

# EFFECTS OF INTROSPECTIVE VS EXTRASPECTIVE INSTRUCTION IN SCALINGS OF HEDONIC PROPERTIES OF FLAVOURING INGREDIENTS BY CHINESE AND GERMAN SUBJECTS

**Friedrich Müller and Ningya Wang**

*Institut für experimentelle Wirtschaftspsychologie,  
Universität Lüneburg, Wilschenbrucher Weg 84, D-21335 Lüneburg, Germany  
Email: f.mueller@uni-lueneburg.de*

## Abstract

*In order to evaluate the frequency of use and the like/dislike of flavouring ingredients, questionnaires were distributed via Internet to Chinese and German respondents. The respondents were asked to indicate to each of 58 different flavouring ingredients how often they eat it and in a second round how well it tastes. The questionnaires were given with either one out of 2 different instructions with wordings as to induce either an introspective or an “extraspective” attitude. Wordings facilitating an introspective attitude result in significantly increased response times as well as significant correlations between the judgements on the frequency of use and both the response time on frequency judgements and response time on hedonic evaluations, whereas significant correlations between these variables were not found in subjects who received a wording facilitating an extraspective attitude. The correlation between frequency of use and hedonic evaluation is notable higher in subjects who received extraspective wordings.*

In everyday life we almost exclusively perceive, think and communicate using categorial descriptions (Ulshöfer-Heinloth, 1964). This refers to categorisation as the most natural scaling method. And this might be one reason why category scales are most commonly used in applied research. In contrast, category scales are not very popular among psychophysicists as it is known that the results are strongly influenced by the context in which data are collected, especially when the situation calls for repeated and multiple judgments. (Müller, 1996). From the observation that scaling data reflect not only information on the attributes asked for but also adjustment processes to the scaling situation, the question arises as how to eliminate unwanted context effects and restore the quantitative description of attributes as one would get in natural settings.

Heller signified that “...*the quantitative judgments of an observer is only valid and can only be reproduced in the individual case if it is clear by what the subject has orientated himself.*” (Heller, 1990, p 52). He pointed out that orientation can be achieved by a) choosing (ecologically valid) stimulus ranges according to the range experienced in everyday life, and b) using psychologically valid scales, which correspond to the everyday use of verbal categories in order to c) establish an isomorphic relation between stimulus range and scale. Furthermore he points on the importance of d) quantitative orientation by giving the subject the certainty (f.i. by sub-deviding and refining the scale) that the exactness of his/her judgments matters and e) qualitative orientation by centering the subjects on the dimension in question. Qualitative orientation can be promoted by creating an extraspective, in contrast to an introspective, attitude. Taking an introspective attitude the scaling process turns into a purely personal matter accompanied by thoughts like “what is my personal impression” or “what does the stimulus remind me of?” whereas an extraspective attitude is directed to the stimuli and the questioned attribute in the sense of “how loud or how big is it?” It is presumed that in the former case other than the asked for attributes (e.g. friendliness, ugliness) may influence the judgements whereas in the latter case judgments are more spontaneous.

While experimental evidence exists for the effectiveness of the former measures, the effect of qualitative orientation still needs to be explored. To verify the effect of wordings chosen to rise introspective vs. extraspective attitudes, the instructions given with a questionnaire on the use and liking of flavouring ingredients were varied respectively.

## **Method**

### *Background*

The survey outlined below is part of a longitudinal study on changes in the use and like/dislike of flavours in diversifying societies. Focussing on the Chinese society which currently opens up to alien cultures it is asked which factors facilitate and which factors obstruct the acceptance of novel flavours. As controls German subjects are included. In Germany significant shifts of eating habits took place with the immigration of foreign employees and extensive travels abroad beginning in the 1960's. Within the framework of the study questionnaires on the use of flavouring ingredients were spread via Email to Chinese and German respondents.

### *Task*

On the basis of up-to-date statistics of the Association of the German Spice Industries (2007) and the Chinese Association of Fragrance, Flavour and Cosmetic Industry (2007) as well as individual interviews with Chinese and German Consumers 58 flavouring ingredients which are widely used in either the Chinese or the German or in both societies were listed. The list consisted mainly of herbs and spices but also includes flavouring vegetables (e.g. celery, fennel) and seeds (sesame).

The respondents were first given an overview over all flavours which were included in the study. After that all items were presented individually and respondents were asked to indicate how often they have contact with the respective flavour by clicking on the appropriate response button out of the alternatives "nearly daily", "at least once per week", "at least once per month", "at least once in a year", "never" and "I do not know this ingredient".

In a third step subjects were asked to evaluate the taste of each of the individually presented flavours by clicking on the appropriate response button on a vertically given scale which consists of 8 numerical alternatives (- 4; - 3; - 2; - 1; + 1; + 2; + 3; + 4) anchored on the number - 4 by the verbal label "this flavour does not taste at all" or "I don't like the taste of this flavour at all"; and on the + 4 "this flavour tastes very nice" or "I like the taste of this flavour very much".

### *Variation*

For Chinese respondents instructions and the items were given in Mandarin and in Chinese ideographs and for German subjects in German language. In both languages 2 versions with different verbalisations in order to induce either an extra- or an introspective attitude were prepared. For the wordings see table 1.

### *Dependent variable*

Beside information on frequency of consumption and hedonic properties of the given flavours the response time for every single frequency- and hedonic judgement were obtained.

Tab 1: Formulations used to induce an introspective vs. extraspective attitude

|                                 | introspective wording  | extraspective wording   |
|---------------------------------|--|---|
| Cover letter                    | .. research on the individual use and the individual likes and dislikes of flavours.   | .. research on the use and hedonic properties of flavours..   |
| Instruction to hedonic scalings | .. please indicate how much you like .. the shown flavours<br><br>.. please choose the alternative which best describes your personal taste sentence | .. please indicate how well the shown flavour tastes<br><br>.. please use the alternative which best describes the taste of the flavour |
| Labels at hedonic scale         | + 4 = I like the taste of this flavour very much<br>- 4 = I don't like the taste of this flavour at all  | + 4 = this flavour tastes very nice<br>- 4 = this flavour doesn't taste at all  |

## Results and discussion

### *Responses*

Out of 177 complete data sets obtained, 116 data sheets (28 intro- and 88 extraspective wordings) returned from German respondents (86 males, 30 females) and 61 (32 extra- and 28 introspective wordings) returned from Chinese respondents (35 males, 19 females, 7 without gender identification).

### *Selection and processing of data*

Taking into account that the respondents may interrupt the task by brakes, extra-long response-times ( $> \bar{x} + 2 * sd$ ) were eliminated. As the Chinese respondents were significantly older than the Germans ( $\bar{x} = 35,4$  vs.  $\bar{x} = 28,4$  years) and response times are age-correlated only data sheets of respondents between 28 and 42 years of age are considered for analysis. The average age of the remaining 31 Chinese subjects included is  $\bar{x} = 31,2$  years ( $sd = 3,7$ ); for the remaining 41 Germans  $\bar{x} = 32,1$  years ( $sd = 3,6$ ). Scalings and response times to specific flavours were only included in statistical evaluation, if more than 75% of the German or Chinese subjects know the flavour and responded to it.

### *Results*

Regarding the nationality German respondents know and use a wider variety of flavours than the Chinese respondents do (out of 58 flavouring ingredients 44 are well known and used by more than 75% of the German respondents compared to 23 ingredients in Chinese respondents) and the Chinese respondents require significantly longer response times (RT) than German respondents. For the estimation of frequency of use the Chinese subjects required  $\bar{x} = 6,4$  sec ( $sd = 1,6$ ) and the Germans  $\bar{x} = 4,7$ sec. ( $sd = 0,9$ ). For the hedonic evaluation Chinese subjects required  $\bar{x} = 5,9$  sec ( $sd 1,52$ ) vs  $\bar{x} = 4,04$  sec ( $sd = 0,91$ ) of the Germans. The correlation between like/dislike and frequency of use of flavours is moderate in Chinese subjects ( $r = 0.47^*$ ) and rather high in Germans ( $r = .832^{***}$ ).

### *Effect of introspective vs. extraspective instruction*

If an introspective instruction is applied, response times are significantly increased compared to an extraspective mode. The average time required for frequency judgements is increased by 15% ( $\bar{x} = 6,02$  sec vs.  $\bar{x} = 5.18$  sec) and for hedonic judgements by 27% ( $\bar{x} = 5,29$  sec. vs.  $\bar{x} = 4,17$  sec). This indicates that introspective instructed subjects scrutinize their responses more than extraspectively instructed persons. As a result they require longer response times and they generally report a slightly more frequent use of flavouring ingredients ( $\bar{x} = 2,87$ ;  $sf = 0.15$  vs.  $\bar{x} = 3,21$ ;  $sf = 0.12$ ).

Introspective instructed subjects require as more RT, as less frequent an evaluated flavour is used. (frequency of use/RT frequency:  $r = 0,530$ ; frequency of use/ RT like/dislike  $r = 0,499$ ) and the RT for both judgments correlate significantly by  $r = 0,552$  (see table 2).

Frequency evaluation as well as hedonic evaluation of extraspective instructed subjects are not significantly correlated with either response times. The correlation between frequency of use and like/dislike of flavouring ingredients, however, is notably higher when an extraspective mode is used ( $r = 0,714$  vs.  $r = 0,594$ ).

Table 2: Correlations between reported frequency of use, hedonic evaluation and response times. Upper-right = introspective instructed subjects, lower-left = extraspective instructed subjects

|                   | frequency of use | like / dislike | response time frequency | response time like/dislike |
|-------------------|------------------|----------------|-------------------------|----------------------------|
| frequency of use  | -                | 0,594**        | 0,530**                 | 0,499*                     |
| like / dislike    | 0,714***         | -              | 0,369 ns                | 0,293 ns                   |
| RT frequency      | 0,08 ns          | 0,003 ns       | -                       | 0,552**                    |
| RT like / dislike | 0,153 ns         | 0,289 ns       | - 0,09 ns               | -                          |

The results suggest, that introspective instructed respondents tend to scrutinize their judgements possibly in direction to more consistent answers. This strategy, however, requires a large number of comparisons with previous judgements and subsequently changes of orienting properties; possibly at the expense of the description of the effective behaviour and effective sensations as the decrease of the expected correlation between like/dislike and the frequency of use of flavouring ingredients indicates.

### **References**

- Heller, O. (1990). Scaling and orientation. In: F. Müller (Ed.), Fechner Day 90: Proceedings of the Sixth Annual Meeting of the International Society for Psychophysics. Würzburg, 1990, pp. 52-57.
- Heller, O. (1980) Orientierung innerhalb von phänomenalen Steigerungsreihen. In: W. Lauterbach and V. Sarris (Eds.), Beiträge zur psychologischen Bezugssystemforschung. Huber, Bern, 1980, 124ff.
- Müller, F. (1996). Veridical scaling of the intensity of perceptions, feelings and emotions. In: A. Mital, H. Krueger, S. Kumar, M. Menozzi, J. E. Fernandez (Eds.), Advances in Occupational Ergonomics and Safety, 1996, Vol. II, 793-804, Cincinnati.
- Ulshöfer-Heinloth, E. (1964). Studien zur sprachkommunikativen Orientierung, Doctoral Dissertation. Universität Tübingen, 1964.