



## Developing a reduced consumer-led lexicon to measure emotional response to beer



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### ABSTRACT

Previous researchers have recently recommended and utilised consumer-led lexicons to measure emotional response. This study further advances this approach by (1) making the lexicon generation process more efficient by using consumer focus groups as opposed to individual consumer interviews and (2) decreasing the number of responses required from each consumer by reducing the lexicon to categories of similar terms. In response to 10 lager samples which were manipulated in order to control selected sensory properties, focus groups generated a lexicon of 44 emotion terms. This lexicon was reduced to 12 distinct emotion categories using linguistic checks and cluster analysis. Naïve beer consumers ( $n = 113$ ) used these 12 emotion categories to rate their emotional response to the 10 samples. The reduced consumer-led lexicon was validated through its ability to discriminate across samples as well as show differences in emotional response between genders and age groups. The 12 emotion categories were found to discriminate well between samples, although a number of categories grouped samples similarly. However, differences in responses to otherwise comparable emotion categories were identified between genders and age groups, highlighting the importance of including all emotion categories so as to not over-reduce the lexicon and risk missing out on valuable emotion data.

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### 1. Introduction

Emotion research in sensory and consumer science has gathered significant momentum over recent years. This is in no small part due to the increased reliance on emotional characteristics of products for a differential advantage in the modern marketplace where products are of similar quality and price (Schifferstein, Fenko, Desmet, Labbe, & Martin, 2013) and comparable in technical and performance properties (Churchill & Behan, 2010). As interest in this research area continues to grow, the need for effective emotion measurement methodologies is increasing.

To date, the majority of sensory and consumer emotion research has focussed on self-report measures which require the consumer to directly indicate their emotional response to the given stimulus. In verbal self-report, this often requires an emotional lexicon for the consumer to refer to. Such lexicons can be divided into

two categories: pre-determined or consumer-led. A prominent example of a pre-determined emotion lexicon is EsSense Profile<sup>®</sup> (Chaya, Pacoud, Ng, & Hort, 2015; Jaeger, Cardello, & Schutz, 2013; Jaeger & Hedderley, 2013; King & Meiselman, 2010; King, Meiselman, & Carr, 2010; King, Meiselman, & Carr, 2013; Ng, Chaya & Hort, 2013; Piqueras-Fiszman & Jaeger, 2014a; Piqueras-Fiszman & Jaeger, 2014b). With considerable consumer input, emotion terms derived from pre-existing affective questionnaires were narrowed down to a final questionnaire of 39 terms which can be applied to a range of foods and beverages. The effectiveness of EsSense Profile<sup>®</sup> for differentiating emotional response both between and within product categories was demonstrated by King and Meiselman (2010) using both qualitative (checklist) and quantitative (rating) approaches.

The major advantage of using pre-determined emotion lexicons like EsSense Profile<sup>®</sup> for researchers is that such lexicons are general and, as such, can be applied to any group of products without the initial outlay of developing a product-specific lexicon. However, some emotion terms may be of little or no relevance to

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certain product categories, causing an already lengthy form to be longer than necessary and perhaps even confusing respondents (Jaeger et al., 2013). Ng et al. (2013) reported six such redundant EsSense Profile® terms in the emotional assessment of a set of blackcurrant squashes. More significantly, terms may be excluded that are characteristic of the emotional response to certain product categories. A number of such omissions were identified by Ng et al. (2013) for their range of blackcurrant squashes (e.g. comforted, curious, disappointed). King et al. (2010) noted that the exclusion of characteristic terms can be ameliorated by modifying or expanding the pre-determined list. Of course, this is associated with additional effort and expense for the researcher, negating somewhat the advantage of employing a pre-determined lexicon.

The alternative to using a pre-determined lexicon is to develop a consumer-led lexicon (e.g. Manzocco, Rumignani & Lagazio, 2013; Ng et al., 2013; Thomson, Crocker, & Marketo, 2010; Spinelli, Masi, Dinnella, Zoboli, & Monteleone, 2014). In response to products of interest to the researcher, consumers generate an emotional lexicon in their own words. This approach incurs increased costs in both time and resources as compared with pre-determined lexicons but has the advantage of excluding irrelevant terms, thus shortening the form and also removing potential consumer confusion (Jaeger et al., 2013). In addition, relevant terms are less likely to be left out, thereby increasing the discrimination ability of the lexicon (Ng et al., 2013). Approaches for generating consumer-led emotion lexicons have yet to become established, presenting the opportunity to further improve on previously published methods.

Recently, Ng et al. (2013) generated and used a consumer-led emotion lexicon to discriminate between the emotional response to 11 commercial blackcurrant squash products. Twenty-nine consumers generated their own individual lexicons in one-to-one interviews. The consumers then used check-all-that-apply (CATA) on their own personal list of terms to indicate their emotional response to all 11 products. Synonyms were combined and any terms checked by fewer than five consumers were excluded, giving a final lexicon of 36 terms. This approach was found to differentiate between the products based on their emotional profiles. However, one-to-one interviews were labour-intensive and the researchers recommended that small focus groups of subjects would be more efficient with the added benefit of enabling group discussion for deeper probing of consumer language. In addition, it was proposed that a quantitative rate-all-that-apply (RATA) approach would open up more opportunities for statistical analysis compared to the qualitative CATA approach. The present study implemented these suggestions by, firstly, conducting group interviews to generate a consumer-led emotion lexicon in order to increase efficiency and promote discussion. Secondly, consumers used RATA as opposed to CATA to record the emotional response to increase the capability for statistical analysis of the data.

A disadvantage of many verbal self-report approaches is that they require consumers to make a large number of evaluations per sample (e.g. 39 in EsSense Profile®; 36 in Ng et al. (2013)), leading to potential consumer fatigue and boredom. Such a large number of emotion terms can also make statistical product comparisons unwieldy. In order to allow an easier and quicker test for the respondent, Porcherot et al. (2010) developed a shorter version of the Geneva Emotion and Odor Scale (GEOS; Chrea et al. (2009)) questionnaire with a reduced number of measurement scales. GEOS consists of 68 affective terms which were reduced to a set of 6 summary scales through factor analysis. Porcherot et al. (2010) advanced this approach by having participants rate a series of 3 representative terms for each of the 6 GEOS dimensions instead of rating the 36 terms individually for each sample (ScentMove™). In spite of the fact that half of the evaluations were required as compared to the original form, similar product

information was obtained by the GEOS and ScentMove™ questionnaires. The present study also takes this approach of reducing the number of consumer responses. However, instead of using factor analysis to reduce the terms to a set of summary scales, similar terms were grouped into emotion categories using cluster analysis. The aims of grouping terms were to reduce potential consumer fatigue and boredom and to increase the ease of subsequent product comparisons.

The effectiveness of any emotion lexicon is assessed by its ability to discriminate between the emotional responses to samples of interest. This validation is of particular importance when assessing the effectiveness of a reduced form because there is the potential to lose important emotional information. Therefore, the present study refers to the ability of emotion categories to discriminate between the selected samples to validate the reduced emotion form. Previous studies have implicated sensory properties in driving emotional response for a range of product categories (chocolate in Thomson et al. (2010); blackcurrant squashes in Ng et al. (2013); beer in Sester, Dacremont, Deroy, and Valentin (2013); chocolate and hazelnut spreads in Spinelli et al. (2014); coffee in Bhumiratana, Adhikari, and Chambers (2014)). However, these studies made use of commercial products with no experimental control of sensory properties and many associated potential sources of variation. An understanding of the direct relationship between products' sensory properties and emotional response is vital for the proposed applications of emotion methodologies for product development (King & Meiselman, 2010). Therefore, the present study exerted a degree of experimental control by manipulating individual sensory properties of commercial lagers. In using samples representing a wide range of sensory properties of beer, the groupings presented here were intended to cover the whole emotional space of this product category, with no redundancy. The success of the reduced consumer-led lexicon was judged on its ability to discriminate between the emotional responses elicited by each sample based on their differences in selected sensory properties.

As well as discriminating between samples, a successful emotional lexicon should permit other investigations around emotional response. Studying the emotional response to beer as a product category is of particular interest when considering differences between consumer groups. Males are more frequent beer consumers than females (Mintel, 2013; Serra & Aranceta, 2003). There is also a decline in the frequency of beer consumption with age (Mintel, 2013; Serra & Aranceta, 2003). Perhaps differences in emotional response to the sensory properties of beer can go some way towards explaining this. Therefore, a further source of validation for the reduced consumer led lexicon was to assess the effectiveness of this approach for investigating differences in emotional response between genders and age groups. In addition, emotions have previously been found to discriminate beyond liking (Ng et al., 2013) and this study was particularly focussed towards exploring if this increased discriminability of emotions over liking could be extended to differences between consumer groups. Familiarity has also been found to have an important bearing on consumer experience (Sester et al., 2013). It was anticipated that there may be a particular effect of familiarity between consumer groups in their reported emotional responses.

The main objectives of the study presented here were twofold: (1) to create an approach for the development of a product category-specific reduced consumer-led lexicon utilising group interviews and cluster analysis, and (2) to validate the use of a reduced consumer-led lexicon by evaluating its ability to (a) discriminate across a range of beer samples specifically designed to elicit specific sensory properties, and (b) reveal differences in emotional response across different consumer segments related to gender and age.

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