

# Emotional state affects food pleasantness differently for novel and familiar foods, and such an effect can be robust.

## Emotional State During Tasting Affects Emotional Experience Differently and Robustly for Novel and Familiar Foods

Daisuke Kaneko<sup>1,\*</sup>, Anne-Marie Brouwer<sup>3</sup>, Maarten Hogervorst<sup>3</sup>, Alexander Toet<sup>3</sup>, Victor Kallen<sup>2</sup>, Jan B. F. van Erp<sup>3,4</sup>

<sup>1</sup> Kikkoman Europe R&D Laboratory B.V., Netherlands, <sup>2</sup> Microbiology and Systems Biology, TNO, Netherlands, <sup>3</sup> Perceptual and Cognitive Systems, TNO, Netherlands, <sup>4</sup> Research Group Human Media Interaction, University of Twente, Netherlands

### INTRODUCTION

- Emotional state during food consumption is expected to affect food pleasantness.
- We hypothesize that a negative emotional state reduces food pleasantness and more so for novel foods than for familiar foods because novel foods have not yet been associated with previous emotions. Furthermore, we expect this effect to be stronger when judging the food again from memory without tasting.

### METHODS & PROCEDURES

- Dutch participants (69 in total) took one sip of familiar (Vegetable) and novel (Japanese Sumashi) soup and rate their emotions on each of the two soups.
- There are two sessions: Day 1 and Day 2 (a week later)
- In day 1, to manipulate emotional state, participants were instructed to do each of different tasks before tasting two soups as follows;
  - Positive emotional state (n=34): “Flip a reward card after tasting two soups”
  - Negative emotional state (n=35): “Sing a song aloud after tasting two soups”
- In day 2, all participants rated their emotions again: once before tasting (with only memory of tasting in day 1 (Day2-1) and after tasting (Day2-2).
- Dependent variables are valence (SAM scale), EsSense 25 emotions rating (5-point scale), Willingness-to-take-home (maximum six), and sip size (g).

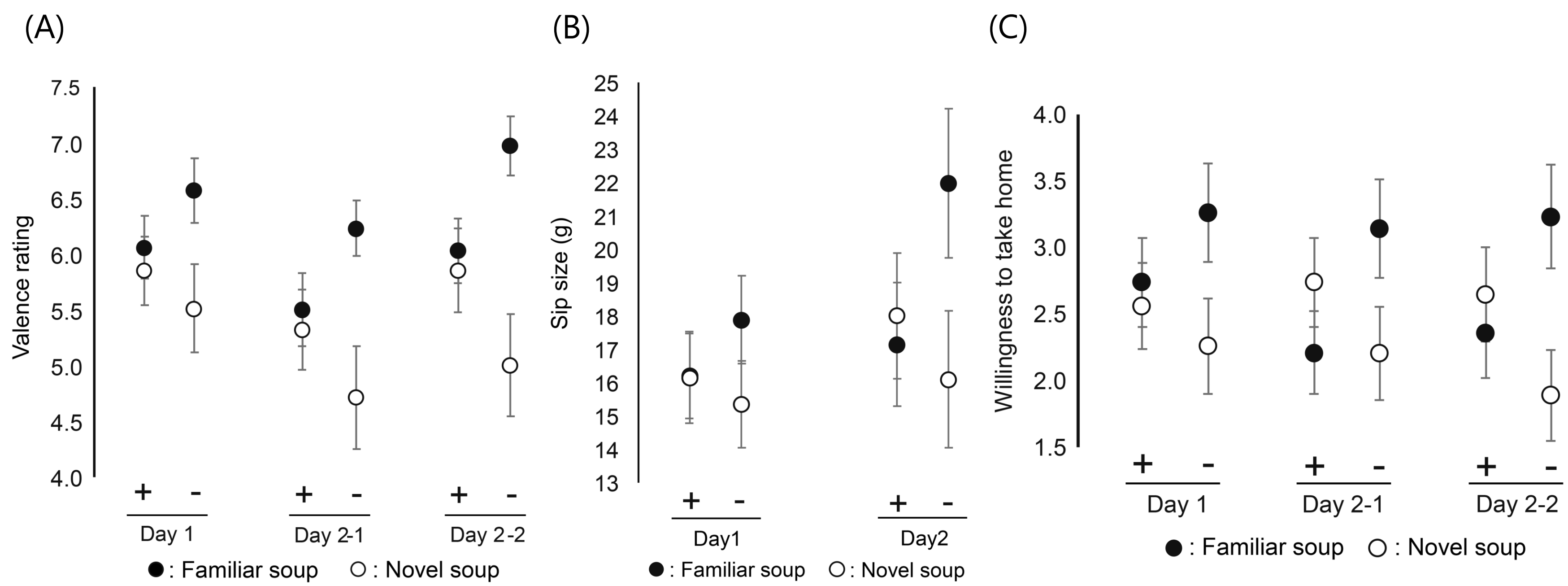
### RESULTS

- A main effect of soup (familiar and novel) was found in all dependent variables.
- There was no main effect of emotional state on valence ratings, sip size, and willingness-to-take-home while significant interactions between emotional state and soup were found in these variables (**Table 1**). Also, there was no main effect of emotional state on the 25 emotions while for 6 positive emotional words, significant interactions between emotional state and soup were found (**Figure 2**).
- No significant interactions between state, soup, and session were found in all variables (**Table 1**).

### DISCUSSION

- The emotional state affected all variables (valence, EsSense 25, willingness-to-take-home, and sip size) in a similar way, with low pleasantness for novel food and high pleasantness for familiar food in the negative compared to the positive emotional group, in which no differences in pleasantness were found.
- The interactive effect of emotional state and novelty (soup) is robust at least 1 week.

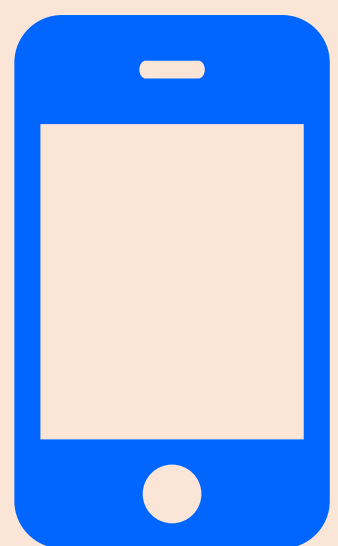
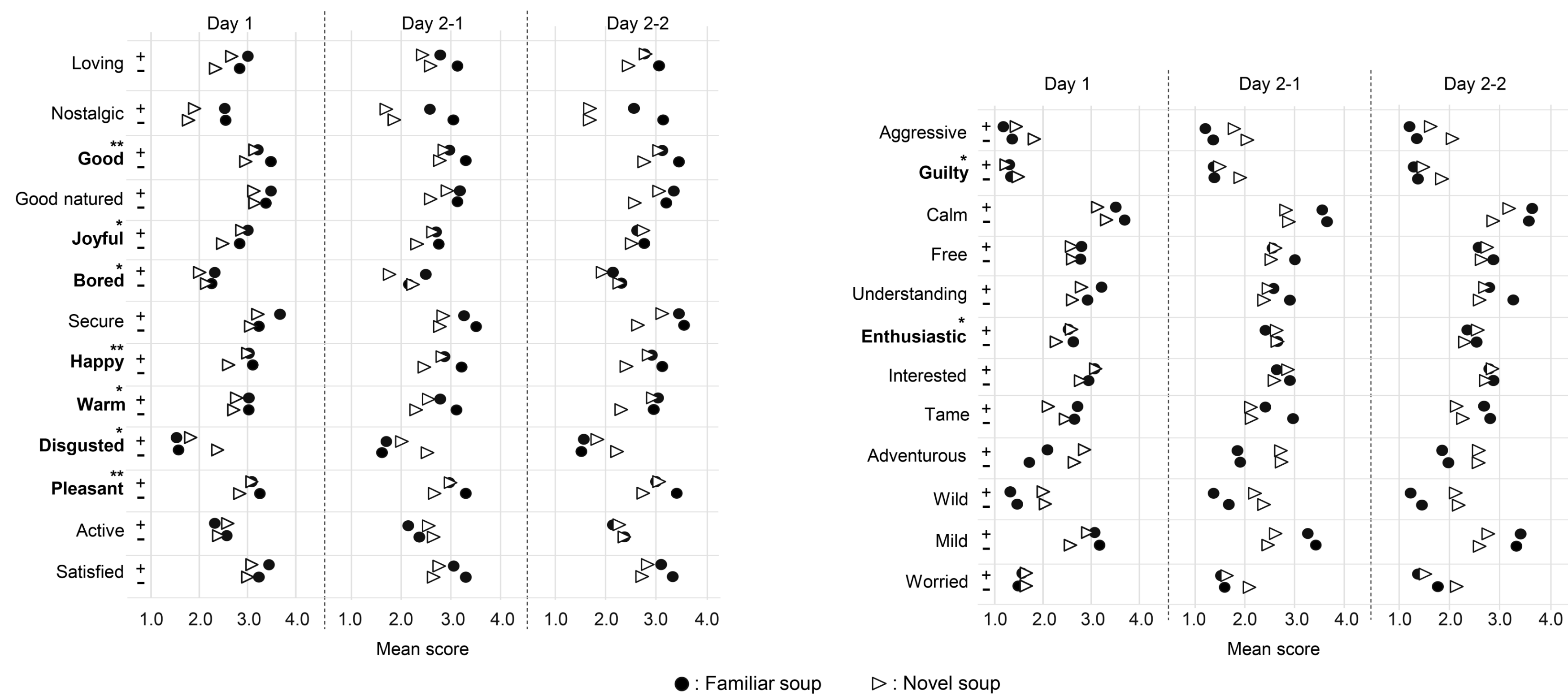
**Figure 1.** Mean rated scores of valence (A), mean sip size (B), and mean rated scores of willingness-to-take-home (C) of familiar and novel soup by positive emotional group (+) and negative emotional group (-) in Day 1, Day 2-1, and Day 2-2. Error bars indicate standard error of the mean.



**Table 1.** Summary of the statistical data obtained with a mixed-model analysis for each of the dependent variables (valence, sip size, and willingness-to-take-home). Significant effects are marked in light gray.

Dependent Variables	Soup (familiar, novel)	State (positive, negative)	Session (Day 1, Day 2-1, Day 2-2)	Soup*state	State*session	Soup*session	Soup*state*session
Valence	F(1, 345) = 27.80, p < .001, $\eta^2$ = .112	F(1, 69) = .09, p = .764, $\eta^2$ = .001	F(2, 345) = 4.90, p = .080, $\eta^2$ = .122	F(1, 345) = 20.90, p < .001, $\eta^2$ = .087	F(2, 345) = .11, p = .896, $\eta^2$ = .003	F(2, 345) = 1.12, p = .328, $\eta^2$ = .039	F(2, 345) = .45, p = .635, $\eta^2$ = .016
Sip size <sup>1</sup>	F(1, 198) = 5.11, p = .025, $\eta^2$ = .089	F(1, 66) = .26, p = .613, $\eta^2$ = .004	F(1, 198) = 5.18, p = .024, $\eta^2$ = .045	F(1, 198) = 7.59, p = .006, $\eta^2$ = .126	F(1, 198) = .37, p = .541, $\eta^2$ = .003	F(1, 198) = .52, p = .471, $\eta^2$ = .014	F(1, 198) = 1.59, p = .209, $\eta^2$ = .043
Willingness-to-take-home	F(1, 345) = 5.02, p = .026, $\eta^2$ = .017	F(1, 69) = .35, p = .557, $\eta^2$ = .005	F(2, 345) = .28, p = .753, $\eta^2$ = .040	F(1, 345) = 11.16, p = .001, $\eta^2$ = .036	F(2, 345) = .05, p = .955, $\eta^2$ = .007	F(2, 345) = .36, p = .697, $\eta^2$ = .021	F(2, 345) = .40, p = .670, $\eta^2$ = .023

**Figure 2.** Mean rated scores of each emotion based on EsSense25 of familiar and novel soup by positive emotional group (+) and negative emotional group (-) in Day 1, Day 2-1, and Day 2-2. Bolded emotions indicate significant interactions between emotional states and soups with \*p < 0.05 and with \*\*Bonferroni correction of p < 0.002.



Take a picture to download the full paper

