# Study 2: Social facilitation and longer-term energy intake (cumulative intake study)

# 1. Aim

The primary aim of this lab-based study to establish the extent to which social facilitation effects on eating persist across multiple meals and days. We examined the amount of food that participants ate when they ate all of their meals (i.e. breakfast, lunch, dinner), across three consecutive days alone (alone condition), and with a friend (social condition). A secondary aim of the study was to examine possible underlying mechanisms for social facilitation effects on eating. In particular we examined whether participants would like the food more, and/or would report more positive mood, when eating with a friend relative to when eating alone.

# 2. Design

A within-subjects design was used in which participants attended two phases of 3 consecutive days. In one phase, participants attended alone (alone condition) and in the other phase participants attended with a friend (social condition) [**Condition**]. The order in which participants completed ‘alone’ and ‘social’ conditions was counterbalanced across participants [**Condition\_order**].

# 3. Measures

Participants completed the following questionnaire measures:

* Appetite and liking ratings***.***Assessments of hunger, fullness, and “liking” for the test foods were taken using 100-mm Visual Analogue Scales (VAS) anchors *Not at all* on the left and *Extremely* on the right. A composite ‘appetite’ score was calculated by taking the mean rating assigned to the ‘hunger’ VAS and the inverse rating assigned to the ‘fullness’ VAS (100-fullness) [**Before meal: Appetite\_pre; After meal: Appetite\_POST**]. Premeal appetite ratings were also averaged across all three meals [**Pre\_appetite\_av].**  Change in appetite from before to after the meal was calculated [**Appetite\_DECREASE].**The liking VAS was anchored by *Didn’t like it at all* and *Liked it a lot* to the left and right of the scale, respectively. Liking ratings were averaged across all foods consumed at each meal [**Liking\_av**], and across all three meals [**Liking\_allmeals**].
* Three-Factor Eating Questionnaire-18***.***The Three-Factor Eating Questionnaire Revised 18-item version (TFEQ-18) was included to assess dietary restraint [**TFEQ\_R**], uncontrolled eating [**TFEQ\_un**], and emotional eating [**TFEQ\_em**] (Karlsson, Persson, Sjöström, & Sullivan, 2000). For each subscale, participants were grouped as either ‘high’ and ‘low’ scorers based on a median split of the data [**TFEQ\_R\_group, TFEQ\_un\_group, TFEQ\_em\_group].**
* Attribution questionnaire.To examine whether participants were aware of any influence that social factors had on their serving selection, they rated the extent to which a variety of factors had influenced their serving-size selection (as in Vartanian, Spanos, Herman, & Polivy, 2017). Ratings were provided on a 9-point scale ranging from -4 (*made me eat less than I normally would*) to +4 (*made me eat more than I normally would*). For the purposes of this study, we were interested in the rating that participants assigned to the item “the presence of my friend.” Additional filler items (e.g., “how hungry I was”) were included to disguise the aim of the study. Participants who indicated that the presence of their friend had influenced how much they ate were asked to write down why they thought this was the case.
  + [Attrib\_Hunger, Attrib\_Mood, Attrib\_Medical, Attrib\_FriendPres, Attrib\_FriendAbs, Attrib\_Energy, Attrib\_Tasty, Attrib\_Expect, Attrib\_Free].
  + [Why\_friendattrib]
* Demographics: Age [**Age**], ethnicity [**Ethnicity**].
* Demand awareness: participants were asked to write down what they thought were the aims of the study [**Study\_aim**].
* Friend familiarity: participants stated how long they had known their friend with whom they had taken part in the study with [**Friendship\_length**]. They also rated on 10-point scales how well they know their friend [**Friendship\_howWell**] and how close they feel to their friend [**Friendship\_close**] [*Not very* and *Very* were assigned to values 1 and 10, respectively]. Using a median split of the data, participants were grouped based on the duration of their friendship [**Friend\_dur\_group**].
* To enhance the believability of the cover story (i.e. ‘time of day and group working on problem solving ability’), participants were given 5 minutes to complete a word or number based problem.
* Mood: Mood assessments were taken using 100mm Visual Analogue Scales (VAS). Each scale was anchored with ‘Not at all’ on the left and ‘Extremely’ on the right. A positive mood score [**Mood**] was calculated by taking the average of scores assigned to the positive mood states and the inverse of scores assigned to the negative mood states. The average mood score across all three meals was also calculated [**Mood\_allmeals**].

Food The food provided on the three daily menus are presented in Table 1. Calories consumed at each meal [**Kcals**] and the total calories consumed on each day (day 1, day 2, day 3) [**Total\_kcals**] were recorded. Menu order was counterbalanced across participants [**Menu\_order**].

Datapoints from one participant-pair (dinner, day 3, social condition) were removed prior to analyses due to failure to follow instructions **[Filter].**

Table 1. *Foods provided and calorie information for each of the three daily menus.*

|  |  |  |  |
| --- | --- | --- | --- |
|  | Menu 1 (total kcals = 3589) | Menu 2 (total kcals = 3699) | Menu 3 (total kcals = 3843 |
| Breakfast | * 2 x wholemeal toast with 40g hazelnut chocolate spread (433 kcals) * 150g strawberry yogurt (123 kcals) * 207g canned fruit with juice (101 kcals) * 150g orange juice (70kcals)   **Total kcals = 727** | * Bagel with 60g soft cheese spread (425 kcals) * 150g strawberry yogurt (123 kcals) * 207g canned fruit with juice (101 kcals) * 150g orange juice (70kcals)   **Total kcals = 719** | * 80g granola (353 kcals) * 200g semi-skimmed milk (100 kcals) * 150g strawberry yogurt (123 kcals) * 207g canned fruit with juice (101 kcals) * 150g orange juice (70kcals)   **Total kcals = 747** |
| Lunch | * 200g cheese & onion quiche (521 kcals) * 150g new potatoes (114 kcals) * 35g green salad (8 kcals) * 75g brownie bites (291 kcals) * 50g salted crisps (272 kcals)   **Total kcals = 1206** | * 2x bean burgers (458 kcals) * White bread roll with 10g margarine (247 kcals) * 60g millionaire bites (300kcals) * 70g cheese tortilla chips (349 kcals)   **Total kcals = 1354** | * Cheese sandwich comprising 3 pieces of wholemeal bread, 20g margarine, 60g cheddar cheese (742 kcals) * 70g flapjack bites (313 kcals) * 50g salt & pepper crisps (311 kcals)   **Total kcals = 1366** |
| Dinner | * 100g (uncooked weight) pasta mixed with 250g tomato pasta sauce, 30g cheddar cheese (580 kcals) * 200g tiramisu (500kcals) * 110g milk chocolate buttons (576 kcals)   **Total kcals = 1656** | * 300g cheese & tomato pizza (767 kcals) * 35g salad (8kcals) * 200g chocolate dessert (270kcals) * 110g milk chocolate pieces (581 kcals)   **Total kcals = 1626** | * 450g vegetarian lasagne (408 kcals) * 200g (frozen weight) chips (358 kcals) * 150g strawberry cheesecake (416 kcals) * 110g milk chocolate (548 kcals)   **Total kcals = 1730** |

# 4. Procedure

Participants were led to believe that the purpose of the study was to examine the effect of time of day and group working on problem-solving abilities. Before each meal, participants completed a short questionnaire in which they were asked whether they had felt ill since their last meal [e.g. **‘Menu1Br\_Ill\_A’**], whether they had taken any medication which may have affected their appetite [e.g. ‘**Menu1Br\_Med1\_A’**], and whether they had consumed any other foods/caloric beverages since their last meal [e.g. ‘**Menu1Br\_Cals\_A’**]. Participants who answered positively to the latter question were asked to record a) what and how much they ate [e.g. **Menu1Br\_CalWhat\_A**], b) the time that they ate [e.g. **Menu1Br\_CalTime\_A**], and c) how many people were present when they ate [e.g. **Menu1Br\_People\_A**]. Before breakfast on each day, participants were also asked to record the amount of time (in minutes) that they had spent engaging in light, moderate, and vigorous activities [**Menu1Br\_LightEx\_A; Menu1Br\_ModEx\_A; Menu1Br\_VigEx\_A**]. Before breakfast on Day 1 of each phase, participants recorded the date of the first day of their last period [e.g. **Menu1Br\_Period\_A**]. Data from these pre-meal questions are provided in the dataset titled ‘Pre\_meal\_questions’[[1]](#footnote-1). Participants also completed a measures of hunger and fullness to provide a measure of appetite [**Appetite\_pre**].

Participants were then seated in a dining room either alone (alone condition) or with their friend (social condition) and were provided with the meal. Participants were invited to eat as much as they wished and to notify the experimenter once they had finished eating. The experimenter covertly recorded the duration of each meal in seconds [**Time**]. The average meal duration, across all three meals, was also calculated [**Time\_allmeals**]. Following the meal, participants completed measures of appetite [**Appetite\_POST**], food liking [**Liking\_av**], and mood [**Mood**]. To reinforce the believability of the cover story, participants were then given five minutes to complete a word- or number- based problem-solving activity. They also completed a short questionnaire about how difficult they found the activity, whether they thought the time of day had affected their performance, and the strategy that they used to complete the task with their friend (if applicable). This was to improve the believability of the cover story.

At the end of the study (i.e. after dinner on day 3, phase 2), demand characteristics were assessed by asking participants to write down what they thought were the aims of the study [**Study\_aim**]. Measures of friendship closeness were also taken by asking participants how long they had known their friend (in months), how well they think they know their friend (1-10 scale), and how close they feel to their friend (1-10 scale). Participants also indicated their age and ethnicity. Following this, participants completed the eating attribution questionnaire, and TFEQ-18. Finally, the experimenter assessed the participant’s height and weight, which was used to calculate BMI [**BMI**], and participants were fully debriefed as to the true aims of the study.

1. Variables in the ‘pre\_meal\_questions’ dataset are sorted by menu (‘Menu1’, ‘Menu2’, ‘Menu3’), meal (br = breakfast, lu = lunch, di = dinner) and social context condition (A=alone, B=Social). [↑](#footnote-ref-1)