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Beverages and containers: An experiment for color appearance teaching

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ABSTRACT

It is the aim of this paper to approach the contribution to color teaching in depth through an applied experiment and to benefit the study of food color appearance. Its project was submitted in the 2007 National Conference on Color in Mar del Plata and in the 2008 Argentine Congress on Color in Santa Fé. This is an experiment proposal to introduce *color appearance* as a subject to be taught to second-year Project Language students studying Industrial Design at the *Universidad Nacional de Mar del Plata*. It begins with an introduction to the topic of food color appearance and it sets forth the need to conduct an examination prior to introducing the subject to students, to then develop the contribution to color and cesia teaching.

1. FOOD COLOR APPEARANCE

In the food world, a beverage can have a certain color and appear as having another and one of the reasons for this change in appearance is the color of the container itself. Therefore, to what extent can the visual perception of a beverage be altered without modifying it in chemical terms?

Here the “overlap” as to container and beverage relationship (without regard to the container graphic effect) is relevant since the change in the color appearance of a drink may benefit the communication of the product characteristics and this may lead to greater consumer acceptance. This change, however, may also convey the idea that the characteristics inherent in the product have been modified and thus cause consumer indifference and rejection. And this may be the result of a design decision which, for example, promotes this phenomenon in the first case or ignores it in the second instance.

The subject of *color appearance*, just as that of *cesia*, is seldom analyzed fully when teaching project language, but it is of great importance in the launching of a new food product.

2. PRIOR EXAMINATION

The proposed aim was to introduce second-year Project Language students of Industrial Design at the *Universidad Nacional de Mar del Plata* to the subject of *visual appearance* through color by experimenting with the phenomenon of perception which involves the observer, the content (beverage), the container (receptacle) which serves as filter and the light source. To such end, a prior examination of the possibilities of teaching the subject was conducted. Different types of sodas and flavored water were surveyed, in terms of their contents and their containers (Figure 1). At that first opportunity (Giglio 2007), in addition to traditional colors such as orange, other colors such as blue or purple were used which, until

recently, were reserved to other types of products. Nowadays, flavored water has expanded its color spectrum, as can be seen in its sport line (Figure 2), which promoted the development of this practice.

The examination was carried out by surveying the different colors of existing drinks and PET or glass containers. One example of this examination is the selection of an orange drink and its appearance in transparent colorless, yellow, green and light-blue containers, where the change in appearance of the drink saturation can be seen (Figures 3 and 4).



Figure 1. Different colored PET containers



Figure 2. Different colored drinks.



Figures 3 and 4. Change in appearance of the saturation of an orange drink due to changes in the color of containers.

The possibilities of different colored beverages and containers were then analyzed following a structured survey, as shown in Figure 5. The original colors are in the containers circled in white; containers which seem to have colorless liquid are circled in yellow; those which seem to have liquid of a similar color are circled in red; and green circles show another example of those containers which seem to have different shades.

Figure 6 shows mainly the change in appearance of the beverage color due to the influence of the color of the container bottom.



Figure 5. Change in appearance of beverage color. Examination using different colored drinks and containers.



Figure 6. Change in appearance of beverage color saturation. Examination using different colored drinks and colored-bottom containers.

3. CONTRIBUTION TO COLOR TEACHING

In general, the study of color appearance is carried out through practices based on the coordination of pigment colors resulting from the action of “juxtaposition” and the *simultaneous contrast* study. Moreover, subtractive mixing practices are basically carried out by mixing pigments or through the filter “overlap” to a beam. In turn, *color appearance* is also experienced as a result of the light pigment color effect and its possibility of reproducing colors as appropriate. These practices seem to apply only to the area of lighting.

This educational experiment aims at contributing to color *appearance* teaching, profiting from the possibilities offered by the *beverage-container* relationship in order to complete subtractive mixing in a comprehensive way (light-pigment) due to the color “overlap”, related to the topic of *cesia*, which allows for the change in appearance in terms of shade, value and saturation to finally be able to expand its application possibilities, for example, to the food industry.

The development of the practice consists of a *descriptive phase* which involves the survey and study of cases, an *experimental phase* which involves the determination of variables and invariables (Figures 7, 8 and 9) and an *analytical phase* which allows for cross referencing. This is explained in the first part of the Theory and Practical Work on Color.

For this experiment, it is necessary to have, on the one hand, colored water with pigments –several colorings which try to reproduce the colors of sodas and flavored water. The main colorings may be red, green, blue, yellow, cyan, magenta and black. Containers are organized in relation to their shape, degree of transparency and color.

Table 1 contains detailed instructions on how to conduct the practice.

Table 1. Instructions to conduct the experiment.

Instructions	Drinks	Containers
Select the containers to be used pursuant to the following criteria. Survey them.		Different colored containers. Different colors Same <i>cesia</i> (transparency)
		Containers of the same color but different <i>cesia</i> Same color Different <i>cesia</i>
Select or produce the liquids to be used pursuant to the following criteria. Survey them.	Different transparent liquids of different colors Different colors Same <i>cesia</i> (transparency)	
Experiment on and observe the changes in appearance in each case. Analyze the results of the experiment as regards color appearance.	Each color of transparent liquids Same color Same <i>cesia</i> (transparency)	Different colored containers Different colors Same <i>cesia</i> (transparency)
	Each color of transparent liquids Same color Same <i>cesia</i> (transparency)	Containers of the same color but with different diffusivity on permeability Same color Different <i>cesia</i>
	Each color of the transparent liquids Same color Same <i>cesia</i> (transparency)	Different colored containers with different diffusivity on permeability Different colors Different <i>cesia</i>



Figure 7. Students working on the experiment in the workshop.



Figures 8 and 9. Photographic survey.

4. FINAL REMARKS

The possibility of experimenting beyond the instructions given allowed students to propose new experiment alternatives in regard to the color appearance of beverages.

One of the questions posed after this practice is: *How is its meaning changed?* The in-depth analysis of the subject in semantic and pragmatic terms is consequently proposed for higher education instances through surveys, observations, experiments with consumers, among other practices, where students may comprehend the effects of senses, the relationship between what is visually perceived and the other senses (taste: liquid taste; touch: liquid texture, etc.) their acceptance or rejection.

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