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# The drinking experience: Cup or content?

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ABSTRACT

Fluid food products are always consumed from a container: a package, a cup, a bowl, and so on. The properties of this container may affect how the food is experienced. In the present study, we develop a method to study the effects of container properties on the experience of drinking beverages. Participants either evaluated empty cups made from different materials, or they evaluated the experience of drinking hot tea or a chilled softdrink from these cups. In all three conditions, the same set of attributes was used. The results suggest that for many attributes the drinking experience followed the experience of the cups. However, some deviations were also evident. Ratings on the cold-warm item increased when hot tea was consumed from some of the cups, probably related to the increase of the outside temperature of the cup. Differences between conditions for other items (e.g., robust-fragile, strong-weak), however, do not seem to be related to physical changes of the cup and may have a semantic or emotional origin.



## 1. Introduction

When someone consumes a fluid food product, the food is always surrounded by a container. When a person wants to drink a cup of coffee or eat a bowl of yogurt at home, (s)he has many different containers to choose from: The options vary in material (e.g., glass, porcelain, plastic, metal, wood), shape, and appearance (color, prints). Nevertheless, people tend to prefer certain options, partly because these are judged to be appropriate for a certain product (Raudenbush, Meyer, Eppich, Corley, & Petterson, 2002). Traditionally, in Western countries consumers mainly use ceramic or porcelain cups with handles for hot drinks like coffee and hot chocolate, whereas glasses without handles are used for cold drinks such as juices, softdrinks, and alcoholic drinks. This might explain why consumers tend to comment that drinks 'just don't taste the same' when they are consumed from disposable cups, even though these cups may have satisfactory functional properties.

Similarly, a food producer can choose from multiple options during the development of a food package. Due to a trend towards increasing consumer convenience, more and more foods tend to be available in packages from which they can be consumed directly. As a consequence, the effect of package characteristics on the perception of its content has increased over the years. Therefore, the choice for packaging materials (plastic, glass, metal foil, cardboard) and shapes has become a critical determinant of product perception. In addition, the container plays an important role on retail shelves, because it can suggest a certain identity for its content that may enhance or interfere with its identification and evaluation (Cardello, Maller, Masor, Dubose, & Edelman, 1985; Seaton & Gardner, 1959).

The choice for a particular type of container will affect how the food is perceived and experienced during consumption. Some of these effects may originate from the physical interaction between the container and its content. For example, off-flavors may occur due to migration of compounds from the packaging material into the food (e.g., Janssens, Diekema, Reitsma, & Linssen, 1995). Also, the shape of a wine glass may have an effect on flavor release and, thereby, on the perceived bouquet of the wine (Hummel, Delwiche, Schmidt, & Huttenbrink, 2003). Furthermore, the shape and size of the container (Raghubir & Krishna, 1999; Wansink, 1996; Wansink & Van Ittersum, 2003) and the magnitude of the opening in the container (Greenfield, Smith, & Wills, 1984) have been shown to affect the amount of content consumed.

The sensory characteristics of a container can also affect the experience of its content. For example, Brown (1958) found that the crisp sound of a wrapper increased the perceived freshness of bread. Similarly, the cold feel of a glass bowl might enhance the perceived freshness of a dessert. Krishna and Morrin (2007) recently showed that touching a flimsy cup decreased the perceived quality of the water served in the cup for some of their participants. Furthermore, McDaniel and Baker (1977) found that the ease with which a bag of potato chips could be opened had a direct effect on the perceived crispiness and tastiness of its content, with difficult-to-open bags presumably containing better quality chips.

In the present paper, we develop a method to determine how a container affects the experience of consuming its contents. In our approach, we will not zoom in on how differences in the physical attributes of a cup affect the way in which it is experienced.

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Instead, we will assess how different cups are experienced and how this affects the experience of drinking a beverage from the cup. In two experiments, we evaluate the effects of different cups on the experience of drinking hot tea or cold softdrink from these cups by comparing the experience of holding an empty cup to the experience of drinking from such a cup. On the one hand, we determine how the container is experienced when it is empty and, on the other hand, we determine how drinking a beverage from this cup is experienced. Because drinking from cups is a natural type of behavior that occurs in everyday life, we try to keep all tasks and experimental conditions as natural and realistic as possible.

We recently defined product experience as 'the awareness of the psychological effects elicited by the interaction with a product, including the degree to which all our senses are stimulated, the meanings and values we attach to the product, and the feelings and emotions that are elicited' (Hekkert & Schifferstein, 2008). In order to capture how people experience (drinking from) a cup, we asked participants to rate aspects that were mainly sensory-perceptual (e.g., warm-cold, soft-hard), had a semantic origin (e.g., gentle-tough, fragile–robust), or were related to emotions (e.g., excited-calm). Although these different types of aspects may be distinguished conceptually and experimentally, we will not regard them as isolated characteristics here, because experiential characteristics tend to be highly intertwined and probably cannot be separated.

## 2. Experiment 1

Each participant was presented with the same seven cups that were either empty (CUP condition), filled with hot tea (TEA condition), or filled with cold softdrink (SODA condition).

### 2.1. Method

#### 2.1.1. Participants

Sixty-one unpaid volunteers, undergraduate students from Delft University of Technology, participated in the experiment. The 40 men varied in age between 17 and 26, while the 21 women varied in age between 18 and 23 years old. Each condition was completed by 20–21 participants. The proportion of women was 0.25, 0.38, and 0.40 in the CUP, TEA, and SODA conditions, respectively. All participants were native Dutch speakers.

#### 2.1.2. Product selection

We started out from containers that were available in local stores and that were used as such or that were slightly altered. Because we were mainly interested in the effects of different materials, we used containers with similar functionality and of approximately the same shape and size. The differences in materials had consequences for many physical and perceptual characteristics, such as the appearance (transparency, color), weight, thickness, and so on. The seven cups tested were cone shaped, had no handle, and had approximately the same size (height varying from 7.3 to 9.9 cm; upper outer diameter between 7.0 and 8.4 cm; lower outer diameter between 4.4 and 5.9 cm). The materials chosen were glass (smooth, transparent), glazed ceramics (smooth, beige color), double-layered stainless steel (smooth, metallic look), polystyrene (thin white plastic), low-density polyethylene (thin transparent plastic), cardboard (with colored print), and polystyrene foam (white, thick foam that does not become hot on the outside when filled with hot fluids). The first three cups were durable, while the other four cups were disposable. These materials were chosen because they differed considerably in specific gravity, heat conductivity, and surface texture, but nevertheless were available in approximately the same size and shape, and were all used occasionally or regularly to drink tea and softdrink.

#### 2.1.3. Procedure

Participants were recruited at the university. Individuals who were willing to participate were taken into a different room. A maximum of two participants could do the test simultaneously. In the case of two participants, they were seated opposite of each other at a table, but visual contact was blocked by a screen. Admission to the three conditions was determined by chance.

Participants were presented with one cup at a time. For each cup they filled out a response form. After completing the form, they received the next cup, but the previous cup remained on the table. In the CUP condition participants received empty cups. In the TEA condition participants received cups that were filled almost half with hot Earl Grey tea (65 °C). In the SODA condition cups were filled almost half with chilled Sprite (12 °C).

In all three conditions, participants filled out twenty-three 7-point scales with bipolar items that reflected what they experienced while touching the cup or while drinking from the cup. The instruction in the CUP condition was: 'Take the cup into your hands and indicate to what extent each term is applicable to your experience. This cup feels ...'. In the TEA and SODA conditions the instructions were: 'Take a few sips of tea/softdrink and indicate to what extent each term is applicable to your experience. Drinking tea/softdrink out of this cup feels ...'.

In order to make a direct assessment of the impact of the various cups on the drinking experiences, we wanted to capture as many different aspects of the experiences as possible. However, in order to facilitate comparisons over conditions we only selected items that made sense and were applicable in all three conditions. We expected that studying the responses for these items would provide the most comprehensible insight into how drinking experiences are shaped by the properties of the cups involved. Hence, we used the same set of items in all conditions. Some of these items were closely related to the dimensions of affective meaning that were identified by Osgood and colleagues using the semantic differential technique: evaluation, activity, and potency (Osgood, Suci, & Tannenbaum, 1957). These items were pleasant-unpleasant, agreeable-disagreeable, good-bad, beautiful–ugly, conspicuous–inconspicuous, interesting–boring, excited–calm, stimulating–relaxing, quiet–lively, gentle-tough, humble–weighty, independent-dependent, strong–weak, and fragile–robust. Others were related to sensory perception in different sensory modalities. These items were heavy–light, thick-thin, hard–soft, warm-cold, smooth-rough, flexible-stiff, stale-fresh, mild-spicy, and sweet-bitter. After evaluating all the seven cups, participants rank ordered the cups with respect to their suitability for drinking hot tea or softdrink out of the cup. The entire test took about 20 min.

#### 2.1.4. Data analysis

To obtain an overall impression of the characteristics of the experiences, we performed a Principal Components Analysis (PCA) with Varimax rotation for each condition, using the responses from a single participant ($N = 20$ or 21) to a single stimulus ($N = 7$) on the 23 binary items as cases ($N = 140$ or 147). Items with high factor loadings on corresponding factors in all three analyses were used to construct sum scales. With this procedure, the majority of variation in individual items is now represented in a limited number of sum variables. This information reduction step makes it easier to interpret the entire dataset, while only a relatively small part of the data – that mainly consists of individual variation between specific items – is disregarded. In addition, sum variables have the advantage over single item scales that their reliability tends to increase and their measurement error tends to decrease with the number of items in the combination (Churchill, 1979).