

# Children's food preferences

## Facial expression analysis with The Observer XT

Despite the health benefits, children consume less vegetables than recommended. Dutch children aged 4-6 years eat 44 grams of vegetables daily, whereas 100-150 grams is recommended [1]. One of the main reasons for this low consumption, is that many children do not like vegetables. Since children's liking or preferences play a crucial role in their food choice behaviour, it would be valuable to increase children's liking for vegetables as an effective strategy to increase their vegetable consumption.

In order to measure small changes in children's preferences, an accurate and valid measurement method is needed. Because children's cognitive capacities are not yet fully developed, they may have difficulties with verbal categorisation tasks and scaling methods that assess food preferences [2]. It would therefore be useful to have a method that is independent of children's cognitive capacities. Facial expressions could be valuable in this respect.

Facial expressions have been used in infants to measure their affective reactions towards the basic tastes sweet, sour, bitter, and salt [3]. However, facial expressions have hardly been used in children. Therefore, our pilot-study was designed to investigate whether facial expressions are an accurate and suitable method to assess food preferences in school-aged children.

### MATERIAL AND METHODS

Six children aged 5 to 13 years participated in our pilot-study. The children tasted seven liquids in randomized order: apple juice, sauerkraut juice, beetroot juice, asparagus solution, skimmed milk, a sweet solution and a bitter solution. The children could indicate their liking for each stimulus via a traditional rank-order procedure [4]. First, the children placed each liquid on one of three smiley faces according to their liking:

- ☺ = like;
- ☹ = neutral;
- ⊗ = dislike.

Subsequently, the children ordered the liquids within each category by repeatedly removing the stimulus that they liked best. This procedure results in a complete preference rank-order with 1= best liked and 7= least liked. The whole procedure was video-taped with a Dome camera of The Observer® XT (Noldus Information Technology, Wageningen).



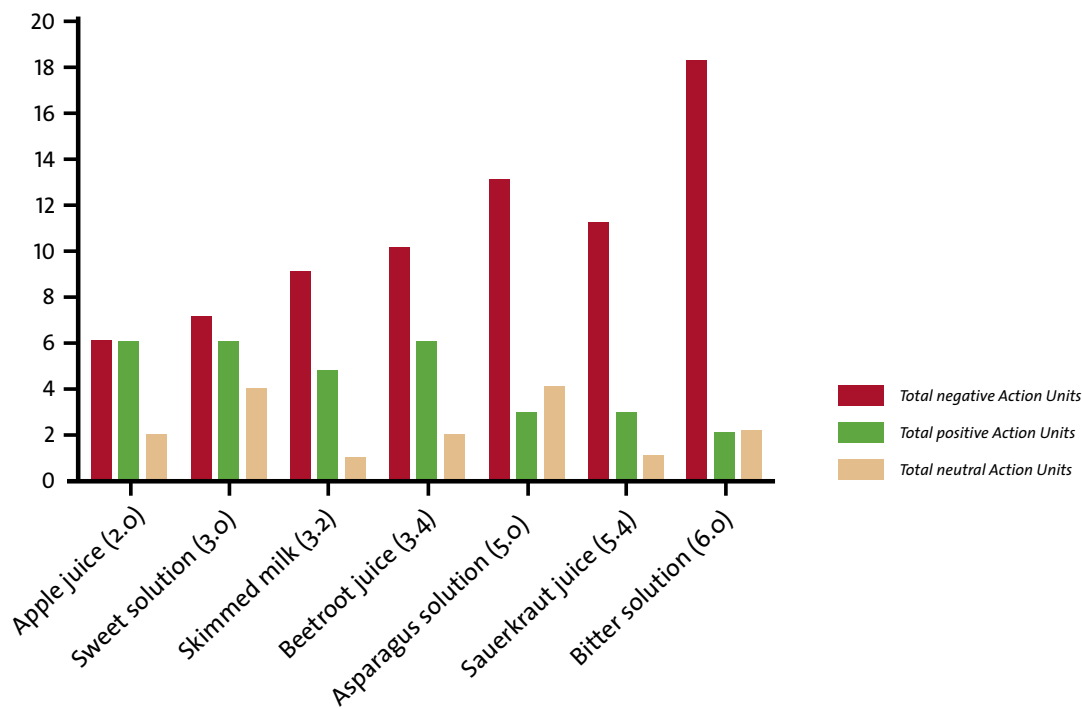
#### Example of coding procedure

- AU 4 Brows are lowered and pulled together, evidenced by bulges on the forehead.
- AU 9 The nose is wrinkled, seen by a bulge on the top of the bridge of the nose. Nose wrinkling also causes the nasolabial furrows to deepen.
- AU 24 Lips are pressed.
- AU 43 Eyes are closed to a maximum.

These videos were used to analyse the facial expressions of the children. A selection of Action Units (=AU) of the Facial Action Coding System [5] were used to code the expressions. An AU is the minimally distinguishable action of a facial muscle. The AUs that showed most consistency in the literature regarding their evaluative value (positive, negative, or neutral) were chosen (26 in total). The first six seconds after tasting were coded in order to include first reactions and more delayed reactions. The video of each child was coded twice on separate days to verify scoring. AUs were counted as frequency occurrences.

### MAIN RESULTS

There was a significant correlation between the rank-order preference and the sum of negative facial AUs (Pearson correlation = -0.44;  $p=0.009$ ). The more the stimulus was disliked, the more negative AUs were



displayed (Figure 1). This relationship was not significant for positive or neutral AUs.

When the number of positive, neutral, and negative AUs were summed up per category of liking (like, neutral, dislike), a significant association was found ( $p < 0.05$ ). For disliked liquids, the majority of AUs were negative, whereas a similar amount of positive and negative AUs were displayed for liked and neutral liquids.

In other words, we could recognize that the children disliked a drink, but we could not distinguish the various gradients of acceptance.

## DISCUSSION

Disliked liquids could be distinguished by facial expressions in our study, but the difference between liked and neutral liquids was not apparent. It may be very important to communicate disliking to caregivers or species members [6], since disliked foods could be dangerous or harmful (i.e. bitter foods in nature are usually toxic and a bitter taste is innately disliked).

It is worthwhile to fine-tune the facial-expression method further, especially in young children (3-5y), whose cognitive capacities are relatively least developed and whose responses may be most influenced by the presence of a researcher.

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