

INFLUENCE OF CHOPSTICK SIZE ON TASTE EVALUATIONS¹

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Summary.—This study explored the influence of the length of chopsticks on taste evaluations. Participants ($N=78$; M age = 21.1 yr., $SD=3.8$) reported a greater liking for their food and higher purchase intentions when using long rather than short chopsticks. Findings also indicated that the long (vs short) chopsticks caused people to slow down when eating, resulting in greater eating duration and a higher number of mouthfuls. The findings of this study provide insights on research into the role of tableware in food intake.

The issue of dietary health has become increasingly of concern in recent years. One reason for this trend is that people are often found either to be overeating or not eating sufficient amounts of food (Wansink, 2004). Many people have difficulty in monitoring how much they eat during a meal (Wansink, 2004; Wansink & Cheney, 2005; Van Ittersum & Wansink, 2012). External cues such as tableware size are likely to be used in judging the amount of food consumed. Larger tableware increases consumption (Wansink & Cheney, 2005; Wansink, Van Ittersum, & Painter, 2006; Van Ittersum & Wansink, 2012) because people tend to employ consumption norms and will anchor judgment of the appropriate amount of food on the presented portion.

The four most common types of tableware are frequently used for dining, including spoons, forks, straws, and chopsticks. Wansink, *et al.* (2006) examined whether spoon size exerts a visual bias (size-contrast effect) leading to over-eating in a natural environment. Empirical evidence showed that individuals ate 14.5% more ice cream when using 3-oz. spoons when compared to those using 2-oz. spoons (Wansink, *et al.*, 2006). The explanation for such a pattern is that people who are given large serving spoons tend to underestimate how much they are consuming relative to those given smaller serving spoons. With regard to fork size, Mishra, Mishra, and Masters (2012) investigated the role of bite size on the quantity of food consumed in a restaurant. They observed that diners consumed more from a smaller fork than from a larger fork and posited that when diners have a well-defined hunger goal to satisfy and have a willingness to reach that

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goal, a smaller fork gives the feeling that they are not making much progress in satiating their hunger, which results in more consumption compared to when they use a larger fork. In terms of straw size, Lin, Lo, and Liao (2013) examined the role of drinking straw size in volume judgment. Two laboratory studies revealed that straw size can lead to different perceptions of consumption time; individuals perceived their consumption to be higher when using a thin straw rather than a thick straw. In contrast to studies using these three types of tableware, there is little evidence on chopsticks in the field of consumer behavior and psychology.

Previous research has discussed the food-serving performance of chopsticks associated with exterior parameters (i.e. shape, length, materials, etc.) and method of use (Hsu & Wu, 1991; Wu, 1995; Chen, 1998; Chan, 1999; Ho & Wu, 2006). Most of the research has focused on which method of use or exterior parameters result in optimal gripping performance. However, there is little research into the length of chopsticks related to eating behavior and consumer psychology. Therefore, the purpose of the current study is to examine how the length of chopsticks can affect taste evaluations.

People's food intake is affected by a variety of environmental factors, such as plate shape, lighting, color, and convenience (Bell & Pliner, 2003; Wansink, 2004, 2010; Stroebele & de Castro, 2006). For instance, lighting and music may have a psychological influence on food intake since they may directly or indirectly affect eating time (Wansink, 2004; Garg, Wansink, & Inman, 2007; Wansink & Van Ittersum, 2012). Eating time plays a crucial role in taste evaluations. It is generally accepted that eating slowly has certain benefits. On the one hand, slower eating speed might help to maximize satiation and decrease the energy intake within meals (Spiegel, Wadden, & Foster, 1991; Andrade, Greene, & Melanson, 2008; Shah, Copeland, Dart, Adams-Huet, James, & Rhea, 2014), and, in addition, eating slowly may increase enjoyment of the taste of food (Brownell, 1989; Wadden & Bell, 1990; Andrade, Greene, & Melanson, 2008; Wansink & Van Ittersum, 2012). For example, Brownell (1989) found that eating slowly enables diners to savor and enjoy the texture as well as the taste of the food. Wansink and Van Ittersum (2012) also reported that the softening of lighting and music extended a diner's eating time and thus increase enjoyment of the taste of the meal. Furthermore, Andrade, *et al.* (2008) found that when participants consumed meals slowly, pleasantness ratings increased. These studies have provided supporting evidence that longer eating time can result in greater enjoyment of the taste of the food.

Hypothesis 1. The use of long chopsticks will lead to an extension of the time spent eating, and this will result in greater enjoyment of the food.

Chopsticks are an indispensable tool used widely in the everyday lives of Asian people. The length of chopsticks is predicted to influence eating duration. The distance from the chopsticks' tip to the point at which they are gripped by the users' fingers can be regarded as the radius of the pinching movement, with the point at which they are gripped by fingers as the center of the circle. Thus, the radius is long when gripping with long chopsticks, while the radius is shorter when using short chopsticks. Using long chopsticks may lead to diners slowing down and taking longer to eat meals, which has been shown to increase enjoyment.

Hypothesis 2. Participants will report higher appreciation for the food's taste when using longer chopsticks than when using shorter chopsticks.

METHOD

Participants

Seventy-eight undergraduate students (34 men, 44 women; $M_{age}=21.1$ yr., $SD=3.8$) were recruited from the Department of Business Administration at Minghsin University of Science and Technology. The mean age of the men was 23.2 yr. ($SD=5.0$), and for women 19.5 yr. ($SD=0.6$). In the long chopsticks group ($n=38$), there were 19 men and 19 women; in the short chopsticks group ($n=40$), there were 15 men and 25 women.

Design

Participants were randomly assigned to one of two conditions: either the long chopsticks group (23 cm) or the short chopsticks group (19 cm). Both types of chopsticks were made of stainless steel, and the chopstick tips were grooved to improve their grip. This experimental material was selected because it is most common in Taiwan. Rice was selected as the material for the taste evaluation, because rice is the staple food in the Asian world and people usually use chopsticks to serve rice in meals. Only 80 g of rice was served to participants for the taste test, since a full bowl of rice may have misled participants about the real purpose of the taste evaluation. Moreover, no other food was given during the taste test to avoid any problems relating to appetite state (hunger).

Procedure

The participants were tested individually in a laboratory. Upon arrival, the experimenter told them that they were participating in a rice taste evaluation, and then they were instructed to sit in front of a table. The participants were asked to provide demographic information and then they rated their hunger on a 7-point Likert scale with anchors 1: Not at all hungry and 7: Very hungry. Next, the participants were asked to gargle with a

25 ml cup of water to eliminate any mouth odors. The experimenter provided them with a bowl of hot rice (80 g) and chopsticks. The participants were asked to finish the rice, without any time constraints, and to rate its taste qualities, including its viscosity, chewiness, and aroma, on 7-point Likert scales. While the participants were eating the rice, another experimenter recorded the eating duration and counted the number of mouthfuls they consumed. After the participants finished the eating task, they were required to rate their overall liking and purchasing intention of the rice on a 7-point scale with anchors 1: Not at all and 7: Very much; this matched the measure of liking used in previous studies (Nowlis, Mandel, & McCabe, 2004; Mandel & Nowlis, 2008). Next, they were asked to answer the question "How comfortable did you feel using the chopsticks?" on a 7-point scale with anchors 1: Not at all comfortable and 7: Very comfortable, and the further question, "How effortful was the use of the chopsticks?" with anchors 1: Not at all effortful and 7: Very effortful. At the end of the study, a ball-point pen was given to all participants as appreciation for their time, and they were then thanked and debriefed.

RESULTS

An independent *t* test showed that if participants ate the rice with the longer chopsticks, when compared to using the shorter chopsticks, their overall liking ($r^2 = .27$) and purchase intention ($r^2 = .29$) of the rice were greater. Participants in the long chopsticks group spent more time ($r^2 = .49$) and took more mouthfuls ($r^2 = .35$) to finish the rice than those in the short chopsticks group (Table 1). A Levene test showed that the variances between the groups of the data set were homogenous.

To examine the influence of participants' sex on the ratings of taste liking, an analysis of covariance (ANCOVA) revealed that the use of the longer chopsticks still resulted in greater liking than the shorter chop-

TABLE 1
THE EFFECT OF CHOPSTICK LENGTH ON TASTE EVALUATIONS

Rating	Long Chopsticks (<i>n</i> = 38)		Short Chopsticks (<i>n</i> = 40)		<i>t</i>	Effect Size	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Overall liking	4.63	0.97	4.05	1.09	2.49	.27	.02
Purchase intention	4.58	1.18	3.98	0.92	2.53	.29	.01
Eating duration, sec.	38.26	11.56	27.03	8.03	5.01	.49	<.001
Mouthfuls	3.55	1.22	2.78	0.83	3.30	.35	.001
Comfort	4.79	1.30	4.28	1.52	1.60	.18	.11
Effort	2.11	1.29	2.28	1.26	-0.59	.07	.56

Note.—Effect size is r^2 .

sticks ($F_{1,76} = 5.43, p = .02$); therefore, sex did not have significant effect on the taste liking. The participants' comfort ratings ($r^2 = .18$) and effort ratings ($r^2 = .07$) for the long and the short chopsticks were not significantly different from each other (Table 1). That is, the difficulty for using the two types of chopsticks was considered to be the same.

DISCUSSION

Previous studies have documented how different tableware, such as spoons, forks, and straws, exert a size effect on food intake behavior. The findings of the current study showed that chopstick length has a significant influence on taste liking and purchase intention. Obviously, due to the physical characteristics of the tableware, the reasons behind the tableware size effect vary. With regard to the chopstick length effect, the duration of eating is an important explanatory factor; i.e., the long chopsticks caused participants to spend more time eating and to take more mouthfuls for the same meal. Importantly, the ratings of comfort and effort were partial evidence that the difficulty of using both types of chopsticks was equivalent.

In fact, eating more slowly can increase diners' satisfaction in a restaurant (Andrade, *et al.*, 2008; Wansink & Van Ittersum, 2012). Prior studies have shown that some environmental cues in restaurants, such as music (Wansink & Van Ittersum, 2012), color scheme (Gorn, Chattopadhyay, Sengupta, & Tripathi, 2004), and space (Baker, Parasuraman, Grewal, & Voss, 2002) affect time perceptions. This study provides evidence that the length of chopsticks can also be taken as a cue to slow the speed at which diners eat, and thus enhance their liking of the meal. Accordingly, restaurants could consider offering longer chopsticks to diners in serving themselves not only to increase their enjoyment of the food but also to enhance customer satisfaction.

Limitations and Future Research

Chopsticks are a major item of tableware for diners in Asia, and the participants in this study were all Taiwanese. Future research is needed to build on the current study to examine the differences in results for Western diners. In addition, only 80 g of rice were provided in the experiment, so it would be worth investigating actual consumption in the real world. Previous evidence has suggested that the food-serving performance of chopsticks is related to exterior parameters (i.e., shape, length, materials, etc.) and method of use (Hsu & Wu, 1991; Wu, 1995; Chen, 1998; Chan, 1999; Ho & Wu, 2006). For example, a combination of bamboo chopsticks with grooved tips operated with a pliers-grasp tends to be preferable for more favorable gripping performance (Ho & Wu, 2006). Hence, in future research the exterior parameters and the various methods of using chopsticks should be considered. Diners

often eat food from containers (e.g., a bowl, or a plate) with chopsticks during a meal. Combinations of sizes of containers and chopsticks can vary, such as a large bowl with short chopsticks. It may be worth investigating how container size interacts with chopstick length in terms of food intake.

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