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Assessing the Effect of Changing a Bottled Beer Label on Taste Ratings

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Abstract

We report on an experiment designed to investigate the impact of labelling on the response of consumers to bottled beer. 142 people were given one of three beers: unlabelled, with a brown label, or with a green label and tasting notes designed to emphasize the beer's citrus/fruity notes in a between-participants experimental design. The participants rated the beer (which they drank from a glass) on 9-point pencil-and-paper line scales. The questionnaire items were designed to assess taste, quality, citrus flavour, purchase intent, and willingness to pay. The results revealed that the label exerted a significant influence over people's ratings: In particular, the green/citrus label led to significantly higher ratings in terms of perceived quality, taste, the dominance of fruity/citrus notes in the beer, and purchase intent. While previous studies have tended to look at either the impact of label/packaging colour or else at the impact of descriptive labelling, this is the first study to combine the two using a between-participants experimental design with commercial beer labels in a naturalistic testing environment. The results add to a growing body of research demonstrating that a variety of product-extrinsic cues influence the consumers' experience and enjoyment of commercial product offerings.

Keywords: Labelling; Beer; Taste/Flavour; Colour; Purchase Intent; Price Estimation; Citrus/Fruit

Introduction

A large body of empirical research now demonstrates that changing the colour of a food or drink product can change people's expectations, and hence their actual experience, of the taste and/or flavour [1,2]. Perhaps more intriguingly, over the years, there have been anecdotal reports suggesting that changing the colour of the packaging of a soft drink can also influence people's judgments of the taste/flavour of the contents [3,4]. A growing body of research clearly demonstrates that packaging plays an important role in driving the consumers' response to a variety of beverages [5], and that includes alcoholic drinks [6-8]. Labels are the most important way to convey information to the consumer, although information search depends both on the ability and the motivation of the individual [9,10]. The effect of a label is much more important when the judgment is made heuristically, so inferences of quality are made on attributes of the product that the consumers decide on the basis of rules of thumb, since not all the information is necessarily readily available.

In perhaps the first study of its kind, Louis Cheskin [3] reported on the results of an informal consumer test in which people complained about the lemony/limey taste of 7-Up after a little more yellow had been added to the outside of the can [3]. There have also been anecdotal reports of consumers complaining about the taste when Coca Cola brought out a special white can one Christmas, instead of using their more traditional bright red can [4]. Elsewhere, it has been shown that the images and text on the packaging of food and beverage products can impact on the response of consumers [11-13].

Certainly, anecdotal reports from the market place [14] suggest that something as simple as a change in the colour scheme and shape symbolism on the beer label can give rise to negative associations in the mind of the consumer. For example, many consumers reported negative associations (of acidity and pungency) when Cardinal beer changed the label of their beer following a merger of several breweries some decades ago. The original label which was predominantly white and yellow was replaced by a new label sporting a pointy yellow diamond against a green background. Given the negative feedback, the company decided to replace the label on their beer once again with a rounded lozenge shape against a white background.

Over the years, a number of studies have highlighted the influence of a variety of product-extrinsic factors on the beer-drinking experience. So, for example, in one classic early study, Allison and Uhl [15] demonstrated that when consumers tasted a range of beers in the home environment, their ratings were different blind versus with brand information [16-18]. More recently, Lee et al. [19] demonstrated that a beer to which a few drops of balsamic vinegar had been added was rated as significantly less liked when the participants (in a bar)were informed about the contents prior to tasting, than if the reveal occurred afterwards. The influence of music, company, and visual atmospherics on the consumption of beer have also been researched [20-24].

In the present study, we investigated whether changing the colour of the label on a bottle of beer, together with any textual information and graphics would impact participants' ratings of the sensory qualities of the beer, their hedonic response, and how much they would be willing to pay for a bottle. The underlying idea here was that our expectations concerning the sensory qualities and hedonic consequences of consuming food and beverage products play an important role in determining our final experience on tasting/sampling the product. If the expectation and experience are not too different from one another then assimilation is normally seen, such that the consumer experiences their expectation as it was [1,25]. Hence, by using different labels on the beer bottles we wanted to determine whether we could induce different sensory expectations in the mind of the participants and hence a different flavour experience.

Methods

Ethical approval

The experiment was reviewed and approved by the Central University Research Ethics Committee of the University of Oxford, and complied with the Helsinki Declaration.

Participants

A total of 142 participants (with an even mix of males and females with a mean age in the mid-30s) took part in the tasting event, the majority of whom reported that they were regular beer drinkers. Given the nature of the event, there was not time to collect detailed biographical details from the participants. However, informed consent was obtained from each and every participant prior to their taking part in the study.

Apparatus and materials

Each participant was given one of three different 330 ml brown glass bottles of beer to evaluate. One bottle was unlabelled, one had a brown label, and the third had a green label (Figure 1). The textual description of the two beer labels differed. This difference in the labelling determined the three experimental conditions: (1) Red, brown, and yellow dominated the colour scheme of the "Genius Loki" label (Figure 1a); (2) Green, yellow, and purple dominated the colour scheme of the "LHC Liquid hop chemistry" label (Figure 1b). Note that this label was designed to prime for an association with citrus notes and fruity flavours– a common, hop derived, flavour in beer; (3) The 'no label' (control) condition consisted of an unlabelled brown beer bottle. Relevant here, green and yellow have been shown to be associated with an acidic, or sour, taste [26,27]. Crucially, the labelling was the only thing that differed between the bottles. All of the beer was produced from the same gyle and bottled on the same day. The labels were applied after filling.

Design and procedure

The participants were tested at the 2014 Edinburgh Science Festival (http://www.sciencefestival.co.uk/). This annual international science festival attracts many thousands of visitors every year. The participants were invited to taste the beer and enter their ratings on paper-and-pencil score sheet. The participants saw the beer being poured from the bottle into a beer glass before tasting. There were bottles on display on the serving counter, and the participants were invited to pick up and look at a bottle if they so desired. The procedure followed a between-participants experimental design in which each participant was given only one of three bottles of Barney's beer (http://www.barneysbeer.com/barneyshome.php). Importantly, the participants were not made aware that there were any other bottle conditions than the one they themselves experienced.

The participants were invited to taste the beer and to rate various attributes on a single-sided questionnaire involving a number of 9-point paper-and-pencil scales (Questionnaire 1). The attributes to be assessed were: Taste (from very poor to very good), quality (from very low to very high), citrus flavour (from very low to very high), purchase likelihood (from very unlikely to very likely), and price they would be willing to pay for a bottle of that beer (in GBP). The order in which these items were presented in the questionnaire was constant across all test conditions and for all participants. Finally, the participants were also invited to indicate their age, gender, if they had tried Barney's beer before (yes/no), and how often they drank beer (1=several times to 10=never).

Importantly, the conditions were tested in batches to avoid the participants from seeing a different label on another person's bottle. Each label was tested for approximately one-hour, at the opening event of the Festival combined with a Scimart event. It was emphasised at the taste-test area that people were trying a new Barney's Beer, to avoid any possibility that if they had drunk Barney's Beer before they may have based their responses on their prior experience.

Data analysis

A one-way analysis of variance (ANOVA) was performed on the five dependent variables considering the experimental condition as an independent factor. In separate ANOVAs gender, and whether the participant had tried Barney's beer before, and their interaction, were also included in the model. Only those participants who were regular drinkers of beers (scoring 1-6 on the 10-point frequency scale) were included in the subsequent analyses (n=142; a further 6 were excluded due to this criterion). Fifty participants evaluated LHC beer, 53 Genius Loki, and 39 the unlabelled version.

Results

The experimental condition was significant for tastiness, $F(2,139)=3.61$, $p=.03$, quality, $F(2,139)=3.41$, $p=.036$, citrus flavour, $F(2,139)=9.82$, $p<.001$, and purchase intent, $F(2,139)=4.81$, $p=.01$ (Table 1). LHC received significantly higher scores than the unlabelled bottle condition except for

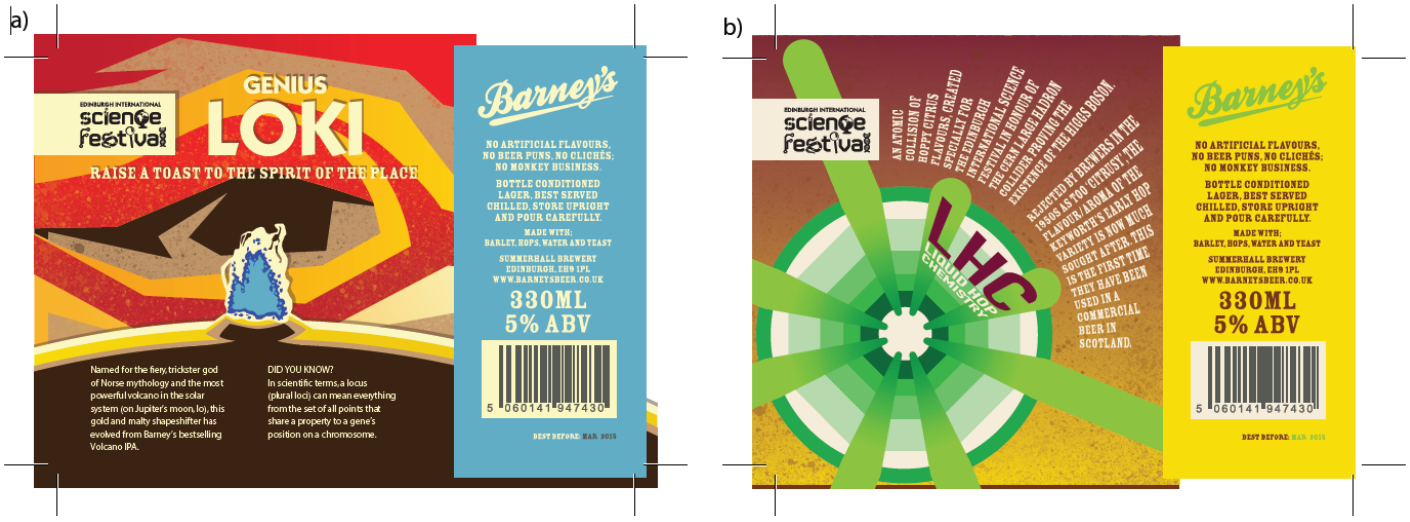

Figure 1: a) Genius Loki label and **b)** Liquid Hop Chemistry (LHC) label.

Bottle/Label	Taste (1-9)*	Quality* (1-9)	Citrus flavour* (1-9)	Purchase intent* (1-9)	Price (£)
LHC	6.9 (0.98)^{A}	7.2 (1.10)^{A}	6.5 1.42)^{A}	6.4 (1.57)^{A}	3.3
Genius Loki	6.5 (1.46)^{AB}	6.8(1.22)^{AB}	4.8 (2.07)^{B}	5.9 (2.33)^{AB}	3.4
Blind	6.4 (1.16)^{B}	6.6 (1.29)^{B}	5.9 (1.8)^{A}	5.5 (1.83)^{B}	3.4

Table 1: Mean scores for taste, quality, citrus flavour, purchase intention, and price. Higher values indicate better (for taste), higher (for quality), more intense (for citrus flavour), and more likely (for purchase intent).
Attributes marked with an * revealed a significant difference between bottle labels at the p<.05 level. Different letters within columns indicate significant differences between conditions.

citrus flavour, in which case only Genius Loki was rates significantly lower. For taste, quality and purchase intent, the Genius Loki received the second highest score, though it was not significantly different from either the LHC or the unlabelled bottle conditions. Only LHC was significantly different at $p<.05$ from the blind tasting condition. No other effects were observed on participants' ratings.

Discussion

Using a between-participants experimental design, the present study demonstrates that the labelling of the bottle from which participants consume beer exerts a significant influence on their judgments of the contents. Specifically, the presence *vs* absence of a label, and perhaps more interestingly, the visual design of that label (in terms of its colour and/or text) influenced the participants' ratings of most attributes being evaluated, being citrus flavour and purchase intent those where larger differences were found. Specifically, the green-yellow LHC label and citrus-inspired text appeared to draw the participants' attention to the fruity notes in the beer, which, as a result, they rated more highly. Such results are consistent with previous research showing that yellow/green, as beverage colours, are associated by consumers with citrusy flavours and refreshment [26-28]. The present results also build on previous findings showing the impact of labelling on people's perception of the taste of beer [17,18]. The effect found on the other attributes could be caused by a *halo effect*, in which, in order to have a consistency among ratings, the final judgment of a certain attribute of a product (say, quality) is affected by all the ratings of all attributes even if they do not have a strong correlation with quality [29].

It should be noted that since both the colours used in the label and the textual description on the label were varied, we cannot say for sure how much of an effect each one of those factors had on the overall results reported here. That said, often consumers do not pay much attention to the verbal information presented in labels [30,31], and it is expected that even less so in such a social event (compared to shopping contexts). Thus it is very likely that, if the participants did pay attention to the label during the evaluation of the beer, they relied on pictorial cues rather than on the verbal details. The design of this study was somewhat constrained (meaning we could not execute a fully crossed experimental design, varying colour scheme and label text independently) given that it was conducted at a Science Festival. Nevertheless, these results add to the literature demonstrating the impact of labelling and packaging colour. Indeed, previous research has shown that when studied individually both the colour of the label or can [3-5], and any textual or verbal information that is provided [19,32], can influence the response of consumers [14,16]. Over potential caveat with the present study relates to the fact that given the nature of the public tasting event where the data was collected, it was simply not possible to collect detailed demographic data. However, informal observation by the first author suggested a wide spread of participants, both in terms of age, and socioeconomic background.

The participants in the present study saw the beer being poured into a glass before they were offered the glass for consumption. Hence, the label was in some sense distanced from the drinking vessel. It therefore remains an interesting question for future research to determine whether an even more pronounced effect of the label would have been obtained has the participants been encouraged to drink from the bottle itself [6]. [1]This point links to broader considerations about the influence of the receptacles from which we always drink beverages, and which, perhaps, has not had the research attention it deserves, given its obvious importance in terms of the overall experience [33]. There has also been growing interest in the product extrinsic factors that influence the beer-tasting experience [6,22,24].

Taken together, the present research adds to the growing body of research on the impact of labelling on product packaging, e.g., see the recent literature on health labeling on wine bottles [34-37]. Intriguingly, Silva et al. [38] have recently investigated the effect of congruent and incongruent product names on liking and emotions when consuming beer or non-alcoholic beer in a bar.

Conclusion

Ultimately, given the clear and significant impact of the labelling on the perception of the contents of a bottle of beer demonstrated in the present study, one might wonder just how much sense it makes for so many beverage providers to conduct the majority of their product testing under conditions where those tasting the product have no access to, or information about, the packaging in which that product will eventually be consumed [7]. We would argue that it makes as much, if not more sense, to ensure (in addition) testing under as realistic consumption conditions as practically possible (i.e., consumers should be encouraged to respond to the product presented in its packaging) as part of product evaluation prior to launch [39]. Indeed, it is a sobering thought to realize how often product and packaging first come together on the supermarket shelf!

Conflict of Interest Statement

The beer samples used in this experiment were kindly provided by Andrew Barnett of Barney's Beer.

Author Contributions

AB and Mountainview Learning designed the experiment. AB oversaw the data collection. CS and AB wrote up the manuscript. Both authors read the final version of the manuscript.

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