

食事の社会的促進に関する研究：  
他人が食事している映像は社会的促進が生じるが、他人  
が話をしている映像では生じない

A study on social facilitation of eating: Watching others eating in the  
video makes food taste better and eat more than watching others  
calling on the phone in the video

郭セツ根, 中田 龍三郎, 川合 伸幸

Zhuogen GUO, Ryuzaburo NAKATA, Nobuyuki KAWAI

名古屋大学

Nagoya University

[guo@cog.human.nagoya-u.ac.jp](mailto:guo@cog.human.nagoya-u.ac.jp), [nakata@cog.human.nagoya-u.ac.jp](mailto:nakata@cog.human.nagoya-u.ac.jp), [kawai@is.nagoya-u.ac.jp](mailto:kawai@is.nagoya-u.ac.jp)

## Abstract

Food tastes better and people eat more of it when eaten with company than alone [1]. As a good example demonstrating an influence of social factors in tasting foods, eating together can change tastes of foods better. Although several explanations have been proposed for this social facilitation of eating, they share the basic assumption that this phenomenon is achieved by the existence of co-eating others.

Recent studies have demonstrated that the social facilitation of eating was been observed when the participants ate food with watching a TV program. However, it is unknown the critical factor to yield the social facilitation effect of eating by the video images. In this study, we presented three types of videos: 1) a person is eating potato chips; 2) a person is talking on the phone, with someone other than the experimenter or the participants; 3) a phone and chips are put on the desk without anyone. The participants tasted popcorn during watching each of these videos. When they watched the video of others eating food, the participants ate much more popcorn, than watched calling video or the video of the food and phone just put on the desk. The subjective evaluations of the popcorn were also better tasting in the eating condition than the two other conditions. These results suggest that, eating behavior of the other people was a crucial factor to induce a social facilitation of eating.

Key words — social facilitation, food intake, eating alone, eating with others, video images

## 1. Introduction

The social facilitation of eating refers to increases in food intake when people eat together, as compared to when they eat alone [3]. When people eat together in company, they typically communicate with each other and experience social bonding [4], which helps them feel comfortable and relax. These positive changes in mood or atmosphere, in turn, may lead to the social facilitation of eating. The presence of others has a direct effect on the human eating behavior. There are a lot of studies that have shown the food will taste better and people will eat more when eat with others [5]. However, no studies had ever questioned whether the presence of another individual in fact is necessary, that for producing the “social” facilitation of eating. This maybe because that, the presence of other individuals is usually treated as a basic premise for producing the social facilitation of eating. The primarily because this facilitation has been observed when an individual ate together with other individuals [1].

Recently, a new study reported that looking in the mirror can make the popcorn taste more delicious and people will eat more [2]. In that study, all the self-images reflected eating behaviors. It is unclear whether “eating” images are crucial to produce the “social” facilitation effect of eating. The study also demonstrated a similar “social” facilitation of eating. Even when participants ate a piece of popcorn in front of a static picture of themselves eating. This suggested that, static visual information of “someone” “eating” food is necessary condition to produce the “social” facilitation of eating.

A study suggested that watching a TV program also

can have social facilitation on eating. Bellisle et al. [7] measured food intake when participants watched a TV program. Intake was significantly greater under watching TV condition than the control condition (read a text on insects). A previous study also showed, watched a TV program that draws the participants' attention much more and make them feel relax [9]; by drawing attention away from the food as it is eaten in much the same way as eating in the presence of other distractions. Pleasurable activities which draw attention away from self-monitoring elicited more intake and the facilitation. These positive changes in mood or atmosphere, in turn, lead to the social facilitation of eating [10].

The previous studies reported that eating whilst listening to the radio or watching TV increases amount consumed [6]. The TV shown were pre-recorded video tapes including no relevance to food or eating. The listening is just a detective story, without video images presented for participants. In both these two conditions, the facilitation effect was observed. These results suggest that just listening to someone talking enhance eating. The previous study also suggested that just sitting around the participant could effect on how much they eat [8]. So, we make the prediction that the mere existence of others in the video, that can increase the participants' subjective feeling of tasting food, and also eat more.

In our daily life, for most people, watching TV or some videos while eating is a relatively common state. In this study, we used videos of the other person to assess whether "eating" video images are crucial to produce the social facilitation effect of eating. In order to illustrate the comparison between eating food and doing other things effect, besides eating condition, we set up other conditions, a person is talking on the phone, with someone who is other than the experimenter or the participants (calling condition), in addition to a control condition, a phone and chips are put on the desk without anyone (absence condition). In this study, anyone was not present beside the participants, but a person with the same gender with the participants appeared in the video. The person in the video do something (eating or calling) may affect the participant food intake. The participants watched one of the three types of videos: eating condition; calling condition and absence condition. We

hypothesized that "the food will taste better and eat more when participants see the eating video than doing other things' video."

## 2. Experiment

### *Stimuli*

To test the predictions, we set up an experiment in which individuals ate alone when watching the video. Adding information about the presence of others, we prerecorded different conditions of videos and playing it for the participants during each condition of the experiment. In the eating condition, a person is eating potato chips. In calling condition, the same person is making a call, instead of eating. The person called an individual who is other than experimenters and participants. Just like we see the stranger making a call. As a control condition, any person did not appear but the chips and the telephone are put on the desk (absence condition). In order to minimize the impact of other factors, we recorded video for female and male. In the experiment period, the female will watch the video, which is also the female in it. The male will watch the video, which is also the male in it. A female screenshot images as shown like the Figure 1. In keeping with the absence condition, all the three conditions of video in this experiment are silent.



Fig.1 Screenshot images of the three conditions in video.

## 2.1 Material and methods

### 2.1.1 Participants

Thirteen female students and fourteen male students who studied in Nagoya University participated in this study from April through June 2019. Their age ranged from 19 to 26 years, with a mean age of 20.75 years old ( $SD = 1.92$ ). We also confirmed that all participants were naive to the purpose of the experiment and had them complete a demographic questionnaire assessing their suitability for the study—namely, that they had good health, no food allergies, no history of eating disorders, and no special dietary restrictions.

### 2.1.2 Procedure

We introduced three different conditions into the tasting period in a randomized order. The video images lasted 90 seconds in each condition.

Each experiment comprised three consecutive phases: Pre-tasting survey, tasting, and post-tasting survey.

*2.1.2.1 Pre-tasting and post-tasting.* The pre-tasting and post-tasting surveys were presented before and after the tasting period respectively. In these two periods, we assessed the mood states survey. The Japanese version of UWIST (University of Wales Institute of Science and Technology) Mood Adjective Checklist (UMACL) [11], [12] was used to assess participants' mood states, as was the previous study [2]. It comprises 20 items that participants must rate in terms of their applicability to participants' present mood on a 4-point scale (from 1 = “definitely not” to 4 = “definitely”). In this checklist, two independent factors were provided. The scores of the specific 10 items (e.g., active) composed energetic arousal (EA) and those of the other 10 items (e.g., nervous) composed tense arousal (TA). Each score ranged from 10 to 40. The combination of these two factors structured mood dimension. For example, higher energetic arousal and lower tense arousal indicated the increase of pleasant mood (positive mood) [11]. In the pre-tasting phase, participants were told that they would be evaluating the taste of different types of popcorn, and that they could eat as much of the popcorn as they liked. At first, participants would complete the mood states

survey. After watching all the three condition videos, one more a mood questionnaire was also conducted for the post-tasting which was done to analyze changes in mood before and after the experiment.

*2.1.2.2 Tasting.* To examine the influence of the three conditions, a 24-in. vertical LED monitor (38 cm × 57 cm) was placed on a desk before the participants sat. The different conditions were taken in advance and displayed on the monitor (absence condition, eating condition, and calling condition). The water and the popcorn were also provided on the desk in advance (prepared just before the tasting).

After participants completed the mood questionnaire, the tasting period began. With an alarm call signaling, the video began to play, participants also began to taste the popcorn while alone watching the video. After another alarm call signaling the end of the tasting period, then they completed a short questionnaire indicating their subjective evaluations of the popcorn. The participants then begin with a new condition with the new popcorn, which delivered by the experimenter each time. Finished watching each video and each taste, participants were required to respond the same questionnaire about popcorn for each time with a new one.

For the subjective evaluations of the popcorn, the short questionnaire contained a number of questions on a 6-point scale (from “not at all” to “extremely”) that reflected participants' subjective evaluations of the food: Like “How good is this food?” “How do you feel about the quality of the food?” So on. We also calculated the consumption ratio of the food subtracting the ratio of the quantity of the remaining food from its initial quantity ratio. The procedure is shown in the Figure 2.

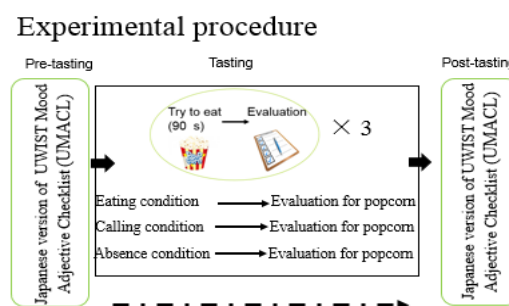
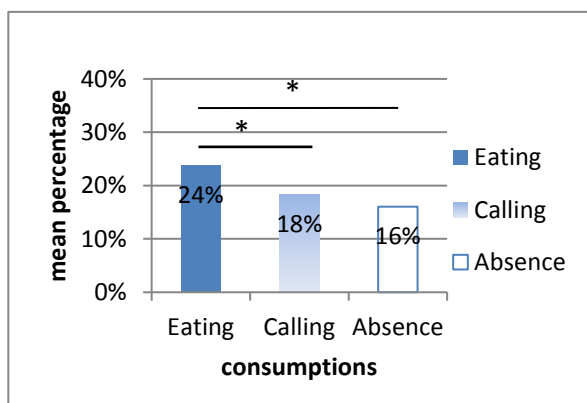


Fig.2 The procedure of the experiments

At first pre-tasting, participants fill out a mood survey. For tasting, the participants begin watching one of the three conditions video in random order with alone tasting popcorn, after watching, filling the survey about popcorn. The same step is used to complete the second and third video watching and popcorn tasting, with new popcorn for each time. At last post-tasting, participants fill out another mood survey, then the experiment complete.

### 3. Results

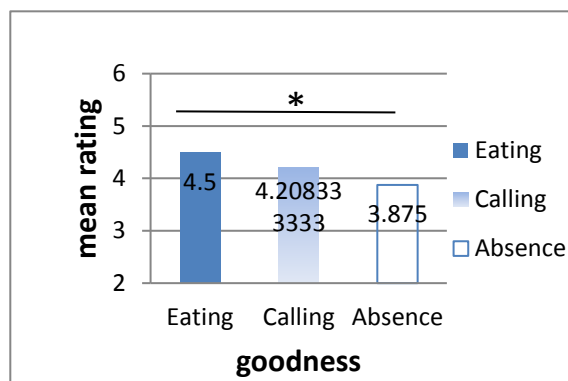


	Eating	Calling	Absence	
Mean percentage	24%	18%	16%	$F = 14.64$ $P < .01$

Fig.3 The vertical axis shows the average consumption of the popcorn, the horizontal axis shows three different conditions (eating condition; calling condition; absence condition). \* $<0.05$ .

The vertical axis represents the mean percentage of the consumption in each condition (eating condition; calling condition; absence condition) in Figure 3. The mean consumption percentage of the popcorn in each condition was analyzed using a one-way analysis of variance (ANOVA). The results indicated that there was a significant main effect of consumption ( $F(1, 23) = 14.64, P < 0.01$ ). Post hoc analysis revealed that the mean percentage of popcorn consumption in eating condition was greater than those in the two other conditions. The consumption of popcorn in eating condition was significantly higher than calling condition and absence condition. Under calling condition, there was no significant difference from absence condition. That is, under calling condition, it did not have the social

facilitation effect.



	Eating	Calling	Absence	
Mean rating	4.5	4.2	3.9	$F = 4.50$ $P < .05$

Fig.4 The vertical axis shows the mean rating of popcorn, the horizontal axis shows three different conditions (eating condition; calling condition; absence condition). \* $<0.05$ .

Participants' ratings of the popcorn were shown in the Figure 4. Participants' ratings of the popcorn in each condition were also analyzed using a one-way analysis of variance (ANOVA). The results indicated that there was a significant main effect of goodness ( $F(1, 23) = 4.50, P < 0.05$ ). Post hoc analysis revealed that the mean rating of subjective evaluations of the popcorn in eating condition was greater than those in absence condition. Under calling condition, there was no significant difference from absence condition. That is, under calling condition, it did not have the social facilitation effect.

Participants rated their mood state before and after tasting in terms of the two independent scores (EA and TA). Our interest here was to assess whether there were any changes in their mood state when tasting popcorn before and after watching the three different condition videos. There were no significant differences between the ratings of EA in pre-tasting and post-tasting period (pre-tasting:  $M = 23.96, SD = 6.45$ , post-tasting:  $M = 22.58, SD = 5.66$ ). There were also no significant differences between the ratings of TA in pre-tasting and post-tasting period (pre-tasting:  $M = 33.63, SD = 4.79$ , post-tasting:  $M = 35.54, SD = 3.39$ ).

### 4. Discussion

Our main findings in this experiment were that the

popcorn tasted better and was consumed more, when the participants tasted popcorn alone watched a person eating video, than watched an absence condition video. The result was consistent with previous studies that social facilitation of eating might also occur without the actual existence of others [2]. In our experiments results, there were also have the social facilitation of eating occurred in eating condition.

We analyzed the experiment results, of calling condition and absence condition, on the consumptions and the goodness of the popcorn. There was no difference between the two conditions. These results suggested that, in calling condition, even the other person was presented in the video image, there was no significant difference. That means in calling condition did not have the effect of social facilitation on eating. Present results appeared that mere the person is not enough to have an effect for facilitation of eating.

But a previous study, compared the listening condition and the watching TV condition [6]. They both have the effect of social facilitation. In the experiment, the TV program and the listening tape were all have the auditory stimulus. In our experiments, when watched the three videos, participants could not hear anything. This is the difference from the previous study. In other words, auditory information is also sufficient to produce the social facilitation of eating. The lack of auditory information in calling condition may cause the failure to observe the facilitation effect. As the previous study suggested, not only watching TV, but also listening a tape without images, as long as the sound can be heard, the facilitation effect was occurred. Maybe the auditory is also another crucial factor for the facilitation. For the next step, we will use the video with the auditory to make a further research, if the auditory is necessary for the effect of facilitation. As for our present results, the videos had no auditory stimulus, just using other people's eating video images can produce the facilitation on food intake. We can suggest that eating maybe a necessary factor for social facilitation effect.

Present results appear to be similar to those found in studies on the social facilitation of eating which participants actually taste food with real others, which is often attributed to the highlighted mood with others

[1],[3]. However, the scores of EA and TA did not deviate from the center of each score range (from 10 to 40 scores); there was no significant increase in mood between before and after the tasting in the present study, when participants were eating in front of a monitor with watching the video. Which suggests that the facilitation effect observed herein could not be attributed to the influence of mood.

The present findings provided us the opportunity to understand an important aspect of the social facilitation of eating. In the future experiments, how does the brain react when people eat under different conditions it will also be considered to design the experiments to measure the correlation of EEG. Measure the change of the ERP. See if in that condition will have the effect on social facilitation of eating.

## 5. References

- [1] C.P. Herman, (2015). The social facilitation of eating. A review, *Appetite* 86 61–73.
- [2] Nakata, &Kawai, (2017). The “social “facilitation of eating without the presence of others: Self-reflection on eating makes food taste better and people eat more. *Physiology & Behavior* 179 (2017) 23 – 29.
- [3] J.M. de Castro, E.S. de Castro, (1989). Spontaneous meal patterns of humans: influence of the presence of other people, *Am. J. Clin. Nutr.* 50 237–247.
- [4] K.A. Patel, D.G. Schlundt, (2001). Impact of moods and social context on eating behavior, *Appetite* 36. 111–118.
- [5] Boothby, E. J., Clark, M. S., & Bargh, J. A. (2014). Shared experiences are amplified. *Psychological Science*, doi: 10.1177/0956797614551162. In press.
- [6] Bellisle F, Dalix AM, Slama G. (2004). Nonfood-related environmental stimuli induce increased meal intake in healthy women: comparison of television viewing versus listening to a recorded story in laboratory settings. *Appetite*; 43(2):175–80.
- [7] Bellisle F, Dalix AM. (2001). Cognitive restraint can be offset by distraction, leading to increased meal intake in women. *Am J Clin Nutr*; 74:197–200.
- [8] D. A. Roth, C. P. Herman, J. Polivy, and P. Pliner (2001). Self-presentational conflict in social eating situations: a normative perspective. *Appetite* 36, 165±171
- [9] M.M. Hetherington, A.S. Anderson, G.N.M. Norton, L. Newson, (2006) Situational effects on meal intake: a comparison of eating alone and eating with others, *Physiology & Behavior* 88 498 – 505.
- [10] V.I. Clendenen, C.P. Herman, J. Polivy, (1994) Social facilitation of eating among friends and strangers, *Appetite* 23 1–13.1030 (PMID: 7826053).
- [11] G. Matthews, D.M. Jones, A.G. Chamberlain, (1990). Reining the measurement of mood:TheUWISTmood

- adjectivechecklist, *Br.J.Psychol.* 81:17–42.
- [12] S. Shirasawa, T. Ishida, Y. Hakoda, M. Haraguchi, (1999). The effects of energetic arousal on memory search, *Jpn. J. Psychon. Sci.* 17: 93–99 (in Japanese).
- [13] Colin D. Chapman, \* Victor C. Nilsson, Hanna Å. Thune, Jonathan Cedernaes, Madeleine Le Grevès, Pleunie S. Hogenkamp, Christian Benedict, and Helgi B. Schiöth. (2014) Watching TV and Food Intake: The Role of Content. Doi: 10.1371/journal.pone.0100602
- [14] B. Wansink, S.B. Park, (2001). At the movies. How external cues and perceived taste impact consumption volume, *Food Qual. Prefer.* 12, 69–74.