Drinking beer in consonant and dissonant contexts: an experimental investigation

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1. Introduction

What can explain the difference in consumers’ perceptions about a beer? Among other factors, the consumption context had been shown to play an important role (Guéguen, 2003; Koch and Koch, 2003). Should then a beer taste different if consumed in different contexts? The answer is yes and relies both on an extension of the assumption that preferences are indeed context-dependent (Tversky and Simonson, 1993), and on the fact that perception is determined by sensorial and beliefs processes (Lee and Ariely, 2006). A beer seller should then take into account those two dimensions when labeling and commercializing the beer.

As reviewed for instance in Bourtolle et al. (2007), Robin et al. (2008) and Harrison and List (2004), the range of existent evaluation techniques for consumers’ perceptions significantly widened, and the difficulty in measuring the influence of context or the role of expectations on beer perception is about selecting the best evaluation strategy. Several studies documented the impact of the context on products appreciation (King et al., 2004, 2007) and recommended to choose either a laboratory controlled and neutral evaluation experiment, or field experiments in which consumers are consuming the product in usual conditions. Following these recommendations, we designed a field experiment allowing to collect data on beer consumers, and to dissociate the two influences. We were also interested to collect cross-data, i.e. to observe not only the influence that the consumption context could have on choices, or the influence that beliefs could have on choices, but also the manner of selecting or guessing the adequate choice and context influence on the ability to guess, as long as the dinking guess or choice is related to a belief attribute.

Therefore, among search, experience and credence or beliefs attributes identified in the theoretical work of Nelson (1970) and Darby and Karni (1973), we defined here a natural field experiment (Harrison and List, 2004) focused on beverages endowed with beliefs attributes, namely beer, selected especially for the pleasure belief related to alcohol consumption.

The theoretical foundation of our contribution is derived from the literature on cognitive natural scanning constraints (Dehaene, 2003), allowing to infer that when receiving (gestative, monetary, visual) information (through tasting or consumption) about a beverage endowed with beliefs attributes, consumers’ attention is more rapidly focused on the valuable (in terms of money or pleasure) attribute in consonant contexts, because redundant available information is efficiently used, whereas in a consonant environment, a huge amount of available information never transforms into useful information (Sutan and Willinger, 2009). This was important to experiment as the natural implication could be an increased consumption of low quality beer in consonant environments, or a higher price (as for example typical beer bars) and a better preference revealing in dissonant contexts. Moreover, this implies that beer seller should carefully evaluate the implications of labeling a drinking context as a beer drinking one.

We review in Section 2 previous work on guessing abilities in different contexts, and extend research on credence attributes to beer consumption. We tempt to model beer choices and dependence on a context in section 3. We present our experimental design in Section 4, main results in Section 5, and discuss and conclude in Section 6.

2. Guessing with negative feedback and credence attributes for beer

Following Arthur’s (1989) work, more and more attention has been devoted in marketing and economics to the idea of positive feedback or consonant consumption contexts. The idea underlying positive feedback is that of a change in the world that makes a following change, of similar character but greater magnitude, more likely: examples stand in the idea of expanding markets or adoption for innovative new products. On the contrary, consumption in consonant contexts or negative feedback describe situations in which individual beliefs and context evolution are of opposite directions (any two consecutive changes have opposite characters, and any expectation about the future state of the world will results in a contrary situation, if generalized).

Using words like positive or consonant and negative or dissonant doesn’t account for good and wrong (Batten, 2004), positive feedback treats with similarity between beliefs and the state of the world (the consumption context) and negative feedback deals with opposite effects in beliefs and the consumption context.

One popular example of expectations coordination somewhat related to beliefs formation in dissonant contexts is the El Farol bar minority problem (Arthur, 1994). The game theory problem is as follows: there is a particular, finite population of people, willing to attend the bar, and willing to have fun. As the bar is quite small, if too many of them do indeed attend the bar, it will be too crowded, and they will not have fun; if not enough of them attend the bar, they will not have fun because the atmosphere will not be enjoyable enough. As all decisions are taken simultaneously, if everyone uses the same pure strategy, it is guaranteed to fail. But people manage to select mixed strategies so that the bar remains open!

Could the El Farol be considered as a beer bar? What is the image that you have in mind? Is it a warmly, noisy atmosphere, in which groups of friends are drinking beer, laughing and having fun, and these are the elements making them detectable as beer drinkers? Or, on the contrary, do you have in mind a cold colored new-generation place, with people talking and paying attention to what they drink? The first example corresponds to a consonant context (or a positive feedback context) for beer drinking (validated in Dacremont and al., 2008), whereas the second is a dissonant one (or a negative feedback one). In a consonant bar, beer drinkers mainly drink beer for its credence or beliefs attributes (enjoy the moment with friends), while in a dissonant bar, one may drink beer especially for the beer itself, i.e. for its search or experience attributes. Therefore, it is more likely that consumers pay attention to the beer they drink, and better fix their own preferences on beer, in a consonant context, because they simply value more the information they have about the product itself, while in a consonant bar, a beer producer for instance could not infer any conclusion about the success of the more consumed beer, because people are drinking the beer pleasure attribute, not simply the beer search or experience attributes.

In Sutan and Willinger (2006, 2009), we indeed identified a stabilization effect in beliefs or preferences in negative feedback or dissonant contexts. In particular, we identified that preference self-enforcements operate in dissonant contexts, as the preference revealing or beliefs formation process is inherently driven to equilibrium in a negative feedback situation.
particularly, as pointed by Arthur (1989), negative feedback tends to stabilize preferences because any major changes will be offset by the very reactions they generate.

According to the economic psychology literature (Franz, 2003), human thinking (or reasoning) continually performs three operations: scanning data for patterns, storing them in memory, and applying them to make inferences and take decisions. There are situations in which the last operation is reached only through careful, elaborate reasoning; but in some other situations, people are able to spontaneously take decisions. Human mind possesses two kinds of beliefs, intuitive and reflective beliefs (Sperber, 1997). No reflection or specifications of any particular justifications are needed in order to hold intuitive beliefs. But when we are able (need) to draw inferences, to process representations (or information) following a scheme or several stages (by using knowledge, common knowledge or reasoning), we hold reflective beliefs. When interacting with a situation, a consumer is usually able to hold these two kinds of beliefs simultaneously, because simultaneously the human mind has the ability to hold representations as (intuitive) beliefs and has a metarepresentational ability (of reflective beliefs). This is one of the consequences of the SNARC (Spatial Numerical Association of Response Codes) concept (Dehaene, 1993): rankings are perceived on a scale on which high rankings are associated with one side and low rankings with the other side. What is essential in this architecture is the order: when switching from a preference \( x \) to another preference \( y \), the order must be respected, i.e. all preferences ranked between \( x \) and \( y \) are bypassed and inversely. Let imagine a consumer making beer choices (ranking preferences for instance) in a negative feedback context: at each choice, the system brings the consumer in an opposite direction. Let suppose that the reasoning procedure (that the consumer is supposed to do when making choices) is made in real time rather than in notional time and is thus observable. Suppose that at the first iteration the consumer switches from \( x \) to \( y \), with \( x < y \); at the second iteration the consumer switches back in the direction of \( x \), to \( z \), with \( x < z < y \) and then back to \( t \) in the direction of \( y \), with \( x < z < t < y \) and so on, and the process converges to an equilibrium that is likely to be situated between \( z \) and \( t \). Therefore, at every switch, the equilibrium preference is bypassed; the consumer scans the equilibrium several times. Repeated scanning helps transforming reflective into intuitive beliefs. On the contrary, in a positive feedback situation, equilibrium is outside the sequence of intermediary steps and more and more iterations do not help the consumer to better find it. This is the intuition of the argument according to which available information (on tastes, preference ranking etc... in dissonant contexts transforms in more useful information (because preferences are scanned several times and this ranking is stored in mind), whereas in consonant contexts, available information only indicates the preference direction (the consumer is never confronted with the same ranking twice, and therefore cannot durably fix it through transformation of his reflective beliefs in intuitive beliefs) (all guessing abilities considered equal at the standard 2 steps of introspection level documented for instance in Camerer (2003)).

Some consumers derive utility from drinking beer in specific contexts, such as typical beer bars, or, on the contrary, new generation cold designed bars. Means of verifying the consonance of a context with the typical beer bar representation can be necessary in order to make sure that context put into practice by the beer seller, for instance, functions efficiently, because consumers can ask themselves whether particular marketing practices were used. In particular, according to the contexts created, the beer's overall perceived quality will change, as well as subsequent coherent consumption choices, and therefore, the context consonance or dissonance with the beer is a component of the consumption itself. Consequently, some beer sellers can consider that drinking beer in a specific context induces an increase in the perceived beer quality and therefore expect a price premium, as long as a minimum standards context for beer drinking regulates the conditions for market access. We can consider them as informational instruments that determine, at least partially, the credibility of the contextual claims in consumers' minds. The types and levels of search and experience attributes required by minimum quality standards may not correspond to those consumers use to infer the credibility of a beer contextual claim. We explore the extent to which the beer contextual claim interact with a beer's other quality attributes in determining the likelihood of success in marketing beer-technical or beer-new generation spent hours in a bar.

In line with Grolleau and Caswell (2006), if consumers perceive a correlation between a contextual attribute, such as the pleasure you can expect while drinking the beer, and other product attributes they can evaluate (flavor, alcohol, quality, price...), the efficiency levels of such supporting attributes can be a substitute for direct verification of pleasure attributes or, a complement to enforce them (verifiable attributes that can be inspected before consumption or evaluated after consumption, can support the credibility of the contextual claim, without strictly proving its truthfulness; similarly, the credibility of a contextual claim can be damaged by a failure to provide adequate levels of other verifiable attributes). We could therefore suggest that the success of typical beer bars or new generation beer bars requires a mix of contextual and other verifiable attributes that together signal credibility.

Understanding the impact of a context on beer choices and guesses about beer attributes is related to the analysis of the overall information available to consumers (contextual, visual, tasting, monetary...). Beer drinkers are likely to behave differently in different contexts and to fix their attention on different attributes. Beer sellers are likely to take this into account when searching for clients and defining the decoration of their bar. Caswell and Mojudzka (1996) argue that an experience or credence attribute can be transformed into a search attribute via labeling, and that when the contents of contextual labeling. Credence attributes, such as context setting, are difficult to induce because the cost of defining, measuring, and verifying them can be high. A potential remedy to the measurement problem is to use a signal. Consumers can search for the typical beer bar, which can be a signal for the pleasure attribute, and thereby avoid excessive transaction costs in finding and evaluating pleasure from several beers. Of course, the signal may convey information about multiple attributes. Even though information about credence characteristics may be disclosed, consumers may have difficulty in processing it because of time constraints or a lack of specific skills. Contextual label design matters because of these information problems. Well-designed context labels can serve as cognitive supports that economize on the attention of consumers and on transaction costs (Valcichin, 1999; Wynne, 1994). An essential element of this decision problem is to measure the extent to which different drinking context influence choices and beer valuations.

3. Modeling contextual beer drinking

The most familiar way in which credence attributes of a product are formed and transmitted is social rank signaling (Grolleau and Lakhal, 2008). Consider the case of a consumer willing to signal high social status as a result of buying a bottle of beer, being part of those having noticeable beer drinking. In this case, as a shortcut related to the social representation, he may be willing to spend time in typical bars. In line with Lancaster’s (1966) framework, and adapting Grolleau and Caswell (2006)'s model on eco-labels to beer and its social credence attributes, the consumer’s utility from drinking beer is not determined by the beer itself, but by the other characteristics the beer provides. Here these characteristics are both the credence contextual characteristics related to social signaling, and the beer’s related search and experience characteristics. To model the choice between two places to consume beer, and consumer behavior in such places, assume the typical consumer derives utility from: (a) consuming the characteristics of the two beers – a beer X consumed in a new generation bar at a cost C, and a beer X’ consumed in a typical bar at a cost C’; and (b) consuming the quality (the consonance) of
the context Q. We refer mostly here to costs C and C' as calculated in terms of time, of cognitive involvement or efforts spent to remain attentive to the beer.

Several factors play a role in the consumer’s utility: the utility resulting from the consumption of the experience and search attributes of X or X', i.e., ∂U/∂X versus ∂U/∂X'. Most generally, (∂U/∂X' - ∂U/∂X) could be positive, zero, or negative; the context quality improvement in consonance resulting from drinking X or X', i.e., ∂Q/∂X versus ∂Q/∂X'; the utility resulting from the context quality improvement in consonance, i.e., ∂U/∂Q.

Assume that consumer’s utility increases with drinking the beers X (∂U/∂X>0) or X' (∂U/∂X'>0), and enjoying the context (∂U/∂Q>0). As noted above, the beer consumed in the typical bar could have related search and experience characteristics that are better, equivalent or worse than the beer consumed in the new generation bar. Moreover, we assume that X and X' are both harmful in the context consonance perception (∂Q/∂X>0 and ∂Q/∂X'0), but the beer consumed in the typical bar (X') is less harmful than the one consumed in the new generation bar (X). This is due in particular to cognitive constraints exposed earlier: the more a consumer drinks beer (alcohol) in a typical bar, the more difficult is the quality perceived consonance of the context, also, the more a consumer drinks beer (alcohol) in a new generation bar, the more difficult is the quality perceived consonance of the context, but within the typical bar the consumer still remains in the path, while in the new generation bar, the consumer is likely to pay more attention around, and to notice dissonances and the intrinsic quality of the beer. The quality in perception of the context consonance Q is decreasing with X and X' more slowly with X' than with X, so that ∂Q/∂X < ∂Q/∂X' < 0. The perception improvement of the context’s consonance with X' is ∂Q/∂X' - ∂Q/∂X. Because of differences in related search and experience characteristics, the expected utility from consuming an beer in the typical bar could be higher than (∂Q/∂X' - ∂Q/∂X), the same as (∂Q/∂X' - ∂Q/∂X), or less than (∂Q/∂X' - ∂Q/∂X) the expected utility from consuming a beer in the new generation bar.

Under these assumptions, the consumer’s problem is a standard maximization of utility Max U(X, X', Q(X, X'), X, X'), under a constraint of time (or cognitive availability or consumption involvement) CX + C'X' = I, where U is a quasi-convex utility function and I is the consumer available time, its cognitive and involvement constraint confronted to consumption of X and X'. The Lagrangian function is therefore written as F(X, X', Q, α) = U(X, X', Q(X, X')) + λ(CX + C'X' - I), where λ is the Lagrange multiplier. The partial derivatives are usually computed as Fx = ∂U/∂X + ∂U/∂Q*∂Q/∂X - ∂C/∂X and Fx' = ∂U/∂X' + ∂U/∂Q*∂Q/∂X' - ∂C/∂X'. We therefore obtain Fx = Fx' = ∂U/∂X + ∂U/∂X' + ∂U/∂Q*(∂Q/∂X - ∂Q/∂X') - λ(1 - ∂C/∂X), if ∂U/∂X > ∂U/∂X'0 and ∂U/∂Q*(∂Q/∂X' - ∂Q/∂X)0, then C - C' = α > 0, as consumers are spending a premium time, or paying a premium implication α in the typical bar (spending cognitive efforts as indicated in Section 2, because of the difficulty to fix the attention on the beer, or paying money). Therefore, α = C' - C = (1 - ∂U/∂X - ∂U/∂X') + ∂U/∂Q*(∂Q/∂X' - ∂Q/∂X)/λ, with λ = (∂U/∂X + ∂U/∂Q*∂Q/∂X)/C = (∂U/∂X + ∂U/∂Q*∂Q/∂X)/C.

Assume a configuration for the market of beer bars in which contextualizing a bar as a typical bar incur higher costs (because of the market trend to new generation bars, expectations of attendance, and cognitive constraints as cognitive computing costs). Here the marginal overall cost of X', is greater than that of X. Therefore, a beer seller will create a typical bar only if the difference between the marginal costs of the two beers is strictly less than α, i.e., the marginal value of the utility resulting from the contextual consonance improvement of the last unit (∂U/∂Q*∂Q/∂X' - ∂Q/∂X)/λ) plus the marginal utility resulting from the increase of related search and experience attributes of the last unit (∂U/∂X' - ∂U/∂X). In addition to the marginal costs, this cost is calculated as (C - C') - α - ∂U/∂Q*∂Q/∂X).

First, consider the situation shown in row B where the level of related search and experience attributes of the two products is equivalent (∂U/∂X = ∂U/∂X'), and the exclusive focus is on the effect of context consonance (∂Q/∂X*∂Q/∂X' - ∂Q/∂X' + ∂Q/∂X). This is the situation analyzed if the two beers are indeed identical and attribute interactions are ignored, and our main case of interest, on which the experimental design will be constructed in Section 4. There are four cases:

Cell B1. Creating the typical bar generates a high consonance quality improvement, and consumers value it highly. The overall impact on α is significant, and beer seller will be likely to create typical beer bars. In this case, the experience quality of the beer has to be high: if consumer’s valuation is effective in terms of time, and the intrinsic (experience) quality of the beer is low, time allows them to fix preferences and this would be noticeable; if the valuation is effective in terms of cognitive efforts, the experience quality of the beer has to be high to support the consonance because consumers are indeed paying attention to the beer itself and put extra efforts into practice to fix preferences.

Cell B2. Creating the typical bar has a low impact on context quality, but consumers value this small impact highly. The overall impact on α is significant, and producers may be likely to do it even though the overall consonant improvement in quality is modest. In this case, the experience quality of the beer has to be really high, because consumers are less likely to stay in the path and to diverge from the pleasure attribute.

Cell B3. The consonant improvement resulting from creating the typical bar is high, but consumers place a low value on this change in context quality. The overall impact on α is weak: eating such a bar can improve context quality significantly, but the seller may not be willing to do so, because consumers are already focused on experience attributes of the beer rather than on pleasure.

Cell B4. Creating such a bar generates a small contextual improvement, but consumers do not value the improvement. The overall impact on α is insignificant, and sellers will be unlikely to create the bar, because the pleasure attribute is not valued.
In these 4 situations, consumers will behave differently and will have subsequent different choices; moreover, as their cognitive abilities are differently activated, they are likely to better or worse valuate the experience attribute itself, and to guess about its intrinsic quality. Creating such a typical bar or not may indeed influence consumers, and the intention of the bar seller is crucial: it is all about selling high quality pleasure or high quality beer!

There are two other interesting cases, but we intend to experiment them in another paper. There is the situation where the level of related search and experience attributes of X is higher than for X (\(\Delta U/\Delta X' - \Delta U/\Delta X\) is positive). In all four cases (cells A1-A4), the higher level of related search and experience attributes for X has a positive impact on the likelihood that typical bars will be created compared to the base case of no difference in these attributes (cells B1-B4). Of particular interest is cell A4. If both the effect of the contextual improvement (\(\Delta Q/\Delta X' - \Delta Q/\Delta X\)) and the valuation of the improvement (\(\Delta U/\Delta Q\)) are low or close to zero, the marginally consonant bar may still be created if the search and experience attributes are significantly better than for X. There is also the situation where (\(\Delta U/\Delta X' - \Delta U/\Delta X\)) is negative, i.e., the level of related search and experience attributes of X is significantly lower than for X. In all cases (cells C1-C4), the lower level of related search and experience attributes for X has a negative impact on the likelihood the bar will be created compared to the base case of no difference in search and experience attributes (cells B1-B4). Cell C1 is an indeterminate case in terms of whether the typical bar will be created. The combined effect of a high contextual improvement (\(\Delta Q/\Delta X' - \Delta Q/\Delta X\)) and the high valuation of the improvement (\(\Delta U/\Delta Q\)) is likely to encourage the creation of the typical bar. However, the lower level of related search and experience characteristics is likely to discourage such creation. The stronger effect determines whether the bar is created.

4. Experimental design

140 subjects took part in our experiment in December 2008. We compared 2 consumption contexts (a consonant and a consonant one) that were designed under the form of 2 experimental bars, installed at the Burgundy School of Business during 3 days (figure 1), in two contingent rooms. One of the bars was beer-consonant, and the other beer-dissonant (consonance and dissonance material elements – music, decors, images... were defined on the basis of a context-test conducted in May 2008 with 168 subjects as described in Dacremont and al., 2008). Subjects were recruited on a voluntary basis, through wall advertising signaling 2 bars opened in the school and they were invited to join. They were free to choose the bar in which they wanted to spend some time. Each bar had a capacity of 8 people. In each bar, subjects were offered to choose between beer, soda or coffee. They were served 3 cups of their favorite drink, and when this was beer, 2 cups were containing for instance an alcohol beer and one non-alcohol beer, in various orders. They were asked to indicate the most alcoholized, the best quality and the most aromatic beer, as well as their perception about the bar environment. They were informed that between those guessing right, 10% of them will randomly be chosen to earn some prizes.

According to our discussion from Section 2 and Section 3, there might be differences in guessing about experience and credence attributes. Imagine the consumer is looking for experience attributes. When consuming in a new generation bar, as the context is dissonant, attention and available cognitive space are high, therefore, the consumer is immediately able to recognize experience attributes as aroma (as they are actively looking for differences). The reverse situation may occur in the typical bar, in which attention being scarce, experience attributes are not noticed. As for credence attributes, a consumer in the dissonant bar is cognitively activated: he is paying attention to the beer, his expectations about what a beer could bring in terms of pleasure are lucid. Once installed in the bar, there is a dissonance between these beliefs and the context and this can be misattributed to the beer. Therefore, the pleasure attribute could be evaluated in terms of experience, and we join the previous guessing algorithm. In the typical bar, credence attributes are consonant with the context, and as soon as this consonance is validated, attention is nearly off. Consequently, the main hypotheses, derived from the previous discussions and model, are: a) there will be differences in bar’s frequention; b) people will behave differently in ordering drinks in each bar; c) the number of people with right guesses will be higher in the new generation bar; d) the context will be correctly perceived.
5. Main results
The results show that a) the beer was the most ordered beverage, and b) subjects managed to guess better about the beer pleasure attribute in the dissonant bar. We here report these results in detail. We will soon provide more analysis on these results. The different sample is always the most flavored and the less alcoholized.

R1: Slightly more participants frequented the typical bar (as reported in Figure 2).

R2: Beer was the most ordered drink (as reported in Figure 3).

R3: Participants differently identify drinks’ attributes in different contexts (as reported in Figure 4).
R5: Participants misidentify more alcohol attributes in the typical bar (as reported in Figure 7 and Figure 8). They are still better to identify alcohol in the new generation bar.

R6: Participants better succeed to identify flavor attributes in the new generation bar (as reported in Figure 5 and Figure 6).
6. Discussion and conclusive remarks

Overall, this paper suggest the impact of different levels of related search and experience attributes on the likelihood of creation of typical bars, in cases where this creation has different consonance effects and these effects are valued at varying levels by consumers. Within different levels of consumer valuation, typical bar creation and marketing will be more likely where the search and experience attributes of beers consumed in typical bars are superior to those of new generation bars.

We focused on how quality and information levels for search and experience attributes influence the consumer’s evaluation of the acceptability of a consonant context, which signals the credence attribute of the pleasure you can experience while drinking the beer. Several steps are required: bar keepers signal the credence attributes of pleasure through use of consonant context. The level of this credence attribute is a promise made by the sellers that is unverifiable by consumers; consumers form expectations on the levels of search (e.g. brown beer) and experience (e.g., better taste) attributes of the beer; consumers assess the search and experience attributes by consuming the beer. Consumers find that (a) the quality of the related search and experience attributes is greater than or equal to their expectations, or (b) the quality of the related search and experience attributes is lower than their expectations. Consumers whose expectations are met project positive feedback onto the other promises made by the seller, e.g., the pleasure or typicality claims. Consumers whose expectations are not met project negative feedback onto other claims made by the seller, especially unverifiable ones such as the pleasure.

When could the labeling through context be effective for beers? This can be simplified to a two-dimensional attribute space: the level of contextual characteristics, and the typicality of search and experience attributes. To be certified to a particular typicality standard, a beer bar must have consonant, experience and search characteristics with a minimum level.