day/2-3 per day/4-5 per day/6+ per day).

Q12. Have you ever watched the following types of videos before? mukbang, cooking show, food related video apart from mukbang and cooking show. (Yes/No)

Q13 Whats your frequency of watching the following types of videos? muk-

bang, cooking show, food related video apart from mukbang and cooking show (for each item, choose from: never, or less than once per month/1-3 per month/1 per week/2-4 per week/5-6 per week/1 per day/2-3 per day/4-5 per day/6+ per day)

Q14 Are you dieting now? (Yes/No)

Q15 Do you have feelings of guilt after overeating? (Never/Rarely/Often/Always)

Q16 How often in the evening do you try not to eat because you are watching your weight? (never or less than once per month/1-3 times per month/1 time per week/2-4 times week/5-6 times per week/everyday)

Q17 Have you ever watched mukbang when you are dieting? (Yes/No)

Q18 Do you think watching mukbang could help you control calorie intake? (very strongly disagree/strongly disagree/strongly disagree/neutral/agree/strongly agree/very strongly agree)

Q19 Through which channel do you think that mukbang help dieters to control calorie intake? (making people feel disgust/making people feel satisfied and dont need to eat the food by themselves/other channel, please specify)

o The mukbang by Alun, <https://youtu.be/QCTOo9UGZD8>

the short version edited by the author: <https://youtu.be/jKDNbnHCiok>

o The cooking show by Cat's Kitchen, <https://youtu.be/EH5Ei-sMP60>

the short version edited by the author: <https://youtu.be/60Reec2lJ0A>

◦ The documentary by Cornell <https://youtu.be/GuM8vTq0jd4>,

the short version edited by the author: <https://youtu.be/wxCMZexHN5Y>

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