The refreshing perception explored

How intrinsic and extrinsic attributes interact in the refreshing perception of a drink

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I Abstract

The refreshing ability of a drink is one of the reasons to purchase a certain product. Therefore, it is interesting for brands to understand more about the refreshing perception. Current study explores the nature of refreshing perception of a drink based on the interaction of intrinsic and extrinsic quality attributes. A sensory experiment among 35 participants was conducted. The results show that the intrinsic attributes temperature and aroma are not interacting with the extrinsic attribute container colour. It is concluded that intrinsic and extrinsic attributes of a drink product are not interacting. Findings of this study give more insight into the perception of quality attributes of a drink product.

Keywords: Interaction effect, sensation transfer, quality attributes, drink products

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1. Introduction

When only looking at the Netherlands, 91.5 litres of soda were consumed per capita in 2015 (FWS, 2015). Within the beverage industry, companies are battling for market share. Companies that are able to develop products that provide most value for their customer, relative to competing products, perform better (Grunert, Larsen, Madsen and Baadsgaard, 1995). The reasons why consumers buy and consume certain products are numerous. These reasons are mainly based on the characteristics of the product (Linnemann, Benne, Verkerk, and van Boekel, 2006). A product can only be successful when producers are able to translate these consumer reasons to purchase into physical product attributes (Grunert, 2005). One of the reasons to purchase a certain food product is its refreshing ability. McEwan and Colwill (1996) describe the importance of refreshing intensity regarding the product category drinks. The attribute refreshing plays an important role in the acceptance of a drink. It is therefore important to take refreshing intensity into account when developing a drink product.

Refreshing perception is the result of attributes that are part of the physical product, intrinsic attributes (e.g. aroma, carbonation) and attributes that are not part of the physical product, extrinsic attributes (e.g. packaging, container colour) (Labbe, Almiron-Roig, Hudry, Leathwood, Schifferstein and Martin, 2009). The perception of refreshing intensity is a complex process, however it is useful to understand more of this evaluation because of its importance in the acceptance of the drink. Zeithaml (1988) and Szybillo and Jacoby (1974) have shown that in a consumption situation, quality perception is mainly based on intrinsic attributes. This indicates that refreshing perception is mainly based on intrinsic attributes. Studies have shown that the intrinsic attributes of a drink, when held constant, are influenced by extrinsic attributes in their refreshing perception (Guéguen, 2003; Deliza, Macfie and Hedderley, 2003). It is however unknown what the influence of extrinsic attributes is on refreshing perception when a specific intrinsic attribute is variating (e.g. cold and warm

temperature). Since no research has been found that studied the interaction effect between intrinsic and extrinsic attributes, the objective of this research is to determine whether or not this interaction effect exists. Understanding a possible interaction effect between intrinsic and extrinsic attributes could provide marketers with valuable insights. Furthermore, an answer to the question whether there is an interaction between intrinsic and extrinsic attributes in the perception of refreshing intensity, would expand the existing literature on the influence of extrinsic attributes on perception.

The aim of this paper is to explore the nature of refreshing perception of a drink based on the interaction of intrinsic and extrinsic attributes. First, examined is which intrinsic and extrinsic attributes separately influence perceived refreshing intensity by an examination of published literature on this process. Based on the literature a theoretical model about a possible interaction process of intrinsic and extrinsic attributes on refreshing perception is proposed. This model is tested by a sensory experiment in which both intrinsic attributes (i.e. temperature and aroma) and the extrinsic attribute container colour are manipulated in order to see if both types of attributes are interacting in their influence on perceived refreshing intensity.

2. Literature review

2.1 Intrinsic and Extrinsic Product Attributes

Consumers use multiple product attributes to indicate the quality of products as described by Olson and Jerry (1972) in the theory of 'Cue utilization'. The perceived quality of a product is of major influence on consumer behaviour and influences brand choice (Olsen, Menichelli, Meyer and Næs, 2011). Olsen and Jerry (1972) described this phenomenon as a result of the predictive and confidence values of attributes. The predicted value of an attribute (PV) is the degree to which consumers think an attribute is representative for the product quality. The confidence value of an attribute (CV) is the degree to which consumers belief they are able to use and judge the attribute correctly. Consumers rely most on attributes that have a high CV and PV in evaluating the quality of the product. Furthermore, these attributes can be categorized as intrinsic or extrinsic. Intrinsic attributes represent product-related attributes, such as ingredients and sensory attributes that cannot be manipulated without also altering physical properties of the product. Extrinsic attributes are not part of the physical product such as price, brand name and packaging (Olsen and Jerry, 1972).

Consumers make use of intrinsic or extrinsic attributes depending on the situation (i.e. point of purchasing and point of consumption). Whether consumers are able to make use of intrinsic attributes at the point of purchasing depends on whether they can be sensed and evaluated at that time (e.g. colour of a drink seen through a plastic bottle) (Zeithaml, 1988). When these are absent, consumers will indicate quality based on extrinsic attributes. At the point of consumption, consumers can actually sense the product, which results in the situation where intrinsic attributes have a greater effect upon product quality than extrinsic attributes (Zeithaml, 1988) (Szybillo and Jacoby, 1974). Only when both intrinsic and extrinsic attributes have a high CV and PV, these are used (Veale and Quester, 2009). Since consumers

rely most on attributes that have a high CV and PV in evaluating the quality of the product, it seems that in the consumption situation, intrinsic attributes have a higher CV and PV than extrinsic ones.

2.1.1 Interaction between Intrinsic and Extrinsic Product Attributes

Although intrinsic attributes have a greater effect upon perceived product quality than extrinsic attributes in a consumption situation (Zeithaml, 1988; Szybillo and Jacoby, 1974), extrinsic attributes can influence the experience of a food product. This is due to the process of 'sensation transfer' where extrinsic attributes bias the perception of other product attributes resulting in an influenced overall sensory perception of a product (Skaczkowski, Durkin, Kashima and Wakefield, 2016). Numerous studies published over the last years have shown that extrinsic attributes can have a major effect on multisensory flavour perception. Many of these studies have looked at the expectations evoked by colours, written information/labelling and branding (on packaging). Piqueras-Fiszman and Spence (2011) performed for example an experiment where the influence of the attribute colour was proved. In this study the relation between colour associations of chips packaging and flavour varieties in potato chips was studied. Participants of the study were faster in combining the right packaging colour to the right flavour, than they were when this combination was incongruent. This study shows that the colour of the packaging provided the participants with some expectations about the flavour. Furthermore, Shankar, Levitan, Prescott and Spence (2009) present that label information influences taste perception. The results of their study show that the labels 'milk chocolate' or 'dark chocolate' significantly influence the perception of the chocolatey-ness of M&M's. Kähkönen, Tuorila and Rita (1996) prove the effect of nutritional information on taste perception. They show that two fat spreads (similar, except for the nutritional labelling) are evaluated differently in a within-subject design. The fat spread with a high salt content according to its nutritional information was also evaluated as saltier than the one that had low

salt nutritional information. Besides, Allison and Uhl (1964) show the influence of the brand name on the taste perception of beers. Loyal users rate their preferred brands higher when they are able to see the brand name than they rate the same beers in a blind test. These studies all show that different types of extrinsic attributes can influence the sensory experience of a food product.

2.2 How Intrinsic and Extrinsic drink attributes are related to Refreshing Intensity

According to the definition, both thirst-quenching and energizing elements of a drink are part of refreshing intensity. Labbe et al., (2009) provide a review on literature that describes the relations between energizing, thirst-quenching and refreshing. These elements are the result of cold (thermally or chemically), sour and liquid properties of a drink. Cold, sour and liquid properties stimulate the production of saliva resulting in a mouth-wetting experience that gives a refreshing perception. Cold and sour properties also both trigger cold receptors resulting in arousal (Labbe et al. 2009). Besides, extrinsic attributes influence the perception of these intrinsic attributes in the refreshing perception of a drink (Guéguen, 2003). Prior to a study on the interaction effect between intrinsic and extrinsic attributes on refreshing perception, it is necessary to identify the attributes that separately influence the refreshing perception of a drink based on earlier performed studies.

2.2.1 Intrinsic Attributes

It appears that of all intrinsic attributes a drink product has, only the temperature, aroma, carbonation and colour have an influence on refreshing perception. In the following section this will be elaborated.

2.2.1.1 Temperature of a drink

Labbe et al. (2009) states that thirst, which is part of refreshing, is negatively correlated with saliva flow. This indicates that an unpleasant dry-mouth sensation is often accompanied with

thirst (Brunstrom, Macrae and Roberts, 1997). Several studies have shown that cold water is perceived as more pleasant and thirst-quenching than warm water because cold water stimulates the production of saliva. An experiment by Brunstrom et al. (1997) showed for example that cold water (3°C) significantly elicits greater saliva production than warmer water (13°C – 37°C) suggesting that a cold drink reduces thirst more than a warmer one. These studies show that the temperature of a drink influences both thirst-quenching and energizing aspects resulting in a the refreshing perception.

2.2.1.2 Aroma of a drink

Moreover, the perception of coldness can also be induced by trigeminal stimulation of products containing menthol (Labbe et al. 2009). Eccles, Du-Plessis, Dommels and Wilkinson (2013) described the refreshing effect of products containing menthol (compound of mint) as a result of their effects on so called Transient Receptor Potential Melastatin 8 (TRPM8) cation channels. Stimulated by menthol, these channels mediate the sensation of cold, which give a cool sensation (Patel, Ishiuji, and Yosipovitch, 2007). Labbe, Gilbert, Antille and Martin (2009) explored the refreshing perception by testing gels flavoured with either peach or mint aroma. Their research showed that mint-flavoured gels were scored as being significantly more refreshing than peach flavoured gels. This indicates that aroma influences both thirst-quenching and energizing aspects resulting in the refreshing perception of a drink.

2.2.1.3 Carbonation of a drink

Furthermore, a study by Guinard, Souchard, Picot, Rogeaux and Sieffermann, (1998) about refreshing intensity and beers showed that also carbonation influences the refreshing perception. Similarly, McEwan (1996) conducted an experiment where participants had to indicate which sensory attributes of soft drinks influence the refreshing intensity of a drink. Among others, carbonation was mentioned as sensory attribute that has an influence on the refreshing perception of a soft drink. Chandrashekar, Yarmolinsky, von Buchholtz, Oka, Sly,

Ryba and Zuker (2009) gave an explanation of this phenomenon by stating that carbonated water is often compared to mild acid stimulation in the mouth. These studies indicate that carbonation influences the refreshing perception of a drink.

2.2.1.4 Colour of a drink

Lastly, Zellner and Durlach (2003) showed that the colour of a drink could also influence refreshing perception. In their study on coloured drinks it was shown that, when drinks are both coloured and flavoured, there is a difference in refreshing perception due to learned associations between colour and flavour. Participants rated for example the perceived refreshing intensity of brown lemon and mint drinks as less refreshing, whilst brown coloured vanilla drinks were perceived as most refreshing. These results differed when the drinks were coloured differently, indicating that congruence matters. Moreover, several studies have indicated the effect of learned associations on perception. Clydesdale, Gover, Philipsen, and Fugardi (1992) state that their unusual finding that brown was related to refreshing could be the result of a learned associations between brown and coca cola. These studies show that congruence based on learned associations of intrinsic attributes influences the refreshing perception.

2.2.2 Extrinsic Attributes

2.2.2.1 Colour of a container

It appears that of all extrinsic attributes a drink product has, only the colour of the container has an influence on refreshing perception. In line with earlier research that confirmed the influence of colour on taste perception (see Clydesdale, 1993 and Delwiche, 2004 for reviews), Guéguen (2003) and Deliza,et al., (2003) showed that the extrinsic attribute colour (i.e. packaging colour and glass colour) influence refreshing perception. Deliza et al., (2003) performed a computer experiment on the effects of packaging features such as background colour on expected refreshing intensity of orange juice. This study showed indeed that

packaging colour could influence consumers' expectations about refreshing intensity. Guéguen (2003) demonstrated that the colour of the glass in which the drink is presented also influences the drink it's refreshing intensity. Participants rated an unnamed drink, served at a similar temperature but in different coloured glasses, as more refreshing in a cold coloured glass (blue and green) than into a warm coloured glass (red or yellow). Although Guéguen (2003) and Deliza et al., (2003) showed that colour, even when it is not part of the physical product, could also influence the refreshing perception of a drink, these studies used a study design where participants were not able to actually sense the intrinsic attributes or where the intrinsic attributes did not vary. Hence, these studies prove the influence of extrinsic attributes on (expectations about) the intrinsic attributes but did not look into whether or not this influence varies when there is variation within a certain intrinsic attribute.

3. Theoretical framework

Literature has shown that the intrinsic attributes temperature, aroma, colour and carbonation separately influence the refreshing perception of a drink via the thirst-quenching and energizing aspects. In this study the focus will be on the intrinsic attributes temperature and aroma. These attributes both stimulate a cooling sensation, thermally or chemically, which lead to refreshing perception.

Besides the earlier described physical mechanisms in chapter 2, also psychological mechanisms influence refreshing perception. Clydesdale et al., (1992) showed for example the effect of learned associations between certain intrinsic attributes. A learned association between a colour and for example refreshing perception raises expectations about the refreshing intensity of another product with the same colour. Zellner and Durlach (2003) showed that also congruence of these learned associations matter. An incongruent combination of intrinsic attributes has a negative influence on the perception.

Moreover, due to a process of sensation transfer, extrinsic attributes bias the perception of other product attributes resulting in an influenced overall sensory perception (Skaczkowski et al., 2016). Deliza and MacFie (1996) describe that the effect of sensation transfer occurs when extrinsic information creates expectations of product flavour. This expectation will then influence the interpretation of the intrinsic attributes. According to Deliza and MacFie (1996) the effect of this sensation transfer occurs when extrinsic information creates expectations of the flavour of a product. Expectations of a product can be formed due to different processes. Guéguen (2003) demonstrated the effect of this phenomenon on drinks in different coloured glasses. Drinks in cold coloured glasses are perceived as more refreshing than in warm coloured glasses. Indicating that learned associations of natural correlations (e.g. fire and the

sun are both warm, yellow and red; water and forests are both cool, blue and green) (Ho et al., 2014), are transferred to the perception of the colour in other situations.

Previous described processes create certain expectations about a product, which in turn influence the actual product perception. Over the years, scientists have come up with four main psychological theories in order to explain the effects of disconfirmation (positive or negative) of consumers' product expectations. These main theories are: (1) assimilation, (2) contrast, (3) generalized negativity and (4) assimilation-contrast (Anderson, 1973). The assimilation and contrast theories both occur when psychological discomfort exists because actual product performance contradicts the consumer's original expectation. However, there is a difference in reaction on this discomfort. Assimilation theory describes a consumer who adjusts the perception of the product towards its original expectation in an attempt to minimize the discomfort, which results in a slightly better evaluation than the actual experience (Schifferstein, Kole and Mojet, 1999). Contrast theory is about the consumer who evaluates the product less favourable than the actual experience of the product (Deliza and MacFie, 1996). (3) Generalised negativity occurs if a consumer negatively evaluates a product because the expectations he had were not met. In this case it does not matter if the product performance was actual better or worse than expected (Piqueras-Fiszman and Spence, 2015). (4) The assimilation-contrast theory assumes that there are limits of acceptance or rejection in customer perception. If the difference in what was expected of the product and its actual performance is relatively small, assimilation will likely occur. However, when this difference becomes too large, contrast effects may occur instead (Deliza and MacFie, 1996).

Based on the previous described literature, it is expected that cold attributes are perceived as more refreshing than warm attributes. Due to a confirmation of consumers' expectations, the influence of cold coloured containers on perceived refreshing perception will be larger for

cold drinks than this influence is for warm drinks. In the latter case, psychological discomfort exists because actual product performance contradicts the consumer's original expectation that was based on the container colour. Therefore, the following hypotheses about interaction effects between temperature or aroma and container colour are formulated:

H_1: The temperature and container colour of a drink interact such that the influence of a cold coloured container on perceived refreshing perception is significant larger for a cold drink, than for a warm drink.

H2: The aroma and container colour of a drink interact such that the influence of a cold coloured container on perceived refreshing perception is significant larger for a cold aromatized drink, than for a warm aromatized drink.

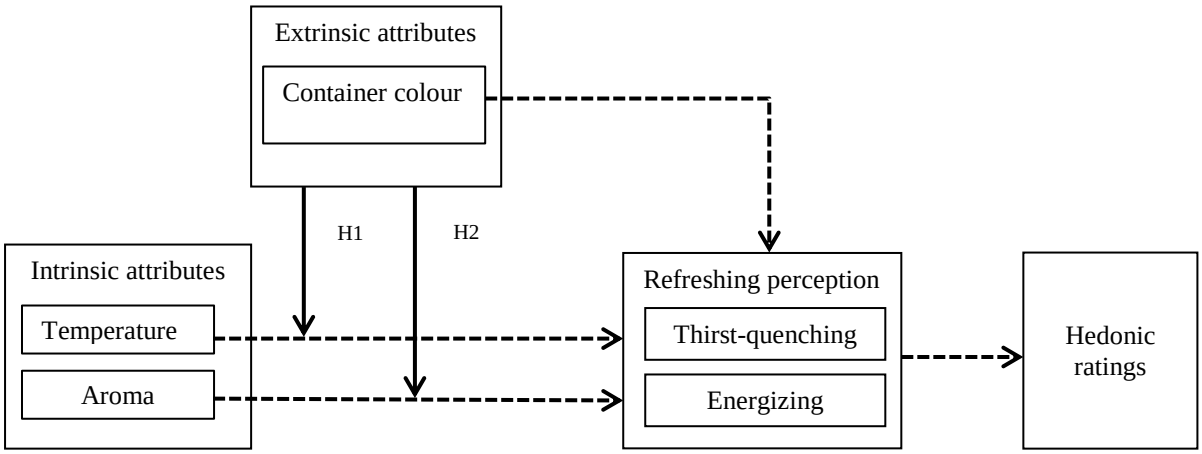

Figure 1. Visual representation of the theoretical model. Dotted lines represent already performed studies which are tested by regression analysis. Normal lines represent the interaction effect between H1) temperature x container colour H2) aroma x container colour

4. Methodology

4.1 Pre-test

In order to verify the different effects of cold temperature, aroma and container colour compared to warmer variants on refreshing intensity, a pre-test was conducted. The ages of the participants ranged from 18 to 25 (M=21.00, SD = 2.20).

According to the predictions, a cold temperature leads to higher perceived refreshing intensity of a drink than a warm temperature. Furthermore, a cold aroma leads to higher perceived refreshing intensity of a drink than a warm aroma. Lastly, a cold coloured container leads to higher perceived refreshing intensity of a drink than a warm coloured container. The findings support these expectations. Analyses on the temperature showed that drinks of 12.8°C were perceived as significantly more refreshing (M = 7,15, SD = 0.65) than drinks of 16.8°C (M = 4.97, SD = 0,79), t(19) = 14,90, p <.001. Mint flavoured drinks were perceived as significantly more refreshing (M = 7,79, SD = 0.58) than peach flavoured drinks (M = 5,22, SD = 0.61), t(19) = 19.74, p < .001. Lastly, drinks in blue coloured containers were perceived as significantly more refreshing (M = 6,83, SD = 0.58) than drinks in yellow coloured containers M = 4,76, SD = 1.59), t(19) = 15,98, p < .001.

4.1.1 Discussion

The results show that cold aroma, temperature and container colour are perceived as more refreshing than warmer variants. It was shown that mint flavoured drinks were perceived as significantly more refreshing than peach flavoured drinks. Drinks of 12.8°C are perceived as significantly more refreshing than drinks of 16.2°C. Lastly, drinks consumed from a blue container were perceived as significantly more refreshing than drinks consumed from a yellow container. After the effects of temperature, aroma and container colour on refreshing

intensity were verified, experiment two was conducted to indicate whether there was an interaction effect between the variables temperature, aroma and container colour.

4.2. Experiment

4.2.1 Design

Based on previous theoretical backgrounds, eight different types of drinks were created, varying in temperature or aroma and container colour. Each participant was asked to evaluate eight drinks. This experiment was conducted in order to determine whether there were interaction effects between temperature*container colour and aroma*container colour (Table 1).

4.2.2 Participants

The sample consisted of 35 participants. The experiment took place at Crown Business Centers in Leiden and was conducted within three days. Only Dutch consumers were allowed to participate in order to filter out cultural differences. Consequently, the questionnaire and recruitment leaflet was in Dutch. The ages of the participants ranged from 18 till 32 and were on average 21.

4.2.3 Stimulus material

4.2.3.1 Container colour

Containers of 150cc were purchased via the internet in two different colours. The containers were exactly the same except for the colour (i.e. blue and yellow) (Figure 2). Each container was filled with 50ml of a drink. The colours blue and yellow were selected as Guéguen (2003) found these to be respectively cold and warm colours. The colour yellow was chosen over red because of a possible learned association between red and sparkling water.

Figure 2. The blue and yellow containers of 150cc which were used during the experiment

4.2.3.2 Aroma

During this experiment the participants tasted normal tap water and several versions of Spa water. Participants tasted Spa water mint and peach without seeing the packaging.

4.2.3.2 Temperature

The temperature of the drinks varied, earlier pre-tests showed that drinks of 12.8°C were perceived as just cold enough while drinks of 16.2°C were perceived as just not cold enough. The participants were asked to enter the room at a specific time. The drinks were taken out of the fridge respectively two and one hour before this moment and the temperature was measured just before starting the experiment.

4.2.4 Measures

Each participant was asked to taste the drinks in random order, to write down the number of the cup and to answer five questions per drink. The first question was about thirst-quenching intensity. The second question was about the energizing intensity. The third question was about the refreshing intensity. Hereafter a dummy question about price expectations of the product was asked to check the model. The evaluation of the thirst-quenching intensity, energizing intensity, refreshing intensity and price was conducted using 10-centimetre-long scales. The scales ranged from “not at all” to “extremely”. Lastly, a question was asked about

hedonic response, consumers had to score their overall liking using labelled affective magnitude scale. This scale ranged from “greatest imaginable dislike” to “greatest imaginable like” and had incremental units of appropriate distances and labels as described by Cardello and Schutz (2004).

4.2.5 Procedure

The experiment consisted of three rounds, the first two rounds consisted of each 10 participants while the last round consisted of 15 participants. Prior to the start of testing, participants were asked to drink until they were not thirsty anymore. By creating this state, the refreshing intensity of the drink was not being influenced by the amount of drinks they had tasted before. Besides a questionnaire, no further information about the specific aim of the study was provided to the participants. Each participant was placed in front of eight containers, four blue and four yellow containers containing 50ml of the drinks. The drinks were coded with a random three-digit number for identification purposes. On the questionnaire, instructions were written as follows: “Please taste each of the provided drinks, write done the code of the drink and rate each drink on thirst-quenching intensity, energizing intensity, refreshing intensity, price expectations and how much you like it on the following scales.” Each participant was provided with drinks in a randomly assigned order.

During the experiment, the thirst-quenching intensity, energizing intensity, refreshing intensity, price expectations and liking were induced by cold water (thermally) or by mint-flavoured water (chemically) and were tested under the influence of either cold or warm coloured containers. All participants were provided with eight drinks (Table 1). The participants were asked to taste the drink and evaluate each drink on thirst-quenching intensity, energizing intensity, refreshing intensity, price expectations and hedonic ratings.

After each sample participants were instructed to clear their mouth with unsalted crackers and to rinse with water.

Table 1

Experiment design: test conditions. Test conditions to test whether there is an interaction effect between temperature and container colour and aroma and container colour (H1-H2).

Hypothesis	**Sample number**	**Container colour**	**Temperature**	**Aroma**
H1	1	Blue	12.8°C	Regular
	2	Blue	16.2°C	Regular
	3	Yellow	12.8°C	Regular
	4	Yellow	16.2°C	Regular
H2	5	Blue	16.2°C	Mint
	6	Blue	16.2°C	Peach
	7	Yellow	16.2°C	Mint
	8	Yellow	16.2°C	Peach

4.2.6 Data analysis

To analyse the results of the experiment, factorial repeated Analysis of Variance (ANOVA) were conducted. The first ANOVA analysis was conducted to analyse hypothesis 1, the interaction effect between container colour and temperature on refreshing intensity (Table 1). The second ANOVA analysis was conducted to analyse hypothesis 2, the interaction effect of aroma and container colour on refreshing intensity (Table 1). When $P < 0.05$, the null hypothesis was rejected and alternative hypothesis (Ha) was accepted. Furthermore, to examine whether or not there exist a relation between refreshing intensity and hedonic ratings, a regression analysis was conducted. When $P < 0.05$, the null hypothesis was rejected and alternative (Ha) was accepted.

5. Results

5.1 Interaction effects

The experiment consisted of 35 participants of whom 11 were male and 24 female. The ages of the participants ranged from 18 to 32 (M=21.31, SD = 3.03). According to the predictions, the colour of the container would interact with the perception of aroma and temperature of a drink. It was expected that the temperature and container colour of a drink interact such that the influence of a cold coloured container on perceived refreshing perception would be significant larger for a cold drink, than for a warm drink. However, the findings do not support the expectations. The one-way repeated measures ANOVA showed that there is no significant two-way interaction effect between the container colour and temperature, $F(1,34) = 1.475$, $p = .233$ (Table 2), therefore H1 is not accepted. Cold drinks, consumed from a yellow container are not perceived as significantly less refreshing than cold drinks consumed from a blue container. Warm drinks consumed from a blue container are not perceived as significantly more refreshing than consumed from a yellow container. Furthermore, it was expected that the aroma and container colour of a drink interact such that the influence of a cold coloured container on perceived refreshing perception would be significant larger for a cold aromatized drink, than for a warm aromatized drink. The results showed that aroma and container colour of a drink also do not interact, $F(1,34) = .487$, $p = .490$ (Table 3), therefore H2 is not accepted. Drinks with a mint aroma, consumed from a yellow container are not perceived as significantly less refreshing than drinks with a mint aroma consumed from a blue container. Drinks with a peach aroma, consumed from a blue container are not perceived as significantly more refreshing than drinks with a peach aroma, consumed from a yellow container.

Table 2

Overview results SPSS one-way repeated measures ANOVA – Hypothesis 1

	dF	**Mean square**	**F**	**Sig.**
Colour	1	6.909	3.331	.077
Temperature	1	20.292	7.575	.009
Colour * Temperature	1	1.420	1.475	.233

Table 3

Overview results SPSS one-way repeated measures ANOVA – Hypothesis 2

	dF	**Mean square**	**F**	**Sig.**
Colour	1	.928	.308	.583
Aroma	1	39.538	7.937	.008
Colour * Aroma	1	.961	.487	.490

5.2 Main effects

The novelty of this study was testing a possible interaction effect between intrinsic and extrinsic quality attributes. Although this appeared not to be significant, some main effects were. According to the predictions, drinks with a cold temperature, a cold aroma and a cold coloured container would be perceived as more refreshing than drinks in warmer versions would. The findings partially supported the expectations. Two one-way repeated measures ANOVA tests were conducted to compare the effects of temperature, aroma and container colour on refreshing intensity. It was expected that a cold coloured container would be perceived as more refreshing than a warm coloured container. There was however not a significant effect found, both in analyses of samples 1 to 4, $F(1,34) = .308$, $p = .583$ and 5 to 8, $F(1,34) = 3.331$, $p = .077$. Regarding the intrinsic attributes, it was expected that a cold drink would be perceived as more refreshing than a warmer drink. The findings support this

expectation, the temperature of a drink has a significant effect on the perceived refreshing intensity, $F(1,34) = 7.575$, $p = .009$ (Table 2). The cold drink ($M=6.667$, $SD=.288$) was perceived as more refreshing than the warmer drink ($M= 6.223$, $SD=.263$). Lastly, it was expected that mint aromatized drink would be perceived as more refreshing than a peach aromatized drink. The findings support this expectation, the aroma of a drink significantly influence the perceived refreshing intensity, $F(1,34) = 7,937$, $p = .008$ (Table 3). The drinks containing mint ($M=6.647$, $SD=.322$) were perceived as significantly more refreshing than the drinks containing peach ($M=5.584$, $SD=.318$).

5.3 Regression effects

Besides the expected hypothesis, several earlier found relations were tested. According to the expectation, both thirst-quenching and energizing elements of a drink are part of refreshing intensity. The findings support this expectation. A Regression Analyses showed that refreshing intensity and thirst-quenching intensity of a drink are strongly related $R^2 = .825$. When energizing intensity is included, the model can be explained slightly better, $R^2= .830$, indicating that thirst-quenching intensity has a larger influence on refreshing perception compared to energizing intensity. A dummy question about price expectations was included. The not significant results of a Pearson correlation test between price and refreshing intensity $r = .207$, $p = .083$ shows that other results are valid. Furthermore, it was expected that a positive relation exist between refreshing intensity and hedonic ratings. The results support this expectation. There is a positive correlation between the refreshing perception of a drink and the hedonic ratings $r = .507$, $p = .002$. Lastly, it was tested if thirst-quenching and energizing correlate with liking to confirm the link between thirst-quenching and energizing aspects on refreshing intensity. A Pearson correlation test showed that thirst-quenching intensity and liking correlate $r = .589$ $p = < .01$. Furthermore, also energizing and liking correlate $r = .567$ $p = < .01$.

6. Discussion

This study was conducted to investigate the interaction between intrinsic and extrinsic attributes on the consumers' refreshing perception of a drink, in order to contribute to existing literature on the influence of extrinsic attributes on perception. The aim was to determine whether or not the colour of the container could influence the perception of the intrinsic attributes temperature and aroma of a drink. It was expected that intrinsic attributes and the container colour of a drink would interact such that the influence of a cold coloured container on perceived refreshing perception would be significant larger for a cold drink, than for a warm drink (thermally or chemically). An interaction effect between colour and varying intrinsic attributes of a drink had not been tested before. This interaction effect was studied by modifying the aroma (i.e. mint and peach), the temperature (i.e. 12.8°C and 16.2°C) and the container colour (i.e. blue and yellow) of the drinks and having people rate the drinks on, among other things, its refreshing intensity. Contrary to expectations based on Guéguen (2003) and Deliza et al., (2003), this study did not find a significant interaction effect between extrinsic attribute container colour and intrinsic attributes aroma and temperature. It is unclear whether or not the participants in the experiments of Guéguen (2003) and Deliza et al., (2003) were thirsty or not, this could explain the different results since in the participants in this study were not thirsty. Although the influence of the extrinsic attribute colour was not significant, the results did show that cold drinks served in a blue container were perceived as more refreshing than cold drinks in a yellow container while warm drinks that were served in a blue container were perceived as more refreshing than warm drinks served in a yellow container. It could be that the effect is not measurable on non-thirsty consumers, future studies with thirsty participants on the current topic are therefore recommended. Especially the influence of coloured containers on different temperatures is interesting because, although the effect of colour was not significant, the effect of colour was stronger on the perception of

drinks with different temperatures than on drinks with different aroma's. A possible explanation for this might be that learned associations between temperature and colour are stronger than between aroma and colour. The other findings of the current study are consistent with those of Labbe et al., (2009) and Brunstrom et al., (1997) who found respectively that mint aromatized drinks are perceived as more refreshing than peach aromatized drinks and that cold drinks are perceived as more refreshing than warm drinks. Furthermore, the findings show that refreshing perception is mainly based on thirst-quenching properties of a drink, but also energizing aspects have a small influence. It was however expected that the effect of energizing on refreshing perception would have been greater based on Labbe et al., (2009). Besides, in line with earlier studies by Zellner and Durlach (2003) and McEwan and Colwill (1996) this study confirms the correlation between refreshing intensity and hedonic ratings.

7. Conclusions

The purpose of the current study was to determine whether or not consumers make use of both intrinsic and extrinsic attributes in their perception of the refreshing intensity of a drink, and more important, if these attributes interact with each other. This study shows that extrinsic attributes do not interact with the intrinsic attributes of a drink. Drinks with a cold aroma or cold temperature but consumed from warm coloured containers are not perceived as significantly less refreshing than consumed from cold coloured containers for example. Although the most important effect, the interaction effect, was not found, the results show the existence of some main effects. Extrinsic attribute container colour has no influence on the refreshing perception of a drink. The intrinsic attributes aroma and temperature do have an influence, it is confirmed that cold aroma and a low temperature are perceived as more refreshing than warmer variants. Lastly, the refreshing perception of a drink is mainly based on thirst-quenching properties of a drink however, also energizing properties have a small

influence. When refreshing perception increases, this positively influences the hedonic ratings of the product.

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9. Appendix

Questionnaire I

Beste deelnemer,

Bedankt dat je wil meedoen aan het vooronderzoek voor mijn thesis. Omdat het van belang is dat iedere deelnemer in eenzelfde staat aan dit onderzoek begint, wil ik je vragen water te drinken totdat je geen dorstgevoel meer hebt. Eet vervolgens een cracker.

Voor je staan zes gevulde bekertjes. Het is de bedoeling dat je de bekertjes een voor een in willekeurige volgorde proeft, het bekernummer noteert en beoordeelt op hoe verfrissend je dit drankje vindt.

Neem elke keer voordat je een nieuwe beker pakt een cracker om je mond te neutraliseren. Het is niet de bedoeling dat er wordt overlegt met andere deelnemers.

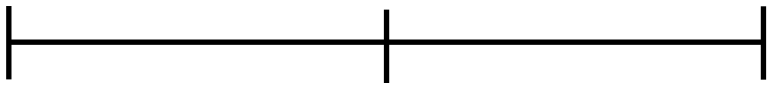
Pak nu het eerste bekertje, op de achterzijde staan de eerste vragen met betrekking tot de drankjes.

Bedankt,
Marleen

Leeftijd:_____
Geslacht:_____

Beker nummer: _____

VERFRISSEND
Hoe verfrissend vind je het drankje?
Teken je antwoord in op onderstaande schaal.

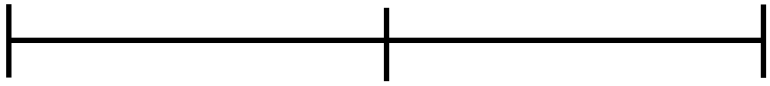


Totaal niet verfrissend Gemiddeld Extreem verfrissend

- Vergeet niet een cracker te eten –

Beker nummer: _____

VERFRISSEND
Hoe verfrissend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



Totaal niet verfrissend Gemiddeld Extreem verfrissend

- Vergeet niet een cracker te eten -

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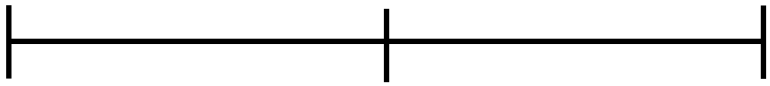
VERFRISSEND
Hoe verfrissend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



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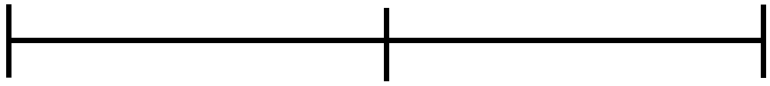
- Vergeet niet een cracker te eten -

Beker nummer: _____

VERFRISSEND
Hoe verfrissend vind je het drankje?
Teken je antwoord in op onderstaande schaal.

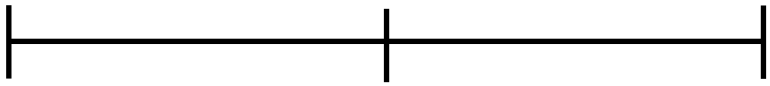


Totaal niet verfrissend | Gemiddeld | Extreem verfrissend

- Vergeet niet een cracker te eten –

Beker nummer: _____

VERFRISSEND
Hoe verfrissend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



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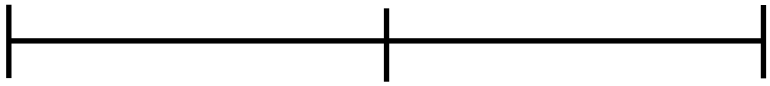
VERFRISSEND
Hoe verfrissend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



Totaal niet verfrissend | Gemiddeld | Extreem verfrissend

- Einde van het experiment, lever je ingevulde blaadjes bij mij in -

Questionnaire II

Beste deelnemer,

Bedankt dat je wil meedoen aan het smaakonderzoek van mijn thesis. Omdat het van belang is dat iedere deelnemer in eenzelfde staat aan dit onderzoek begint, wil ik je vragen water te drinken totdat je geen dorstgevoel meer hebt. Eet vervolgens een cracker.

Voor je staan acht gevulde bekertjes. Het is de bedoeling dat je de bekertjes een voor een in willekeurige volgorde proeft, het bekernummer noteert en beoordeelt op vijf aspecten.

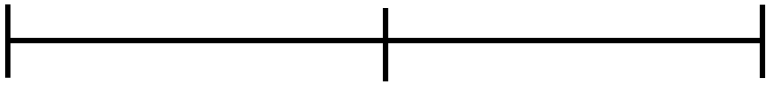
Neem elke keer voordat je een nieuwe beker pakt een cracker om je mond te neutraliseren. Het is niet de bedoeling dat er wordt overlegt met andere deelnemers.

Pak nu het eerste bekertje, op de achterzijde staan de eerste vragen.

Bedankt,
Marleen

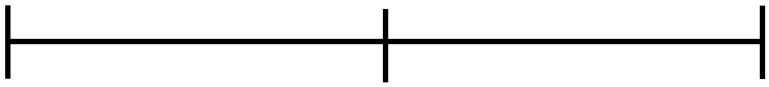
Beker nummer: _____

Dorstlessend
Hoe dorstlessend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



Totaal niet dorstlessend | Gemiddeld | Extreem dorstlessend

Stimulerend
Hoe stimulerend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



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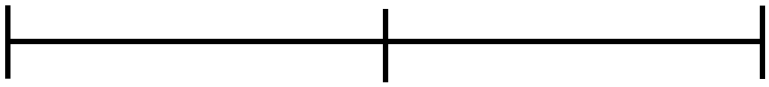
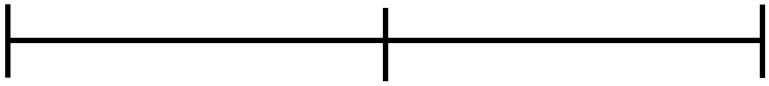
Verfrissend
Hoe verfrissend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



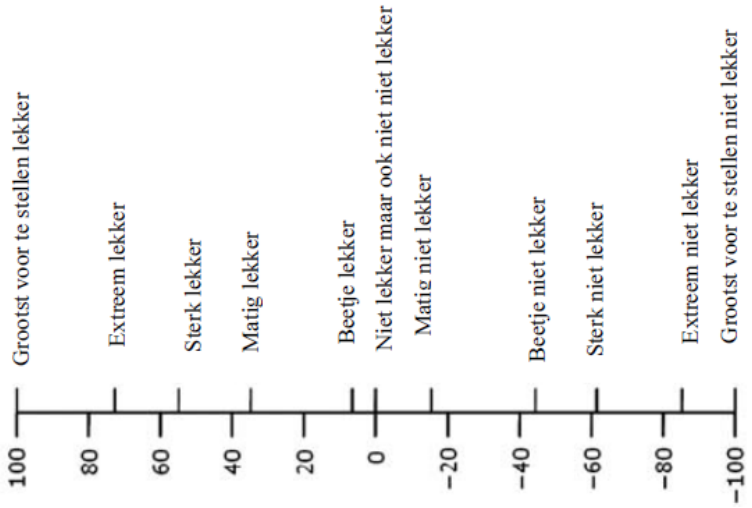
Totaal niet verfrissend | Gemiddeld | Extreem verfrissend

Prijs
Hoe duur verwacht je dat dit drankje is?
Teken je antwoord in op onderstaande schaal.



Totaal niet duur | Gemiddeld | Extreem duur

Smaak
Hoe lekker vind je het drankje?



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Dorstlessend
Hoe dorstlessend vind je het drankje?
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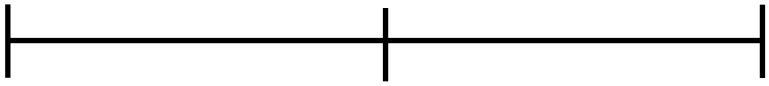

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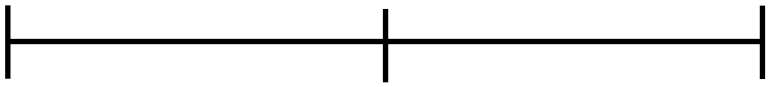
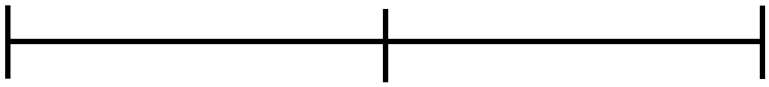
Stimulerend
Hoe stimulerend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



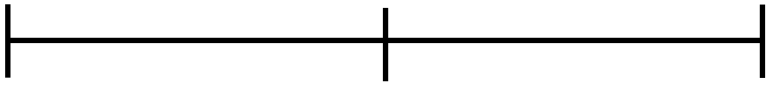
Totaal niet stimulerend | Gemiddeld | Extreem stimulerend

Verfrissend
Hoe verfrissend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



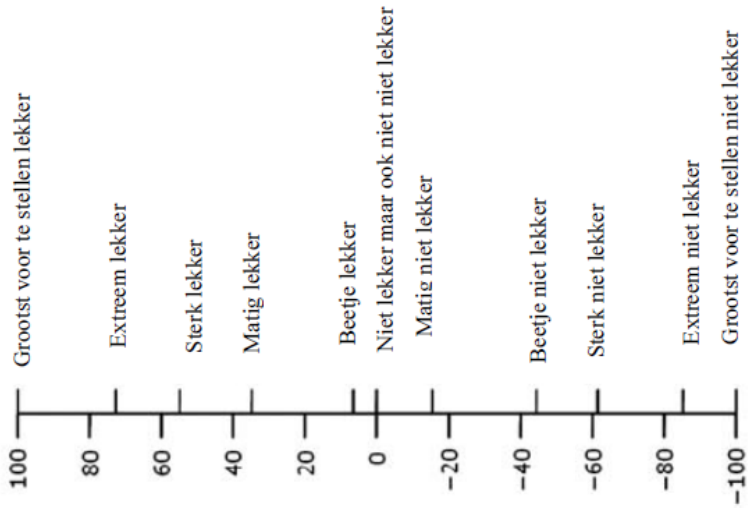
Totaal niet verfrissend | Gemiddeld | Extreem verfrissend

Prijs
Hoe duur verwacht je dat dit drankje is?
Teken je antwoord in op onderstaande schaal.



Totaal niet duur | Gemiddeld | Extreem duur

Smaak
Hoe lekker vind je het drankje?



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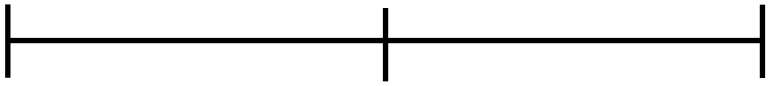
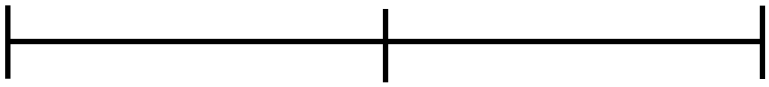
Dorstlessend
Hoe dorstlessend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



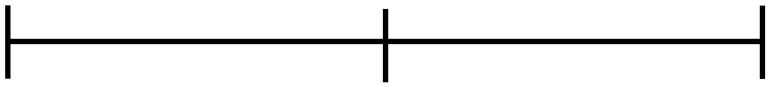
Totaal niet dorstlessend | Gemiddeld | Extreem dorstlessend

Stimulerend
Hoe stimulerend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



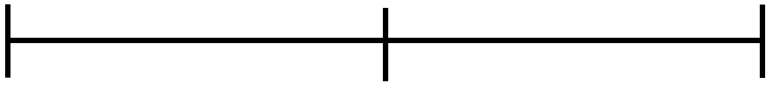
Totaal niet stimulerend | Gemiddeld | Extreem stimulerend

Verfrissend
Hoe verfrissend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



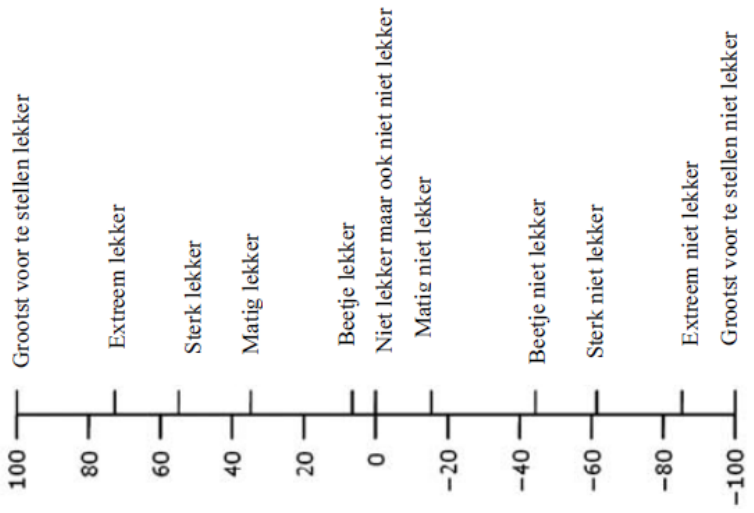
Totaal niet verfrissend | Gemiddeld | Extreem verfrissend

Prijs
Hoe duur verwacht je dat dit drankje is?
Teken je antwoord in op onderstaande schaal.



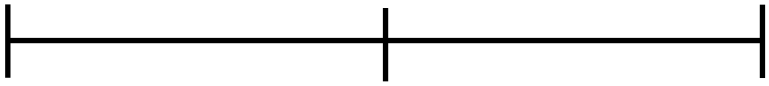
Totaal niet duur | Gemiddeld | Extreem duur

Smaak
Hoe lekker vind je het drankje?



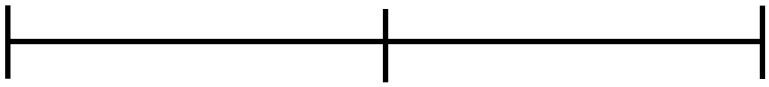
Beker nummer: _____

Dorstlessend
Hoe dorstlessend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



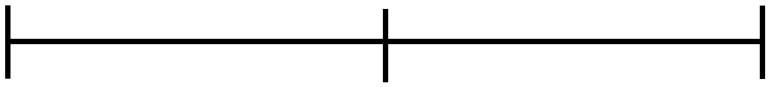
Totaal niet dorstlessend | Gemiddeld | Extreem dorstlessend

Stimulerend
Hoe stimulerend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



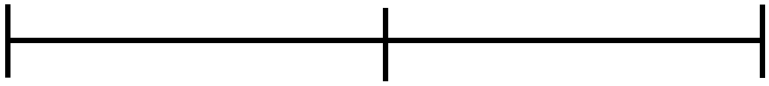
Totaal niet stimulerend | Gemiddeld | Extreem stimulerend

Verfrissend
Hoe verfrissend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



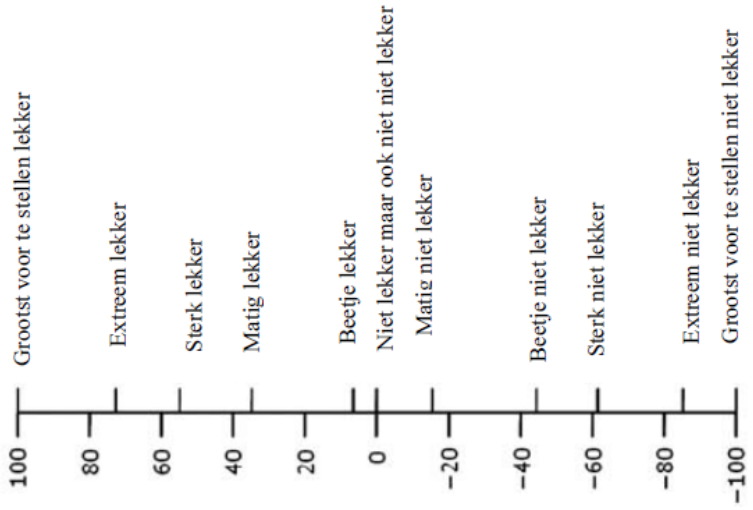
Totaal niet verfrissend | Gemiddeld | Extreem verfrissend

Prijs
Hoe duur verwacht je dat dit drankje is?
Teken je antwoord in op onderstaande schaal.



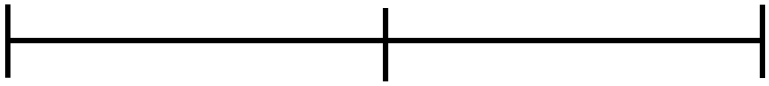
Totaal niet duur | Gemiddeld | Extreem duur

Smaak
Hoe lekker vind je het drankje?



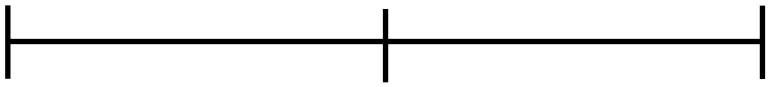
Beker nummer: _____

Dorstlessend
Hoe dorstlessend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



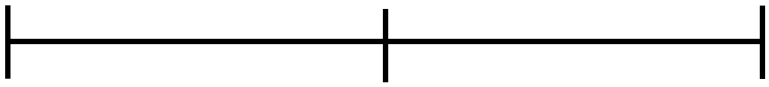
Totaal niet dorstlessend | Gemiddeld | Extreem dorstlessend

Stimulerend
Hoe stimulerend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



Totaal niet stimulerend | Gemiddeld | Extreem stimulerend

Verfrissend
Hoe verfrissend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



Totaal niet verfrissend | Gemiddeld | Extreem verfrissend

Prijs
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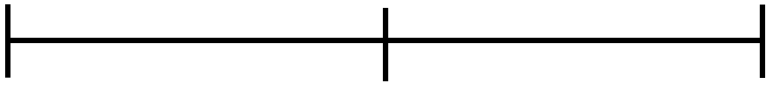
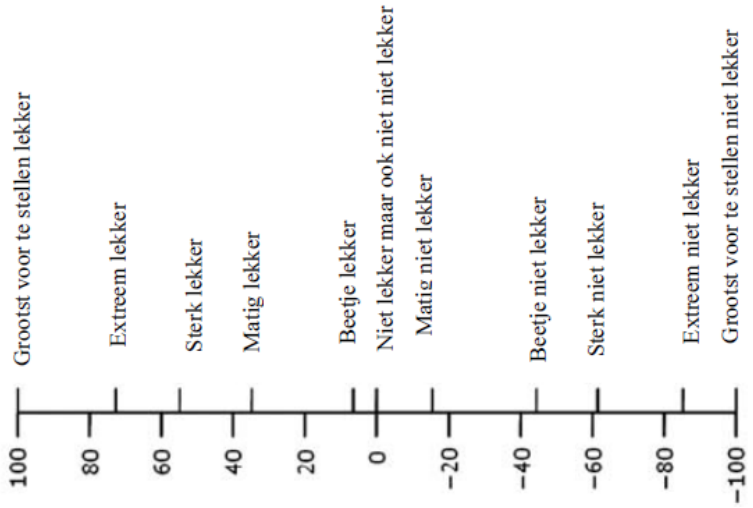


Totaal niet duur | Gemiddeld | Extreem duur

Smaak
Hoe lekker vind je het drankje?



Beker nummer: _____

Dorstlessend
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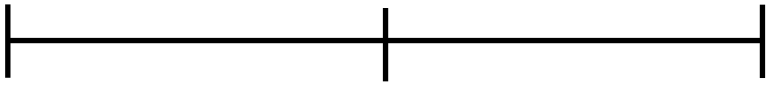

Totaal niet dorstlessend | Gemiddeld | Extreem dorstlessend

Stimulerend
Hoe stimulerend vind je het drankje?
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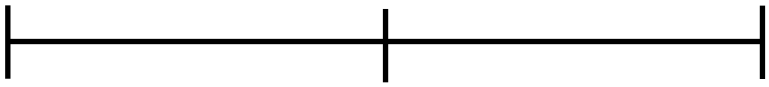

Totaal niet stimulerend | Gemiddeld | Extreem stimulerend

Verfrissend
Hoe verfrissend vind je het drankje?
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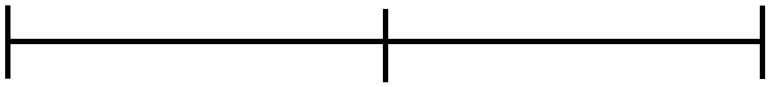

Totaal niet verfrissend | Gemiddeld | Extreem verfrissend

Prijs
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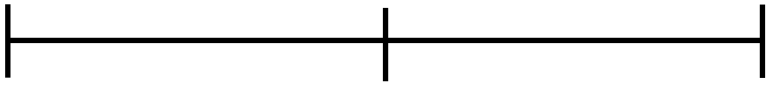
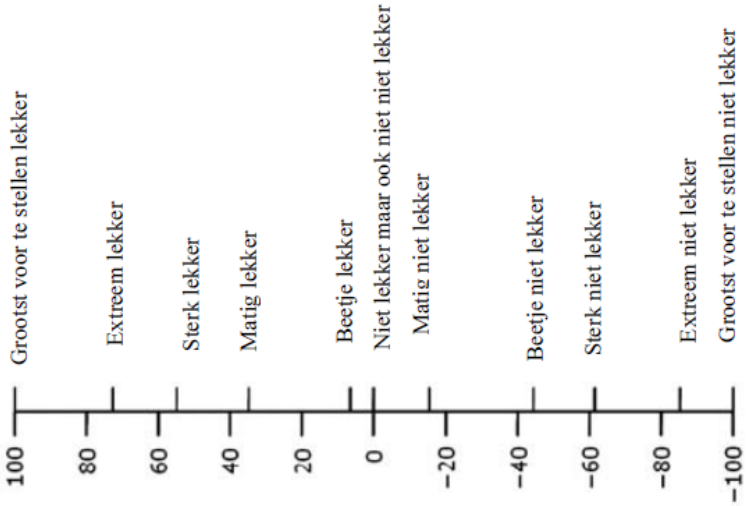


Totaal niet duur | Gemiddeld | Extreem duur

Smaak
Hoe lekker vind je het drankje?



Beker nummer: _____

Dorstlessend
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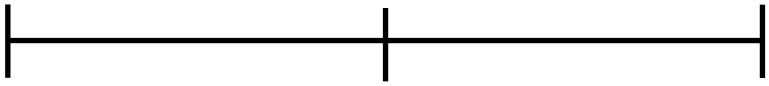

Totaal niet dorstlessend | Gemiddeld | Extreem dorstlessend

Stimulerend
Hoe stimulerend vind je het drankje?
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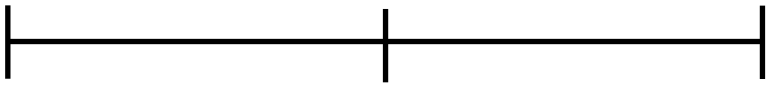
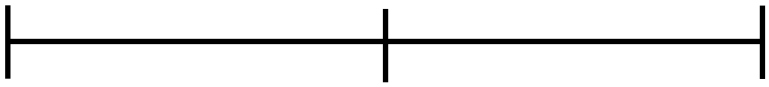


Totaal niet stimulerend | Gemiddeld | Extreem stimulerend

Verfrissend
Hoe verfrissend vind je het drankje?
Teken je antwoord in op onderstaande schaal.



Totaal niet verfrissend | Gemiddeld | Extreem verfrissend

Prijs
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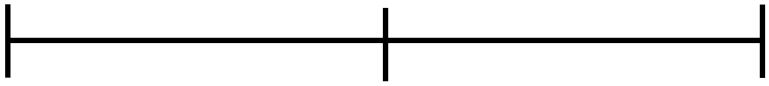
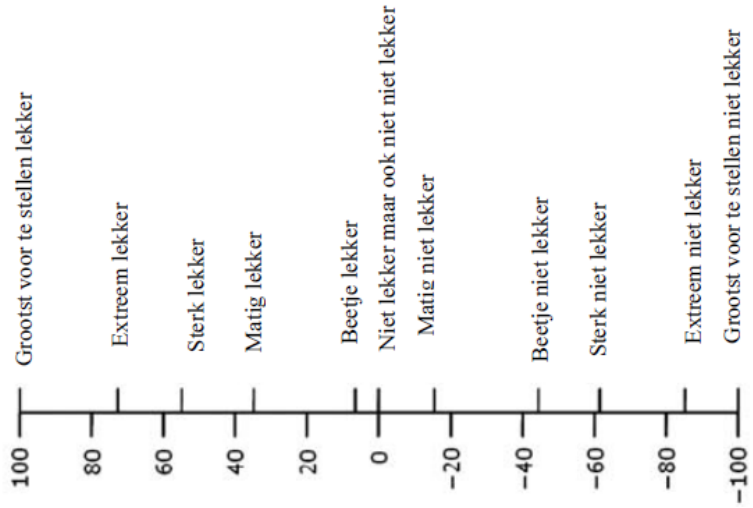


Totaal niet duur | Gemiddeld | Extreem duur

Smaak
Hoe lekker vind je het drankje?



Beker nummer: _____

Dorstlessend
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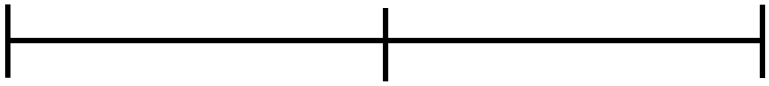

Totaal niet dorstlessend | Gemiddeld | Extreem dorstlessend

Stimulerend
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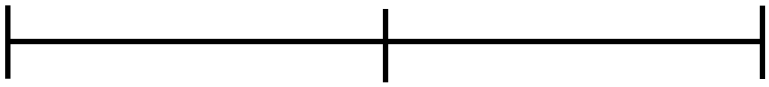

Totaal niet stimulerend | Gemiddeld | Extreem stimulerend

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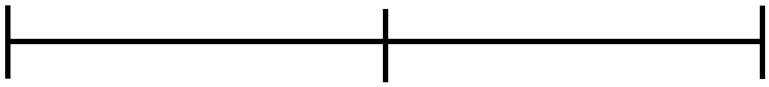

Totaal niet verfrissend | Gemiddeld | Extreem verfrissend

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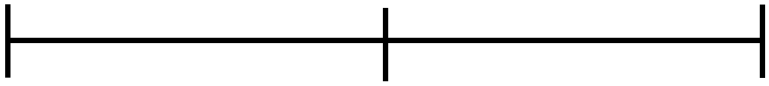
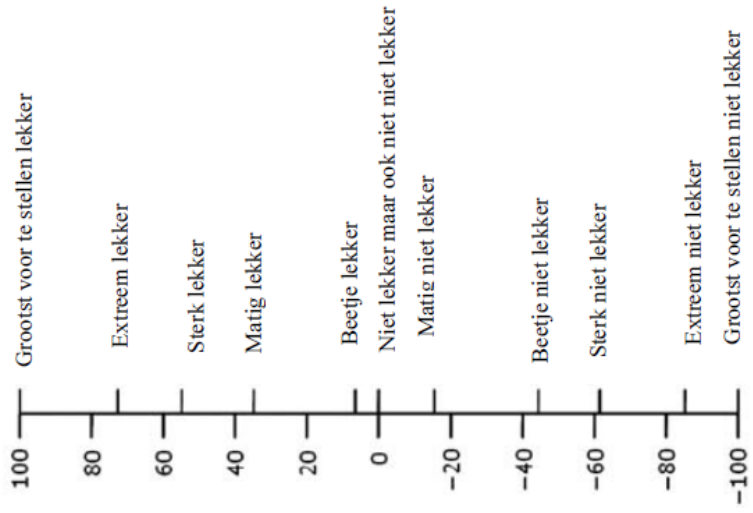


Totaal niet duur | Gemiddeld | Extreem duur

Smaak
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