

Implicit & explicit measurement of emotional responses to sensory stimuli – comparison of facial expressions, forced choice associations & emotional ratings.

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Introduction

Emotions impact product experience and evaluation. Products trigger emotions – however, explicit assessments might fail to detect them. In the last few years, intensive research has been conducted about implicit and explicit processing of sensory stimuli. The aim of this study was to compare explicit (sensory and emotional ratings) with two implicit methods (forced choice associations and facial expressions) to assess emotional responses to sensory stimuli.

Procedure

Different orange juice samples were tested in a blind test situation under standardized sensory lab conditions (University of applied sciences Nordhausen). Orange juices were used as samples. The sensory profiles of the juices were chosen to trigger and measure specific emotions. So the respondents have to trunk a premium and standard product, a diluted and high sweetened orange juices and a blend of orange and peach juice. In total, 138 consumers participated in this study. However, only for 58% of them a statistical analysis of the FaceReader data was possible, because some respondents did not look directly into the camera or supported the head on their hands.

Test Step	Method	Data Analysis
1 Implicit observation	First, a video-based observation of facial expressions took place. The spontaneous expressions of the respondents were detected during and after sampling the juices. FaceReader analyzes six emotions (angry, disgusted, happy, sad, scared, surprised) and a neutral status.	• Noldus FaceReader 5
2 Implicit survey	Directly after sampling the products a second time, the respondents had to decide under time pressure (within 3 seconds) whether the shown emotions fit the orange juice or not. In addition to emotions and motives, this Forced-Choice Association-Test also included further types of items (sensory attributes, target group, functional uses and usability).	• Frequency • Allocation Methods
3 Explicit survey	For the explicit measurement a 9-point scale was used. The respondents drank from the juices once again and after the sensory product assessment (overall acceptance and sensory properties) the emotional evaluation of twelve emotions took place.	• Means • ANOVA
4 Data Linking	Focus of the analysis was to compare the results of implicit and explicit methods, especially for the six emotions (angry, disgusted, happy, sad, scared, surprised), which were measured of all three methods.	

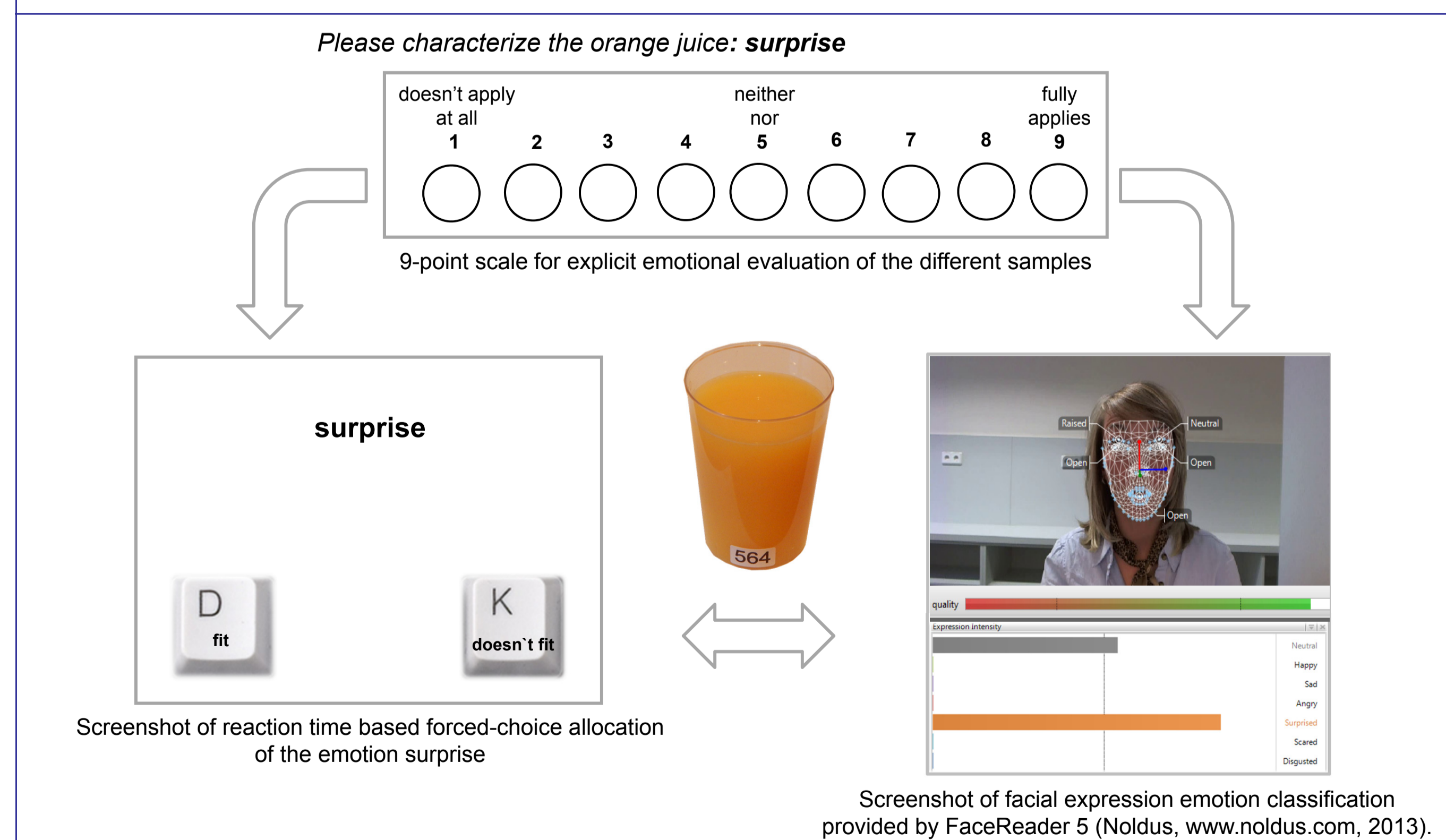


Fig. 1: Experimental Design of the survey

Results

Conform to expectations the premium sample and the sample with the juice combination were evaluated better than the sweetened and diluted ones. Two of the three experimentally modified juices were perceived as 'unusual'. This holds for both the explicit rating and the implicit association assessment.

Across products, the emotional explicit ratings and implicit associations correlate $\geq .98$, hence are very similar. Also the within subject correlations are strong ($r \geq .50$). The factor analysis has shown that respondents evaluate the different juices in the same way explicitly and implicitly. In both measurement methods, the same factors (surprise and valence) could be identified.

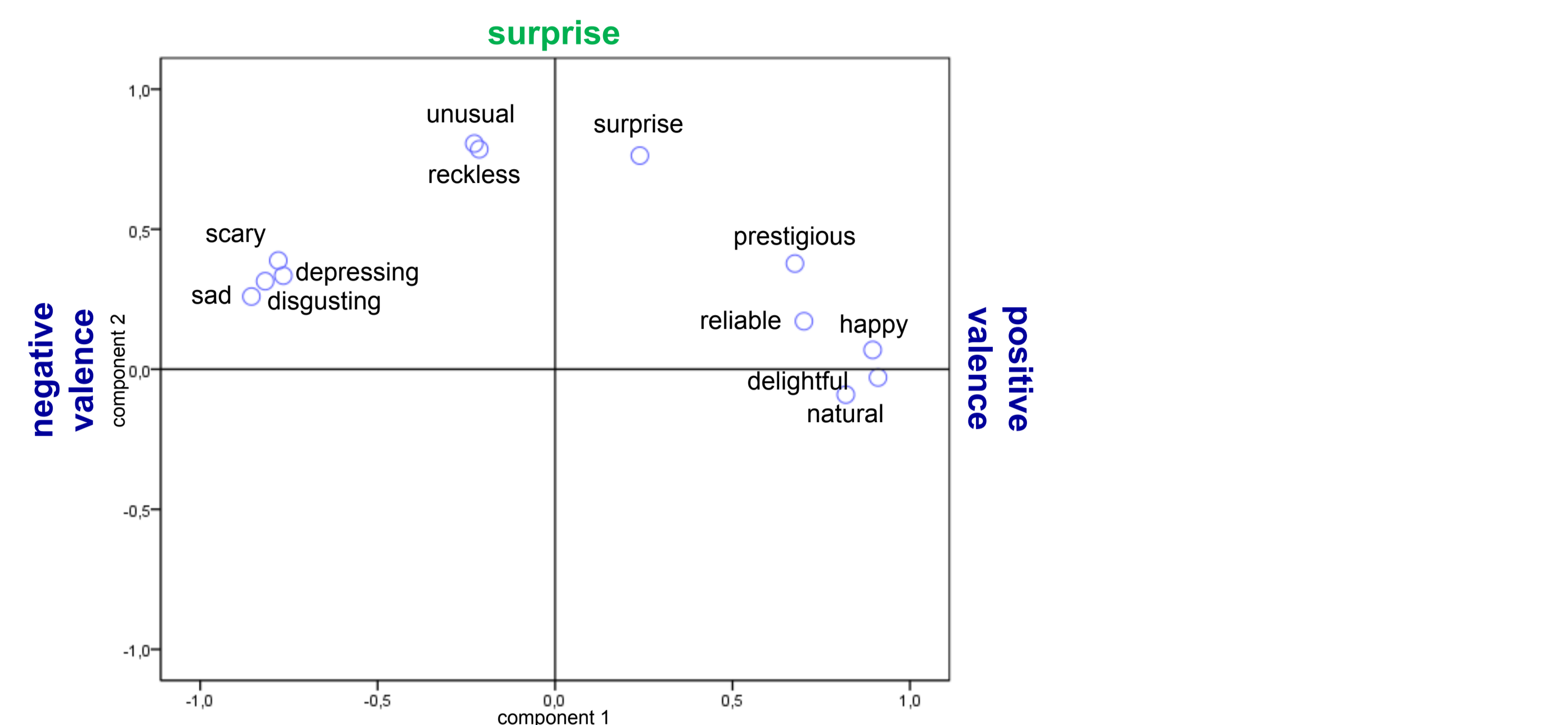


Fig. 2: Result of the factor analysis of explicit rating data

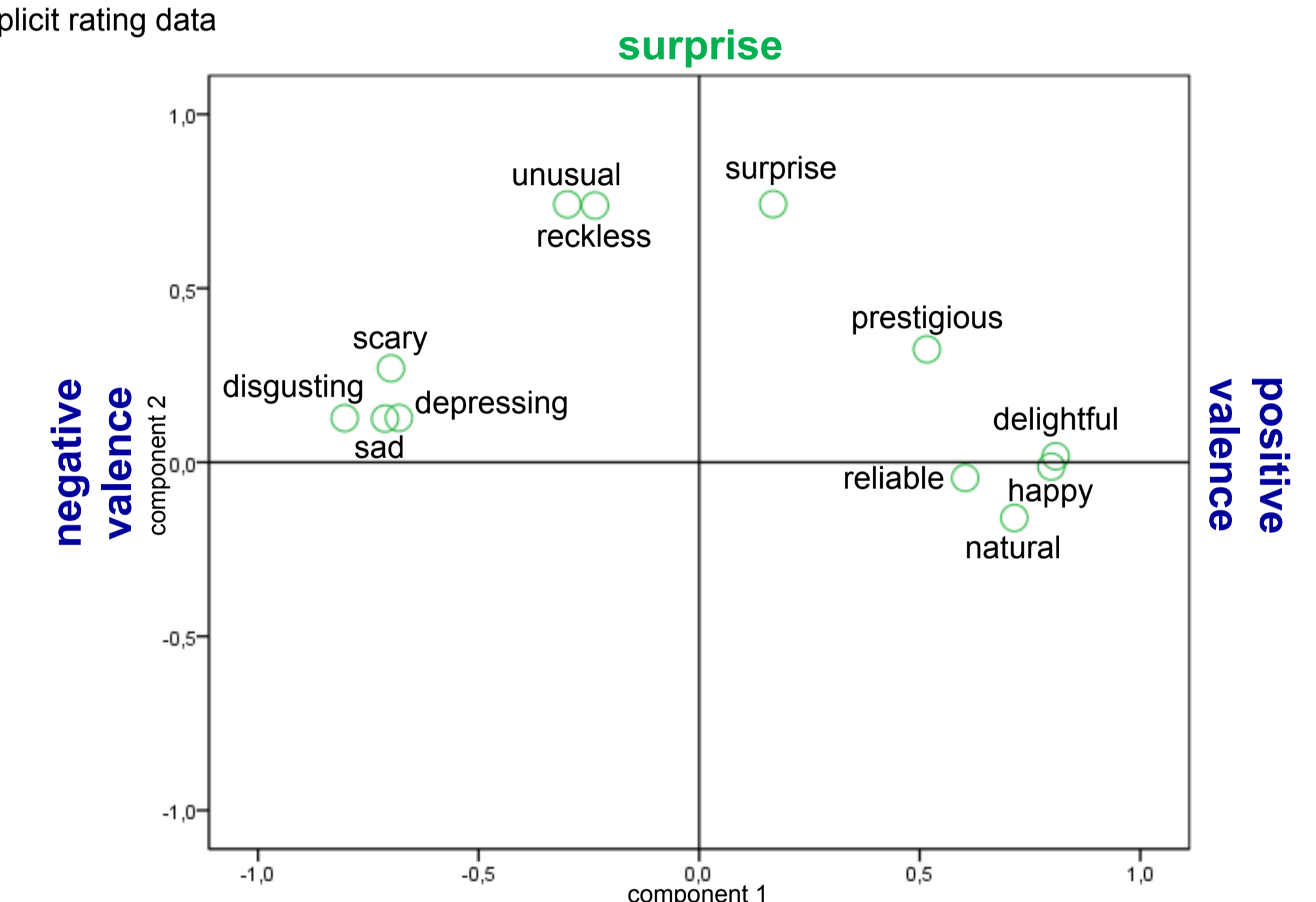


Fig. 3: Result of the factor analysis of implicit association data

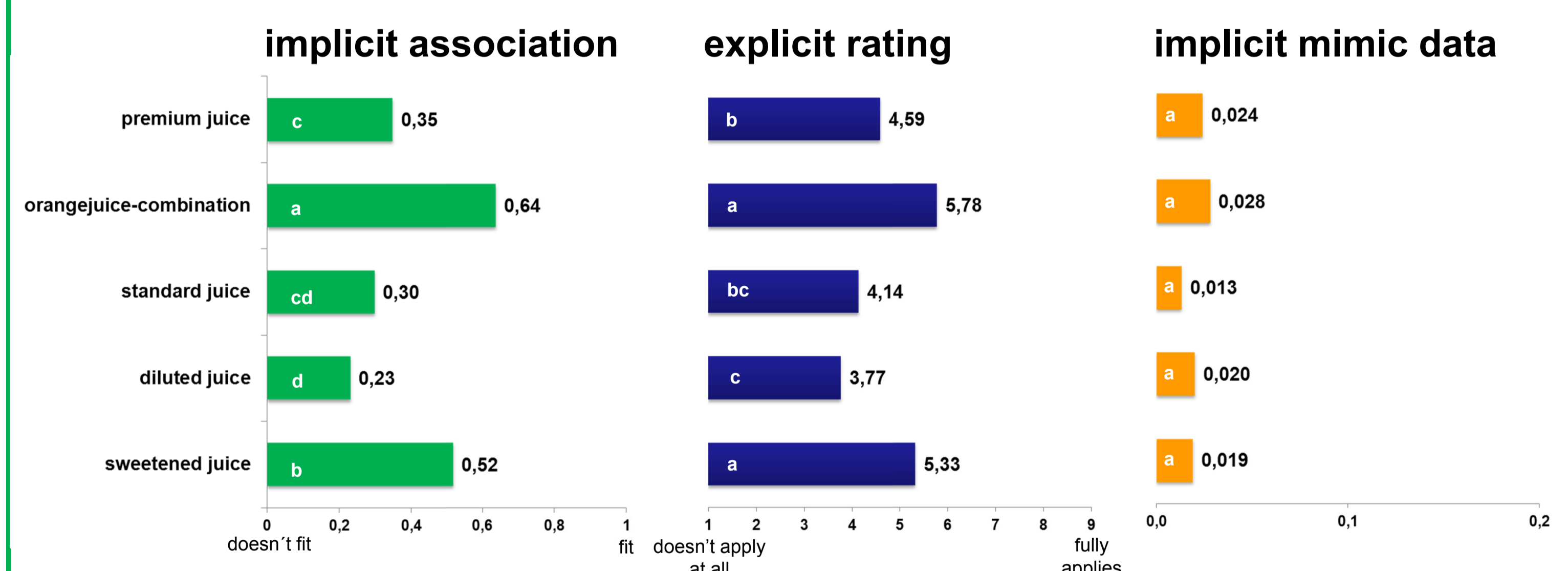


Fig. 4: Mean values emotion: surprise

FaceReader data are more difficult to interpret. The sweetened juice elicited the emotions 'angry', 'sad' and 'disgusted' significantly stronger than standard and premium juice. Across products, the emotional explicit ratings and FaceReader expressions correlated highly ($r > .70$) for 'scared', 'angry', and 'disgusted', only .61 for 'surprise', but -.62 for 'happy'. Also the within subject correlations vary ($-.13 < r < .24$), but always remain small.

Conclusion

The implicit assessment of emotional reactions to sensory stimuli is expected to yield additional information. In this study, correlations of explicit ratings and implicit associations were high, those between explicit ratings and implicit mimic data were low. Because the samples were experimentally constructed, we can conclude that in this study the explicit assessment would have been sufficient to measure the emotional response.

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