

**Visual Complexity of eco-labels and Product Evaluations in Online Setting:
Is simple always better?**

Abstract

Noticeable and comprehensible eco-labels are needed to promote sustainable products. So far, researchers have mostly studied consumers' evaluations of eco-labels, without analyzing eco-label's visual complexity. Through two experimental studies this paper proposes that consumers' evaluations of sustainable products increase when zoom-in feature provided in online stores, and they are labelled through eco-labels that have high design and low feature complexity due to increased perceptual fluency. The findings demonstrate that while design complexity increases consumer product evaluations due to increased perceptual fluency, feature complexity increases - instead of decreases - consumers' evaluations due to conceptual - and not perceptual - fluency. Consequently, it is advised to design and adapt eco-labels easy-to-understand, visually eye-catching and highly visible (i.e., in large size) to enhance ease of processing and increase product evaluations.

Keywords: Eco-label, Design and feature complexity, Processing fluency, zoom-in feature, Sustainable products

Declarations of interest: None

1 Introduction

Millions of households started buying groceries online for pickup or home delivery with the coronavirus pandemic and many will continue using e-commerce options after the crisis passes (UNCTAD, 2020). Compared to the offline market, by selling online, retailers can better inform consumers about food healthiness, through the presence of nutritional label, and about food sustainability, through the presence of eco-labels, using image interactivity technology, such as close-up pictures or *zoom-in* functions (Kim, Fiore and Lee 2007) with the aim of allowing consumers to better distinguish between sustainable and conventional products.

Eco-labels are symbols that are designed to identify and differentiate products with positive environmental and social impact (Darnall et al. 2018; Thøgersen et al. 2010) and to reduce uncertainty about the validity of consumers' green purchases (Atkinson and Rosenthal 2014). Despite eco-labels are not one of the essential purchase decision criterion for most consumers yet, their presence was proven to positively affect company reputation, trust, and purchase intentions (e.g., Grankvist and Biel 2007; Potter et al. 2021). Accordingly, several brands, as for example Unilever (i.e., using MSC eco-label for frozen fishes, and Rainforest eco-label for ice-creams), are promoting their sustainability through eco-labels placed in front of pack and using large size. Even retailers are promoting their private labels through the presence of one or more eco-labels (Asche et al. 2015). For instance, Albert Heijn, the largest Dutch supermarket chain, has launched its own environmentally friendly logo for fruit and vegetables, complementing its quality labels for pork and dairy products (Dutch News 2021). E-commerce giants, as Amazon, also partnered with trusted third-party certifications and launched climate pledge friendly badge to signal sustainable products in France, Germany, Italy, Spain, and the UK in 2020.

However, one of the principal barriers to eco-label adoption is that consumers have difficulties in recognition and understanding eco-labels on product packages (Thøgersen 2000). We propose that in online setting, a tool for increasing eco-label visibility, thus diminishing the gap between e-commerce sites and physical stores, can be the presence of the zoom-in feature that

allows visitors to zoom-in on specific details on the product image and to get a feel of the product (Kim et al. 2007).

Moreover, the massive presence of different eco-labels in the market (i.e., more than 450 according to the EU commission), each of them certifying a different type of sustainability through the presence of different combination of visual design, may confuse consumers and making their presence not effective.

Consequently, eco-labels need to capture consumers' attention in likable ways, and their visual complexity plays a central role in this regard, as it has been demonstrated that visual complexity affects consumers' evaluation in several marketing domains (e.g., Creusen et al. 2010; Pieters et al. 2010; Miceli et al. 2014; Orth and Wirtz 2014). Nevertheless, despite every eco-label has a logo, the effects of their logo visual complexity have hardly been studied empirically. In particular, previous studies (e.g., Tang et al. 2004; Rihn et al. 2019) did not consider the isolated effect of eco-label design on product evaluation, moreover they did not analyze the mechanism explaining this relationship. Consequently, the objective of this research is to verify if eco-label's visual complexity influences consumers' evaluations of the labelled products. Specifically, building upon the theoretical distinction between *design* (i.e., design elaborateness of a visual stimulus) and *feature* complexity (i.e., number of details and variations of a visual stimulus) proposed by Pieters et al. (2010) and on a processing fluency account (Reber et al. 2004; Lee and Labroo 2004), it is proposed that the effects of the two forms of complexity affect (labelled) product attitudes and willingness to buy, and these relationships are driven by feelings of perceptual fluency. However, the hypothesized effects can be verified only if the eco-labels are noted by consumers and, as already underlined, in online setting the zoom-in feature (Kim et al. 2007) on eco-label can be a useful tool for increasing its attentiveness and therefore its recognition. Consequently, another objective of the present research is to test how consumers assess products with an eco-label when its visibility increases considering the zoom-in feature in an online setting.

The proposed results offer three major contributions to advancing extant scientific knowledge. First, we contribute to the literature on sustainable consumption showing how eco-label visibility and visual complexity can positively affect sustainable product evaluations. Second, we contribute to the growing body of literature on visual complexity that seeks to understand the mechanism behind the relationship between visual complexity and consumer evaluations (e.g., Miceli et al. 2014) via processing fluency in the context of eco-labels. Finally, we contribute to the logo design literature (Van Grinsven and Das 2014; Henderson and Cote 1998; Miceli et al. 2014) as, to the best of the authors knowledge, the present research is the first that analyzed the effect of feature complexity of eco-label logos on product evaluations. Our research also offers practical implications for marketing communication managers and retailers looking for new ways to promote sustainable products, and particularly for those managers who are interested in empirical evidence supporting their decision to invest in right eco-labels. In particular, according to our results, the most effective eco-labels are those characterized by high visibility and by a visual design easy to process.

2. Eco-labels Design

As consumers' environmental sensitiveness increases, more fast-moving consumer goods (FMCG) manufacturers are using eco-labels on their products, as it has been demonstrated that eco-labels positively affect product evaluations (e.g., Van Loo et al. 2015; Donato and D'Aniello 2021). There is extensive literature about European consumers' choice of labelled products, as for example Marette et al. (2012) in France, and Janssen and Hamm (2012) in six European countries. Van Loo et al. (2015) in Belgium firstly, and Meyerding and Merz (2018) in Germany later, analyzed visual attention to different eco-labels through conjoint and eye-tracking studies, whereas other studies compared in Spain (de Magistris and Gracia 2016) and in Belgium (Rousseau 2015; Van Loo et al.,

2014) preferences of products with eco-labels that have different sustainability claims. Eco-labels have been extensively studied also in Italy, for example Donato and D’Aniello (2021) found that Italian consumers awareness and understanding of eco-labels is quite limited. A similar result has been found by Aprile and Punzo (2021), according to which Italian consumers are sensitive to the presence of eco-labels especially if they are aware of the meaning and the content of the labels. Then, it is of paramount importance to define actions aimed at increasing Italian consumer awareness of eco-labels. We propose that one of these actions can be to increase eco-labels’ visibility on product packages through a zoom-in feature in online setting.

Additionally, as a policy tool, eco-labels provide information about a product’s sustainability characteristics (Delmas et al. 2013), and therefore their graphical elements, textual information (if present) and colours are aimed to certify a sustainable meaning. However, despite previous studies have shown that the graphical elements characterizing a logo have a significant impact on recognition, emotional responses and attitudes of consumers (Machado et al. 2015; Henderson and Cote, 1998; Miceli et al. 2014), only few studies addressed how eco-labels logo design affects consumers evaluations. For example, Tang et al. (2004) found that both visual and verbal elements of eco-labels affect the purchase of sustainable products, Rihn et al. (2019) noted that compared to textual element, logo eco-labels are able to capture more visual attention. Finally, Coderre et al. (2021) underlined the benefits of adopting food labels presenting logos easy to recognize and understand. However, no previous research analyzed how visual complexity of eco-labels’ logo affects consumers’ evaluations of labelled products.

3 Hypotheses development

In order to be effective, eco-labels should at a minimum be noticed by consumers (Thøgersen 2000). Despite previous literature documented cases in which the presence of eco-labels creates negative evaluations, and a sort of eco-penalty (e.g., Abraben et al. 2017; Delmas and Lessem 2017), recent eye-tracking studies (Guyader et al. 2017; Rihn et al. 2019; Song et al. 2019)

demonstrated that, once noted, eco-labels can positively affect consumers behavior, proposing different solutions to retailers in order to increase eco-label visual attention. In the online setting a possible tool for increasing eco-labels visual attention can be the zoom-in feature (Kim et al. 2007) on product packages. Accordingly, we propose that the possibility of increasing eco-label visibility through a zoom-in feature aimed at magnifying the eco-label present on a product package in the retailer website, can increase consumer's product assessment of the product compared to the presence of the product without any increased eco-label visibility.

H₁: Higher visibility of an eco-label through the presence of zoom-in feature generates a superior product evaluation compared to a condition of lower visibility of an eco-label (i.e., absence of zoom feature).

Once noticed, as other visual stimuli, eco-labels are processed by consumers. Previous marketing literature (e.g., Henderson and Cote 1998; Miceli et al. 2014) analyzed visual dimensions of brand logos that are better evaluated by consumers. In particular, Pieters et al. (2010) discussed two dimensions of visual complexity for print advertisements: *design complexity*, which concerns elaborateness of the design regarding shapes, objects, and patterns, and *feature complexity*, that refers to the extent an advertisement contains more details and variations in their basic visual feature, colour and luminance (Pieters et al. 2010). The authors indicated that feature complexity has a negative effect on advertising attention and likability, whereas design complexity has a positive effect on them. Van Grinsven and Das (2014) also investigated design complexity of brand logos and found that exposure increases logo recognition and positively impacts brand attitudes when logo has a complex design. More recently Madan et al. (2018) investigated the relationship between affect and ratings of visual complexity on visual stimuli, finding a robust positive correlation.

Nevertheless, as general printed advertisements, also eco-labels can be distinguished on the basis of their design and feature complexity, and therefore it is important to verify if these two

forms of complexity can affect consumers' evaluations of the labelled product. In particular, extending results of previous research on printed advertising and logo design to eco-labels evaluations, it is possible to expect that eco-labels characterized by low feature complexity, but high design complexity are preferred by consumers, and as such, this preference can be reflected in terms of product evaluations. We propose that these two effects can be explained via processing *fluency*.

Fluency is defined as the ease of elaboration of a stimulus (Reber et al. 2004), and previous research has largely demonstrated its key role in facilitating consumer processing of visual marketing stimuli such as brands, labels, package or logos (Morgan et al. 2021; Mauri et al. 2021; Gomez et al. 2017; Seo and Scammon 2017; Miceli et al. 2014). In particular, it is possible to distinguish between two types of fluency: *perceptual fluency*, defined as the ease to elaborate the visual attributes of the stimulus (Bornstein and D'Agostino 1992), and *conceptual fluency* defined as the ease to elaborate the meanings associated with the stimulus (Shapiro 1999).

Since the two dimensions of complexity defined by Pieters et al. (2010) refer to visual (and not conceptual) design, this research proposes that both of them are related to the perceptual fluency. Accordingly, it is claimed that the design complexity of an eco-label positively affects consumers' evaluations of the product, in terms of attitude and willingness to buy, via perceptual fluency. Design complexity, which concerns the visual structure of a stimulus (i.e., quantity, irregularity, dissimilarity, detail, asymmetry, and irregularity of objects that refers to a visual stimulus, Pieters et al. 2010) affects the ease with which perceptual information is attended and interpreted with consequent positive effects in terms of consumers evaluations (Miceli et al. 2014). Indeed, visually complex stimuli are perceived as more interesting than simple ones with consequent increase of fluency in terms of elaboration (Bornstein and D'Agostino 1992; Jacoby et al. 1989). This higher perceptual fluency, in turn, will lead consumers toward a higher evaluation of the visually complex stimuli (e.g., Miceli et al. 2014). Consequently, consumers will show a higher

attitude toward products showing an eco-label with high (vs. low) design complexity via increased processing fluency.

H₂: When highly visible, eco-labels characterized by high design complexity will generate higher evaluations of the related product because of higher perceptual fluency.

Eco-labels can vary also in terms of their features, and those presenting more details and variation in their basic visual elements, color, luminance, and edges present high feature complexity.

Images high in feature complexity are visually messy, which hinders people in locating specific objects in them (e.g., Rosenholz et al. 2007). Accordingly, Pieters et al. (2010) demonstrated a negative effect of feature complexity on attitude toward printed advertisements, because high levels of feature complexity generate visual clutter hurting attention and therefore consumers' attitude (Pieters et al. 2007).

Similarly, we propose that feature complexity of an eco-label negatively affects consumers' evaluations of the labelled product because eco-label visual clutter hinders consumers' ability to process information, and therefore perceptual fluency. The difficulty of elaborate the visual information conveyed by the eco-label will be reflected in a lower evaluation of the related labelled product. Consequently, consumers will exhibit lower evaluations toward products presenting an eco-label with high (vs. low) feature complexity via lowered perceptual fluency.

H₃: When highly visible, eco-labels characterized by high feature complexity will generate lower evaluations of the related product because of lower perceptual fluency.

4 Method

The objective of our experimental studies is threefold: we first examined whether presenting a product with a highly visible eco-label (i.e., zoom in on an eco-label) influences consumers' product assessments of the labelled product, second, we investigated whether eco-label visual complexity

(i.e., design and feature complexity) plays any role on its' effectiveness in terms of product attitudes and willingness to buy (WTB), and we finally investigated the role of fluency on these processes.

We measured the visual complexity dimensions of various eco-labels in the marketplace via pre-test and then we selected eco-labels with high and low design and feature complexity to use in experimental studies.

4.1 Pre-test: Measuring Design and Feature Complexity of Eco-labels

A total of 15 eco-labels were selected by a research assistant, not aware of the study objectives, on the basis of the observation of the labelled products available on the website of five Italian retailers (two general supermarkets, two discounts and one specialty store focused on organic products). In particular the selected eco-labels were differentiated in terms of product sustainability (EU, ICEA, SOIL, ICEA, USDA, AB, RSPO, MSC, ASC eco-labels), social sustainability (Fairtrade and WFTO eco-labels) and production process sustainability (FSC, PEFC, Rainforest Alliance and EMAS eco-labels, see Appendix A).

Feature complexity of each eco-label was measured as the picture's file size after using JPEG compression given the same picture dimensions of eco-label logos (bitmaps of 250×250 pixels; Pieters et al. 2010). More complex pictures have larger file sizes because the degree of compression of pictures with more details given the same picture dimensions is lower than less complex pictures.

Design complexity of the 15 eco-labels were coded by a panel of four judges: two academicians and two experts on logo design elements (2 males, 2 females, $M_{age} = 40$, $SD = 5.10$) and it was calculated as the average of the being present (1) or absent (0) of the six principles defined by Pieters et al. (2010), namely quantity, irregularity, dissimilarity, detail, asymmetry, and irregularity of objects. Thus, design complexity was a proportion between 0 and 1, values close to 1 indicating more design complexity.

The highest score for feature complexity was for ICEA eco-label (60.60) and the lowest for organic EU eco-label (9.98) (Table W1). The lowest score for design complexity was for SOIL eco-

label (0.08) and the highest for WFTO eco-label (0.96). As a consequence, we selected these 4 eco-labels for our experimental studies.

5 Study 1: The effect of Design Complexity on Eco-label Effectiveness

5.1 Procedure

A total 246 Italian adults ($M_{\text{age}} = 47.23$, $SD = 17.23$, 61% Female) selected between February and March 2021 through an online platform (i.e., Winnerland.com) were asked to evaluate a fictional yogurt brand present in an anonymous retailer website. The average age in Italy in 2021 was 46.5 with 51.31% females. The sample can be assumed being representative in terms of age and contains more females than men similar to Italian population. In particular, subjects were randomly exposed to a mock yoghurt package with a low (SOIL = 0.08) versus high (WFTO = 0.96) design complexity eco-label. Yoghurt was selected as a product category since its package typically contains eco-labels. We used a fictional brand name to eliminate confounding effect of brand familiarity.

Participants assessed the same product twice: first without any zoom-in on the eco-label on the product package, and then with zoom-in on the eco-label on the product package (Appendix B). In both cases, consumers assessed willingness to buy (WTB, Doods et al. 1991, $\alpha_1 = 0.97$, $\alpha_2 = 0.98$), willingness to pay (WTP), perceived quality (Yoo et al. 2000, $\alpha_1 = 0.97$, $\alpha_2 = 0.98$), attitude toward the labelled product (Keaveney et al., 2012, $\alpha_1 = 0.95$, $\alpha_2 = 0.97$), price and taste perceptions ($\alpha_1 = 0.94$, $\alpha_2 = 0.97$), and eco-label recognition.

Then subjects responded to perceptual fluency (Labroo et al. 2008, $\alpha = 0.97$) measure. We also measured conceptual fluency (Miceli et al. 2014, $\alpha = 0.90$) in order to ensure that design complexity indeed concerns the visual and not the conceptual dimension of eco-labels. After that, participants were administered measures of perceived product greenness (Adigüzel and Donato 2021, $\alpha = 0.93$), product trust (Adigüzel and Donato 2021, $\alpha = 0.93$), label comprehensibility (Pieters et al. 2010, $\alpha = 0.94$, high values represent difficulty in understanding) and frequency of seeing products with the eco-label in stores. Then the study ended asking participants their environmental concern

(Haws et al. 2014, $\alpha = 0.95$), familiarity of the previously shown eco-label (1 “yes”, 0 “no”), frequency of buying yoghurt (1 “never”, 5 “always”), age and gender (1 for females).

We performed confirmatory factor analysis (CFA) to validate the unidimensionality of our measurement scales (Table 1). Measurement model fit indicators were very good. All measures show good convergent validity since all average variances extracted (AVE) are above 0.50, the composite reliabilities are satisfactory ($CR > 0.7$), and standardized factor loadings are larger than 0.7 (Hair et al. 2006, Table W2). The average variance extracted for each construct exceeded the squared correlation between constructs (The Fornell and Larcker criterion 1981), which supported the discriminant validity of the measures except control variable pairs “trust-greenness” for the high visibility case. All the multi-item scales were measured using seven points rating scales and were found to be reliable and valid (Table 1).

Frequency of seeing products with the label in stores, product greenness, consumer trust, and yoghurt consumption between high vs low design complexity conditions did not significantly differ, indicating no confounding effects.

(INSERT TABLE 1 HERE)

5.2 Results

5.2.1 Testing Visibility Effect

To test H_1 , difference in means were compared with the paired t-test between low and high visibility conditions (Table W3). When consumers were exposed to the high visibility condition with the zoom feature, attitude toward the labelled product ($\Delta WFTO = 0.32, p < 0.001, \Delta SOIL = 0.27, p < .01$), WTB ($\Delta WFTO = 0.48, p < .001, \Delta SOIL = 0.49, p < .001$), product quality ($\Delta WFTO = 0.80, p < .001, \Delta SOIL = 0.64, p < .001$), perceived price ($\Delta WFTO = 0.65, p < .001, \Delta SOIL = 0.66, p < .001$), taste ($\Delta WFTO = 0.35, p < .001, \Delta SOIL = 0.43, p < .001$), and WTP ($\Delta WFTO = 0.23, p < .001, \Delta SOIL =$

0.17, $p < .01$) were significantly higher than in the low visibility condition for both eco-labels, thus confirming H₁.

Despite SOIL label was recognized more than WFTO (10.2% vs 9.3%) in low visibility condition, people stated being more familiar with WFTO than SOIL (12.2 vs 10.2%) in high visibility condition (Table 2).

(INSERT TABLE 2 HERE)

5.2.2 Testing mediating effects

We used PROCESS Model 4 (Hayes 2017) to test the mediating effects of perceptual and conceptual fluency separately because of high correlation between perceptual and conceptual fluency (0.80^{***}). Design complexity was set as the independent (1 = high “WFTO”, 0 = low “SOIL”) and attitude toward the labelled product with high visibility was set as the dependent variable. Age, gender, environmental concern and familiarity were added as covariates. The results are reported in Table 3.

Perceptual fluency as a mediator. The eco-label with high design complexity (WFTO) had a larger perceptual fluency ($b = 0.40, p < .05$). Environmental concern ($b = 0.49, p < .001$) and familiarity with an eco-label ($b = 0.74, p < .001$) had also a positive effect on perceptual fluency. When perceptual fluency and attitude toward the labelled product were regressed on design complexity, perceptual fluency and covariates, perceptual fluency significantly influenced labelled product attitudes ($b = 0.54, p < .001$), but the effect of design complexity was not significant ($b = 0.00, p = .99$). Environmental concern ($b = 0.34, p < .001$), label familiarity ($b = 0.31, p < .05$), and age ($b = -0.01, p < .05$) influenced significantly labelled product attitudes, but not gender.

The indirect effect of design complexity on attitude toward the product was significant for perceptual fluency ($c = 0.22, CI (0.02, 0.41)$). Thus, according to H₂, product attitude is higher for eco-labels with high design complexity compared to eco-labels with low design complexity due to increased perceptual fluency.

We repeated the same analysis considering conceptual fluency as a mediator; however, the indirect effect was not significant ($c = 0.10, CI (-0.06, 0.26)$), demonstrating that the mediating effect

of conceptual fluency between design complexity and attitude toward labelled product was not confirmed when subjects were exposed to a product with highly visible eco-labels. The findings were in the same line also for consumers' willingness to buy for the labelled product (see Fig. 1).

(INSERT TABLE 3 HERE)

(INSERT FIGURE 1 HERE)

6 Study 2: The effect of Feature Complexity on Eco-label Effectiveness

6.1 Procedure

A representative sample of total 245 Italian adults ($M_{\text{age}} = 48.52$, $SD = 17.14$, 57% Female) selected through an online platform (i.e., Winnerland.com) were exposed between February and March 2021 to a mock yoghurt package with low (organic EU = 9.98) versus high (ICEA = 60.60) feature complexity eco-label. Procedure and measures were totally the same as study 1 (Appendix C). Subjects in two conditions did not significantly differ in frequency of seeing the eco-label in store, product greenness, consumer trust and yoghurt consumption. Measurement model fit in CFA was very good: All scales have convergent validity, good reliabilities and high factor loadings (Table 1). Discriminant validities were also good except attitude-taste without zoom-in and trust-product greenness with zoom-in conditions. Attitude toward a labelled product and taste perceptions, product trust and greenness perceptions are theoretically expected to be highly correlated, however since they are not the main constructs used in hypothesis testing, we can disregard it (Table W2).

6.2 Results

6.2.1 Testing Visibility Effect

According to a series of paired t-tests (Table W3), there was significant difference in attitude toward the product ($\Delta\text{ICEA} = 0.32$, $p < 0.001$, $\Delta\text{EU} = 0.34$, $p < .001$), WTB ($\Delta\text{ICEA} = 0.60$, $p < .001$, ΔEU

= 0.51, $p < .001$), product quality (Δ ICEA = 0.71, $p < .001$, Δ EU = 0.56, $p < .001$), price (Δ ICEA = 0.55, $p < .001$, Δ EU = 0.56, $p < .001$) and taste perceptions (Δ ICEA = 0.28, $p < .001$, Δ EU = 0.41, $p < .001$), and WTP (Δ ICEA = 0.20, $p < .001$, Δ EU = 0.12, $p < .01$). When visibility of eco-labels increased with zoom feature, consumers' evaluations significantly increased, confirming again H₁.

Recognition rate was the same for organic EU and ICEA logo (6.5%). However, subjects stated strongly being more familiar with organic EU compared to ICEA (11.8 vs 5.7%, Table 2).

6.2.2 Testing the mediating effects

To test the mediating effects of perceptual ($\alpha = 0.90$) and conceptual fluency ($\alpha = 0.96$) for feature complexity, we set attitude toward the product with high visibility ($\alpha = 0.97$) as the dependent variable and feature complexity as the independent variable (1= high "ICEA", 0 = low "EU"). Age, gender, environmental concern ($\alpha = 0.95$) and familiarity were added as covariates. We ran mediating effect tests separately due to high correlation between perceptual and conceptual fluency (0.80^{***}) as in study 1.

Perceptual fluency as a mediator. Eco-label with high feature complexity "ICEA" (vs. low "organic EU") did not significantly influence perceptual fluency ($b = 0.13$, $p = .43$). The indirect effect of feature complexity was not significant neither ($c = 0.06$, CI (-0.08,0.22)). So, H₃ was not confirmed.

Conceptual fluency as a mediator. High feature complexity positively influenced conceptual fluency ($b = 0.54$, $p < .01$). Both environmental concern ($b = 0.55$, $p < .001$) and familiarity with an eco-label ($b = 0.53$, $p < .05$) significantly influenced conceptual fluency, but not age and gender. When attitude toward the labelled product regressed on feature complexity, perceptual and conceptual fluency, and covariates with the high visibility condition, conceptual fluency had a positive effect on attitude toward the product ($b = 0.35$, $p < .001$); however, the effect of feature complexity on product attitude was not significant anymore ($b = -0.11$, $p = .48$), indicating the mediating effect. Indeed, the indirect effect of high feature complexity through conceptual fluency was significant ($c = 0.19$, CI (0.06,0.34)). Thus, attitude toward a product with an eco-label indicating high feature complexity

was higher than the one indicating low feature complexity due to increased conceptual fluency. Similarly in this case, the findings were in the same line for willingness to buy the labelled product (Table 3). Moreover, attitude toward labelled product increased with environmental concern ($b = 0.39, p < .001$) and being female ($b = 0.33, p < .05$), but not with familiarity with an ecolabel ($b = -0.33, p = .052$) and age ($b = -0.00, p = 0.72$).

A possible explanation of this counterintuitive result is that since eco-labels basically refer to sustainability as a meaning, the presence of different features helps consumers to better understand and elaborate that meaning. Additionally, more descriptive logos are easier to process because they are conceptually more fluent (Labroo et al. 2008; Lee and Labroo 2004); in fact, compared to EU eco-label that is characterized by low feature complexity, ICEA eco-label (high feature complexity) is characterized not only by the presence of different visual elements, but also by the presence of text aimed at explicitly explain the label meaning. In this regard, we conducted a post-test with a sample of 27 subjects ($M = 30.07, SD = 5.06, 17$ Females) to which we showed both eco-labels (EU and ICEA) and we asked to enumerate a maximum of 3 meanings for each eco-label. Indeed, results showed that EU eco-label (low feature complexity) generates higher different meaning associations (18) than ICEA eco-label (high feature complexity) (11); wordclouds of the two eco-labels (Appendix D) confirmed such a result. As a consequence, feature complexity, by facilitating the eco-label understanding, positively affected product evaluations via increased conceptual fluency (Fig. 2).

(INSERT FIGURE 2 HERE)

7. General Discussions

Despite several sustainable FMCGs packages present large size eco-labels, most consumers are still not aware and do not know their meaning (Henryks et al. 2015), in fact eco-labels on product package pictures are hardly noticeable on physical stores (e.g., Atănăsoaie 2013; Brécard 2014).

However, once noticed, eco-labels, as other sustainability cues, are demonstrated to positively affect both product and store evaluations (e.g., Donato and D'Aniello 2021; Lombart and Louis, 2014). This issue can be particularly relevant for e-retailers that want to promote sustainable products (Rausch, Baier and Wening, 2021) and for that reason the zoom-in feature available on e-retailers' website on the product eco-label can be a useful tool, especially for environmentally concerned consumers.

In fact, our results demonstrated that compared to a low-visibility condition, the use of zoom-in feature on product eco-labels significantly increases perceived labelled product attitudes, willingness to buy, perceived quality, expensiveness and taste perceptions.

Moreover, in order to further promote sustainable products consumption, once noticed eco-labels need to be positively evaluated by consumers, therefore designing noticeable and comprehensible eco-labels should be a priority of eco-label designers. In this regard, an important dimension is related to the eco-label visual complexity, however previous research did not clarify how this dimension can affect labelled products' evaluations. Following the Pieters et al. (2009) distinction between design and feature complexity, we conducted two experimental studies with the objective of verifying if under increased eco-label visibility (i.e., zoom-in feature) these two dimensions affect labelled product evaluations in terms of attitude toward the labelled product and willingness to buy it. Results indicated that eco-labels characterized by high design complexity led to increased perceptual fluency and consequently to high WTB and attitude toward a labelled product. Thus, similar to printed advertisements (Pieters et al. 2010) and brand logos (van Grinsveen and Das 2014), design complexity increases the ease of identifying and processing eco-labels (i.e., perceptual fluency). However, feature complexity did not change perceptual fluency of eco-labels on product packages, which is probably caused by high-visibility through zoom-in feature. Since eco-labels are in small size and that the presence of colours, shapes and text are limited compared to printed advertisements, we did not have the negative effect of feature complexity on consumers evaluations of labelled products due to no change in perceptual fluency. Besides, the zoom-in feature gives

customers the opportunity to see all the visual details of eco-labels preventing any potential problem deriving from the visual cluster as in advertising, in fact we found that feature complexity increased conceptual fluency and resulted in increased WTB and attitude toward a labelled product. Increased visibility with zoom-in feature helps consumers to clearly read the text and interpret shapes or colours present in eco-labels and therefore their sustainable meaning is easily understood, with consequent more positive evaluations of the labelled product.

7.1 Theoretical implications

We firstly contributed to the logo design literature by investigating design and feature complexity in eco-label effectiveness context. To the best of the authors knowledge, the present research is the first one that verified Pieters et al. (2010) visual complexity measures of printed advertisements on eco-labels efficacy in terms of labelled product consumers' evaluations. Related to design complexity, our results replicated those of van Grinsveen and Das (2014) on brand logo evaluations, however the authors did not investigate the effect of feature complexity on logos evaluations. We found that differently from traditional printed advertisements, eco-labels' feature complexity does not negatively affect labelled products evaluations. Besides, we contributed to fluency literature (e.g., Reber et al. 2014; Miceli et al. 2014) demonstrating the mediating role of perceptual and conceptual fluency to explain the effectiveness of design and feature complexity on labelled products. Additionally, we examined the relationships between visual complexity dimensions and attitude toward labelled products with high visibility (i.e., zoom-in feature) of eco-labels contributing therefore to sustainability (e.g., Thøgersen et al. 2010) literature, confirming that once noticed eco-labels improve labelled products' evaluations also in e-retailing environment.

7.2 Practical implications

The present research offers several practical implications for eco-label designers, (sustainable) FMCGs retailers as well as manufacturers, and further stakeholders. First of all, according to our results to motivate consumers to make sustainable purchases, eco-labels on

product packages should be easy-to-understand, visually eye-catching and highly visible (i.e., in large size). In online stores, we recommend providing zoom-in feature for products with eco-labels to increase visibility and sustainable products demand. Overall, retailers and manufacturers should prefer eco-labels with high design complexity because of perceptual fluency, and eco-labels with high feature complexity due to conceptual fluency. When environmental concern and eco-label familiarity increase, fluency of eco-label increases. Therefore, specific campaigns could be designed to increase awareness about eco-labels, especially for environmentally sensitive consumers. Moreover, eco-labelled products are perceived as more expensive, higher quality and tastier, therefore, companies can differentiate their products using eco-labelling scheme and benefit of a premium price.

7.3 Limitations and future research directions

Despite our theoretical and practical implications, our research is subject to several limitations that can stimulate further studies. First of all, attitudes and purchase intentions were measured, despite behavioral data might provide more insight on effectiveness of eco-labels in marketplace.

Moreover, differently from previous studies on logos evaluations that focused on anonymous visual stimuli (e.g., Miceli et al., 2014; van Grinsveen and Das; 2014), this research used real eco-labels isolating the two visual complexity dimensions of Pieters et al. (2010). However, further research can disentangle the two forms of complexity creating fictitious labels, controlling for colour and text, with the attempt of replicating the found results.

Additionally, despite there are several visual attention studies on eco-labels (e.g., Guyader et al. 2017; Rihn et al. 2019; Song et al. 2019) none of them analyzed the effectiveness of zoom-in feature on labelled product packages, consequently further eye-tracking studies can be conducted for comparing consumers' visual attention in case the absence (vs. presence) of zoom-in feature.

Finally, despite the present research demonstrated that eco-labels positively impacted products evaluations, the effectiveness in terms of store image was not investigated. Several stores

are launching labelled private labels products and future research can verify how these labelled products can affect consumers' store evaluations.

Increasing visibility of eco-label logos in online stores through zoom-in feature has proven to be a crucial factor for increasing product evaluations and willingness to buy for labelled products in our research. Under increased visibility, products with both design and feature complex eco-labels, have been assessed more positively because consumers engaged more to process those eco-labels and eventually products. Noticeable eco-labels are those characterized by high design complexity and those easier to understand are those characterized by high feature complexity.

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Table 1

Measurements constructs, Cronbach's alpha, factor loadings from CFA and model fit statistics (study 1-2 without and with zoom)

Construct (Source), Cronbach's alpha(α) for 1-4 Items	ItemNo	1.Study 1 No zoom Loadings	2.Study 1 Zoom in Loadings	3. Study 2 No zoom Loadings	4. Study 2 Zoom in Loadings
Attitude toward a labelled product (Keaveney et al. 2012) $\alpha = 0.95, 0.97, 0.95, 0.96$ Negative vs Positive Bad vs good Disliked vs Nice Unfavorable vs Favorable	Atti1 Atti2 Atti3 Atti4	0.92 0.94 0.90 0.95	0.95 0.94 0.94 0.96	0.94 0.91 0.86 0.90	0.96 0.96 0.90 0.94
Willingness to buy (Doods et al. 1991) $\alpha = 0.97, 0.98, 0.96, 0.98$ The probability that I will buy is high. The likelihood that I will consider purchasing is high. My willingness to buy is high.	WTB1 WTB2 WTB3	0.96 0.97 0.96	0.97 0.97 0.98	0.92 0.94 0.96	0.98 0.96 0.97
Perceptual fluency (Labroo et al. 2008) $\alpha = 0.97, 0.90$ In reference to the eco-label, to what extent do you find this logo interesting? The eco-label ... has graphic elements that catch my attention.	PerFlu1 PerFlu2		0.93 0.90		0.90 0.90
Conceptual fluency (Miceli et al. 2014) $\alpha = 0.90, 0.96$ To what extent is the eco-label above easy to interpret? To what extent does the eco-label ... convey a clear meaning?	ConFlu1 ConFlu2		0.96 0.97		0.94 0.98
Perceived quality (Yoo et al. 2000) $\alpha = 0.97, 0.98, 0.97, 0.98$ The probability that the product is reliable is high. The likelihood that this product is trustworthy is high. This product should be of excellent quality. This product is of high quality.	PQua1 PQual2 PQual3 PQual4	0.95 0.96 0.93 0.94	0.97 0.95 0.97 0.97	0.97 0.96 0.91 0.94	0.96 0.96 0.95 0.96
Taste (Self-made) $\alpha = 0.94, 0.97, 0.93, 0.97$ Not at all delicious: Delicious Not very tasty: Very tasty	Taste1 Taste2	0.96 0.96	0.99 0.96	0.92 0.94	0.97 0.96
Environmental concern (Haws et al. 2014) $\alpha = 0.95, 0.95$ For me it is important to use products that do not harm the environment. I consider the potential environmental impact of my actions when I make many of my decisions. My shopping habits are influenced by my concern for the environment. I am worried about wasting our planet's resources. I would define myself responsible from an environmental point of view. I am willing to have some inconvenience in order to take more environmentally friendly actions.	Envi1 Envi2 Envi3 Envi4 Envi5 Envi6		0.91 0.88 0.90 0.82 0.86 0.85		0.91 0.93 0.90 0.85 0.86 0.82

Product greenness (Adıgüzel and Donato 2021) $\alpha = 0.93, 0.94$ Products with this label are environmentally friendly Products with this label are sustainable	Green1 Green2		0.95 0.89		0.94 0.94
Product trust (Adıgüzel and Donato 2021) $\alpha = 0.93, 0.93$ Companies that produce goods with this label are very trustworthy I trust companies that produce goods with this label	Trust1 Trust2		0.94 0.93		0.93 0.93
Label comprehension (Pieters et al. 2010) $\alpha = 0.94, 0.91$ The label is difficult to understand The label is complicated The label is unclear	Comp1 Comp2 Comp3		0.93 0.92 0.90		0.86 0.87 0.92
Perceived price (Self-made) ^a I will pay a little for this product: I will pay a lot for this product	PPrice1	0.97	0.97	0.96	0.96
Frequency of seeing eco-labelled products in stores ^a I frequently see products with this label in stores	FrqSee1		0.96		0.95
CFA Model Fit Statistics					
RMSEA		0.058	0.063	0.058	0.052
SRMR		0.017	0.027	0.023	0.024
CFI		0.986	0.966	0.987	0.975
TLI		0.985	0.958	0.983	0.968
chi2 model vs. saturated(df)		123.487 (68)	785.478 (400)	123.098 (68)	668.951 (400)
chi2baseline vs. saturated(df)		5207.702 (91)	11934.033 (496)	4475.105 (91)	11051.693 (496)

Notes. Standardized factor loadings are reported. CFI: Comparative fit index, TLI: Tucker-Lewis index, RMSEA: Root mean squared error of approximation, SRMR: Standardized root mean squared residual.

^a Single item constructs' error variance were fixed to 0.15 as suggested by Joreskog and Sorbom (1982).

Table 2

Recognition and familiarity under low and high visibility (Study 1-2)

Study 1				
	Recognition Low visibility		Familiarity with eco-label High Visibility	
	Yes	No	Yes	No
WFTO (high design complexity)	23	101	30	94
SOIL (low design complexity)	25	97	25	97
Total (N = 246)	48(19.5%)	198(80.5%)	55(22.4%)	191(77.6%)
Study 2				
EU (low feature complexity)	32	89	58	63
ICEA (high feature complexity)	32	92	28	96
Total (N = 245)	64(26.1%)	181(73.9%)	86(35.1%)	159(64.9%)

Table 3

Mediating effect results with high visibility of an eco-label for product attitude (Atti) and willingness to buy (WTB)

	Per. Flu.	Con. Flu.	Atti with zoom	Atti with zoom	WTB with zoom	WTB with zoom	Per. Flu.	Con. Flu.	Atti with zoom	Atti with zoom	WTB with zoom	WTB with zoom
Perc. Fluency			0.54***		0.54***				.38***		.59***	
Conc. Fluency				0.39***		0.39***				0.35***		0.42**
Design Complex	0.40*	0.26	0.00	0.11	-0.35**	-0.24						
Feature Complex							0.13	0.54*	-0.03	-0.11	-0.03	-0.18
Environ. Concern	0.49***	0.38***	0.34***	0.45***	0.42***	0.54***	.63***	.55**	.28***	.39***	.29***	0.42**
Familia- rity eco- label	0.74***	0.99***	0.31*	0.33	0.22	0.23	0.35	0.53*	-	-0.33	-0.46**	-0.47**
Age	0.01	0.01	-0.01**	-0.01**	-0.01*	-0.01*	0.01*	0.01	-0.00	-0.00	-0.01	-0.00
Female (1)	0.18	0.10	0.12	0.17	0.05	0.11	0.32	0.32	0.29	0.33*	0.31*	0.36*
Constant	1.42	1.45	1.22***	1.42***	0.24	0.44	0.58	0.73	1.47	1.52***	0.40	0.44
Rsquare	0.28	0.19	0.61	0.55	0.60	0.55	0.38	0.28	0.47	0.42	0.54	0.49

Indirect effects (c):

Perceptual fluency:

Design complexity=> c=0.22** (0.02,0.42) for Atti; c=0.22** (0.02,0.42) for WTB

Feature complexity=> c=0.06 (-0.08,0.21) for Atti; c=0.07(-0.10,0.25) for WTB

Conceptual fluency:

Design complexity=> c = 0.10 (-0.06,0.26) for Atti; c=0.10 (-0.06,0.28) for WTB

Feature complexity=> c=0.19** (0.06,0.34) for Atti; c=0.23** (0.09,0.40) for WTB

Notes. Design Complexity (High (1) = WFTO, Low (0) = SOIL) Feature Complexity (Low (0) = Organic EU High (1) = ICEA)

Fig. 1. Testing visibility of an eco-label with and without zoom in (H_1) and mediating effect for design complexity(H_2) (Study 1)

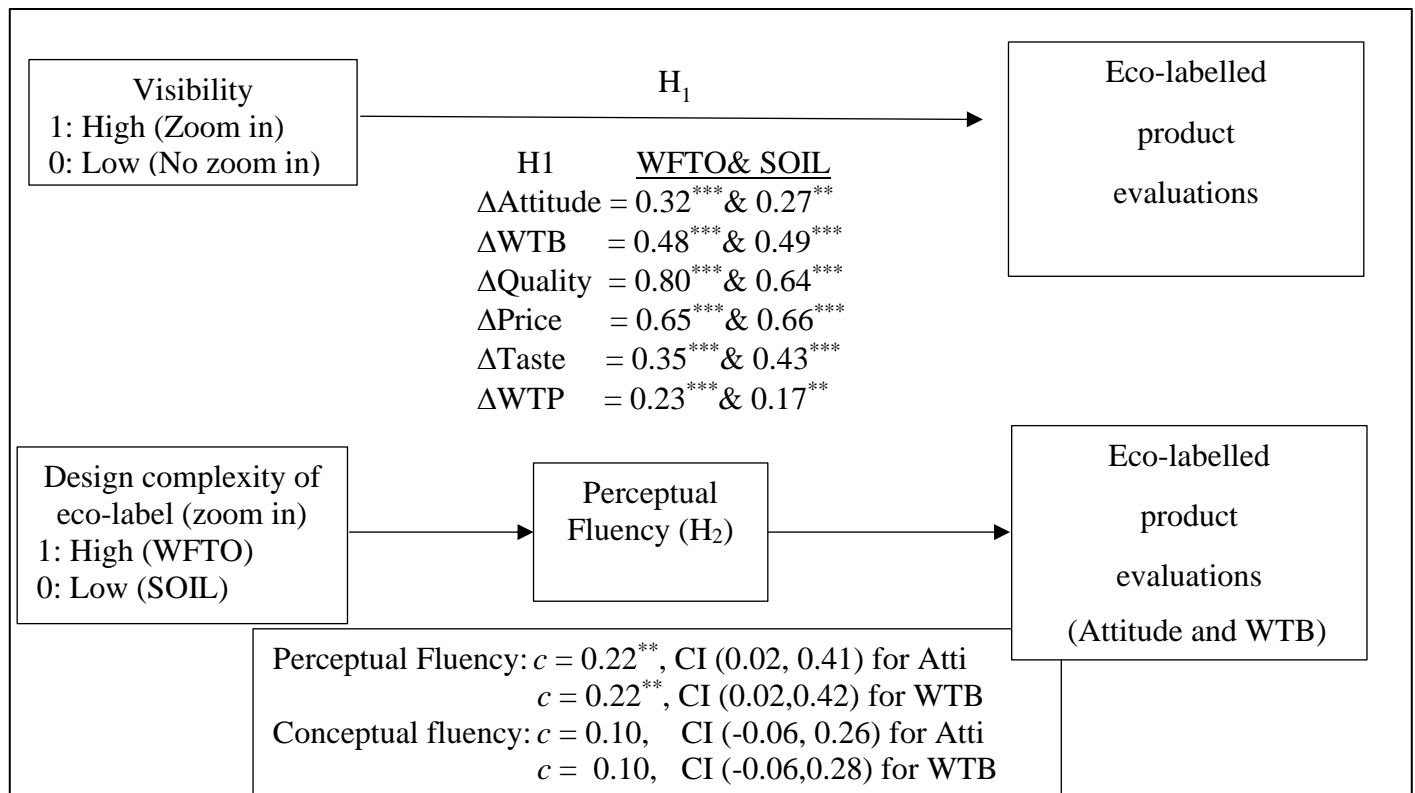
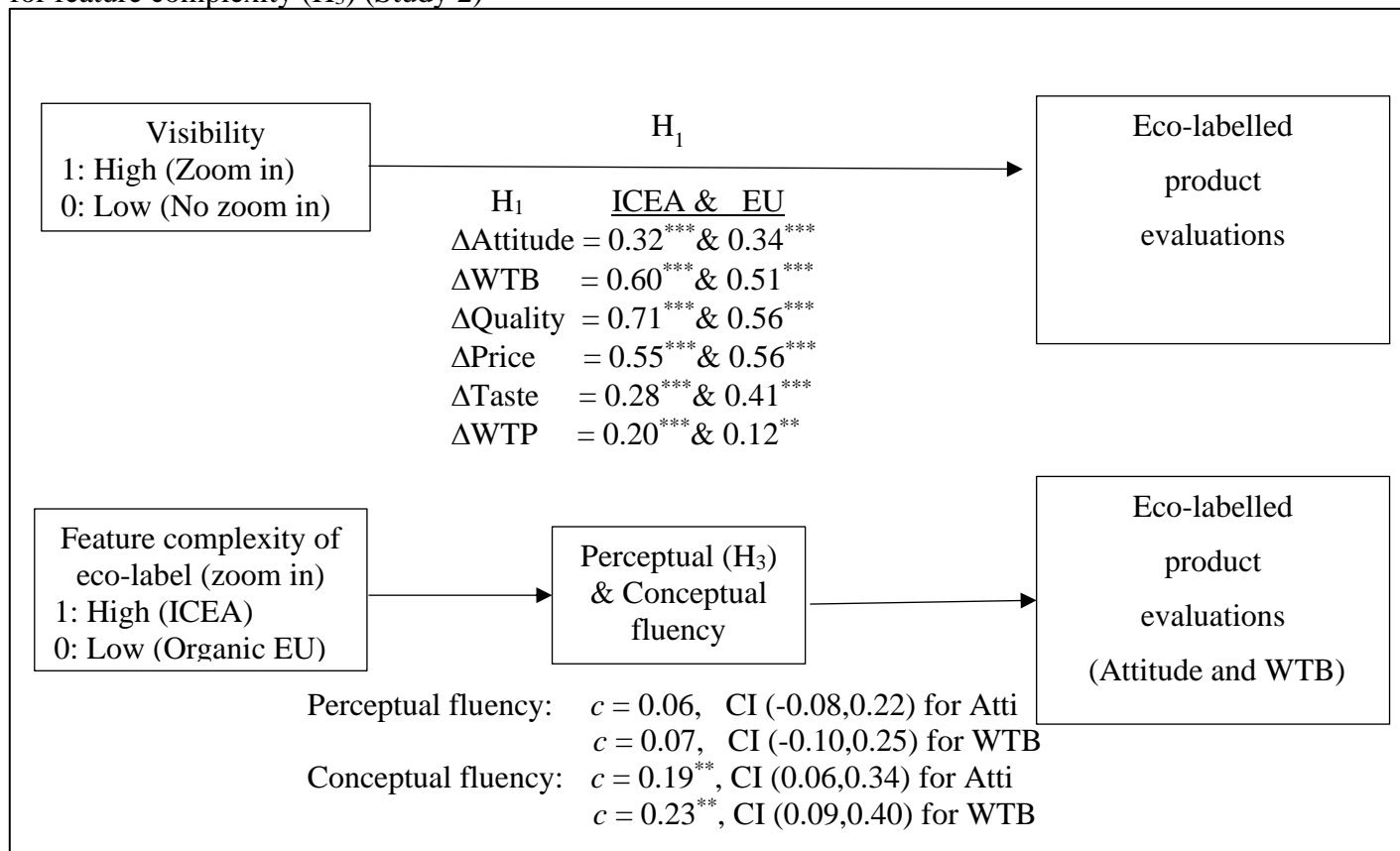


Fig. 2. Testing visibility of an eco-label with and without zoom in (H_1) and testing mediating effect for feature complexity (H_3) (Study 2)







Appendix A

Pre-Test Eco-labels

Product sustainability			
			
			
 RSPO-1106097			
Social Sustainability			
			
Production Process sustainability			
			





Appendix B

Stimuli used in Study 1

High design complexity	Low design complexity
 <p>A white yogurt cup with a pink band at the top containing the text "BeYogurt". Below the band, the text "300g" is printed in pink. To the right of the weight is a black cartoon character of a yogurt container with a face and arms. To the left of the character is a circular logo for the World Fair Trade Organization.</p>	 <p>A white yogurt cup with a pink band at the top containing the text "BeYogurt". Below the band, the text "300g" is printed in pink. To the right of the weight is a black cartoon character of a yogurt container with a face and arms. To the left of the character is a circular logo for the Soil Association Organic.</p>
 <p>A white yogurt cup with a pink band at the top containing the text "BeYogurt". Below the band, the text "300g" is printed in pink. To the right of the weight is a black cartoon character of a yogurt container with a face and arms. To the left of the character is a circular logo for the World Fair Trade Organization. A white rectangular inset box is positioned in the foreground, partially overlapping the cup, containing the World Fair Trade Organization logo.</p>	 <p>A white yogurt cup with a pink band at the top containing the text "BeYogurt". Below the band, the text "300g" is printed in pink. To the right of the weight is a black cartoon character of a yogurt container with a face and arms. To the left of the character is a circular logo for the Soil Association Organic. A white rectangular inset box is positioned in the foreground, partially overlapping the cup, containing the Soil Association Organic logo.</p>

Appendix C

Stimuli used in Study 2

Low feature complexity	High feature complexity
 <p>A white yogurt cup with a red band at the top containing the text "BeYogurt". Below the band is a black cartoon character. On the left side of the cup, there is a small green European Union Protected Designation of Origin (PDO) logo and the text "300g".</p>	 <p>A white yogurt cup with a red band at the top containing the text "BeYogurt". Below the band is a black cartoon character. On the left side of the cup, there is a circular green logo for ICEA (Istituto per la Certificazione Etica e Ambientale) and the text "300g".</p>
 <p>The same yogurt cup as in the top-left cell. A white rectangular callout box is positioned in front of the cup, containing a magnified view of the green European Union PDO logo.</p>	 <p>The same yogurt cup as in the top-right cell. A white rectangular callout box is positioned in front of the cup, containing a magnified view of the circular ICEA logo.</p>

Appendix D

WordCloud of organic EU



WordCloud of ICEA



