2019

MSc Thesis Consumer Studies

The effect of ingredient item depiction on the front of packaging on pre- and post-consumption product evaluations

MARKETING AND CONSUMER BEHAVIOUR

COURSE CODE: MCB-80406 | REG. NO. 960708835060 | NICOLE TIMMERMAN

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MSC Thesis Consumer Studies MCB-80436
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March, 2019
Wageningen University & Research

Summary

Background and objective - Depiction of ingredient item images on the front of a packaging is one of the most frequently used cues explicitly linked to the content of the product and usually gets a prominent position on the front-of-pack label. Yet, it is still to be known to what extent consumers make inferences about the content of a product from ingredient item images and whenever incongruent with the actual ingredient list, whether a mismatch between these two is perceived to be misleading. The current research therefore focuses on (in)congruity between visual (ingredient item depiction) and textual (ingredient list) information on food packaging and their influence on expected and perceived flavour intensities, mismatch perception, perceived deception and intention to purchase by taking into account the possible moderating role of consumers' thinking style.

Design/methodology/approach – Three studies were performed. First, a 2 (visual ingredient imagery: more mango vs more apple) x 2 (textual ingredient list: more mango vs more apple) x 2 (tasting evaluation: present vs absent) experimental design was set up in the form of a digital questionnaire to be filled in during a Central Location Test at the Wageningen University. In total of 436 Dutch students, rated a 100% Apple Mango fruit juice packaging in terms of *expected* (and *perceived* in the tasting condition) *flavour ratio*, *perceived mismatch, perceived deception,* and *willingness to purchase* and additionally a questionnaire to determine dominant thinking style (experiential or rational). A replicate of the pre-consumption evaluation (N=216) was performed via an online survey with a less salient position of the textual information. A third sensory study (N=108) was performed with total absence of the textual information and an added cognitive load.

Findings – Results indicated that regardless of a person's dominant thinking style, a salient positioning of the ingredient list led to assimilation of expected and perceived flavour ratio towards this textual ingredient information, without an effect of visual ingredient depiction. A less salient position of textual information led to a significant main effect of the ingredient image as well with a strong main effect of assimilation towards the image with no ingredient information presented. Overall, the textual packaging cue was found to be a stronger predictor for expected and perceived flavour ratio compared to the visual packaging information, but mostly when more apples (vs. mangoes) were displayed. The empirical results showed that, regardless of dominant processing style, incongruity between visual and textual packaging information did not lead to higher ratings of perceived mismatch in both the pre- and post-consumption evaluation. Perceived mismatches in turn, whether *objectively* deceptive or not, did lead to lower willingness to purchase via increased feelings of perceived deception.

Originality/value – This paper offers insights for understanding the effects of visual packaging on consumer product evaluations. Based on the study findings, a direction for guidelines for visual design elements to protect consumers from potentially being misled is given.

Keywords: visual packaging cue, textual packaging cue, rational cognitive style, experiential cognitive style, expected/perceived flavour intensity, mismatch perception, perceived deception

ACKNOWLEDGEMENT

This thesis was written as a final degree project for the master 'Management, Economics, and Consumer Studies' in 2018-2019 at Wageningen University. I would like to express my gratitude to the most important persons during the writing process.

First and foremost, I would like to thank my supervisor Betina Piqueras Fiszman for her patient guidance, enthusiastic encouragement, and useful critiques of this thesis. For providing me with the opportunity to present my results in Angers, France. It was a pleasure working together, Betina always made sure that our meetings were efficient and challenging, accompanied with a dose of delicate sense of humour and irony.

In addition, I want to thank Gineke Boven - van der Spoel, a unique person who has guided me the last five years in Wageningen, always busy empowering others to reach their fullest potential and who has believed in me and given me as much understanding and sympathy as a person could wish for.

Finally, I must express my very profound gratitude to my parents, sister, housemates, and Jelle, for providing me with unfailing support, late night discussions on the topic, and continuous encouragement throughout my years of study and through the process of researching and writing this thesis.

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1. Introduction

The food industry is continuously growing, therefore consumers face an ever-increasing number of daily products to choose from in the supermarkets. In this abundant choice environment, consumers have a limited capacity to process all the information they face when deciding on their food choices and usually rely on effortless and intuitive thoughts. Consequently, a product's visual appearance is often the main driver for consumer first purchase decisions (Bloch, 1995; Crilly, & Moultrie, 2004).

Different strategies are taken on by retailers to attract consumers' attention towards their products in the competitive choice setting of a supermarket (Underwood, 2003). Decisions on these visual packaging elements, such as colour, shape, typography, and images are mindfully made by marketers to differentiate amongst competitive products (Deliza, Macfie, & Hedderley, 2003). Some of these strategies are informative and convey a message through textual elements, such as claims, whilst others, such as colour, can also be used as an indicator for taste or just to stand out on the shelf.

One of the strategies on visual design elements of a packaging often used by companies is providing information about the product within the packaging (Mai, Symmank, & Seeberg-Elverfeldt, 2016). Depiction of ingredient item images on the front of a packaging is one of the most frequently used cues explicitly linked to the content of the product and usually gets a prominent position on the front-of-pack (FOP) label (Simmonds & Spence, 2017). Next to communicating information about the product within, these images allow consumers to create expectations and draw inferences about the product, its quality, and its taste (Mai, Symmank, & Seeberg-Elverfeldt, 2016; Becker, Van Rompay, Schifferstein, & Galetzka, 2011; Cardello, 1994; Schifferstein, Kole, & Mojet, 1999).

However, these tempting ingredient images on the FOP label do not always correspond with the actual content of the product. Hence, there are two situations in which a potential mismatch between the FOP information and the actual content could occur. First, in pre-consumption evaluations, comparing the depicted ingredient elements on the FOP label with the actual ingredient list could lead to contrast perceptions based on the formed expectations from the ingredient images if this greatly differs. Second, when a consumer relied on the ingredient item depiction to buy the product, a post-consumption mismatch between the expected and perceived flavour could arise at home after tasting the product. In both situations, it could be questioned whether the ingredient item depiction is a misleading factor on the packaging and whether it leads to negative consequences.

In order to protect consumers from potential deception from packaging, Governments follow a European regulation on the provision of food information to consumers. However, this legislation mainly focuses on potentially misleading textual elements (e.g. nutritional labelling), whilst regulations on visual elements (e.g. images) is lacking. Given that consumers mainly base their product choices on elements that are easy to interpret, it becomes pertinent to also regulate these visual design elements (Purnhagen, Herpen, & Kleef, 2016), such as ingredient item depiction on the FOP label.

Yet, it is still to be known to what extent consumers make inferences about the content of a product from ingredient item images (Machiels & Karnal, 2016) and when this appears to be the case, whether these images interact with textual design elements, such as the actual ingredient list, and whenever inconsistent, whether a mismatch between these two is perceived to be misleading. Whenever a perceived mismatch between the packaging and the product either in the pre- or post-consumption phase is perceived as misleading and people feel deceived, this could have multiple negative consequences for the retailers, such as a decrease in credibility towards their brand, potentially leading consumers to switch to a substitute product or brand.

Understanding about the effect of depicting ingredient items on the front of packaging on pre- and post-consumption product evaluations is needed in order to create guidelines for visual design elements to protect consumers from potentially being misled. Therefore, the main aim of this thesis will be to study the effects of two perceived discrepancies (mismatches) from pre-consumption information (ingredient item depiction vs ingredient item list) and post-consumption information (expected vs actual flavour perception) on product evaluations in terms of perceived deception and intention to purchase.

In addition, consumer response to depiction of ingredient items on front of packaging might depend on characteristics of the consumer. Previous studies on consumer response to packaging design, have found moderating effects of information processing style (e.g. Shiloh, Salton, & Sharabi, 2002). It will be considered that individual differences in cognitive processing style amongst consumers might influence the effect that ingredient item depiction has on inference making. Consequently, the following main research question was formulated:

"To what extent do consumers rely on depiction of ingredient item cues on the front of packaging to make pre- and post-consumption evaluations?" Specifically:

- *How does (in)congruity between visual and textual packaging elements influences expected and perceived favour ratios and perceived mismatch?*
- *How does a perceived mismatch between visual packaging elements (ingredient item depiction) versus textual information (actual ingredient list) affect perceived deception and willingness to purchase? (i.e. pre-consumption phase)*
- *How does a perceived mismatch between flavour expectations from pre-consumption cues versus real flavour perception affect perceived deception and willingness to purchase? (i.e. post-consumption phase)*
- *Which of the two mismatches (pre- and post-consumption) plays a larger role in perceived deception and willingness to repurchase the product?*
- *What is the moderating effect of cognitive processing style on the relationship between packaging design elements (ingredient item depiction vs actual ingredient list) and the perceived mismatch in both (pre- and post-) consumption phases?*

2. Theoretical framework

2.1. Background

Consumer reliability on packaging design

Estimates show that around three-quarters of consumer purchase decisions are made in-store and that 90% of these decisions are solely based on front-of-pack (FOP) elements (Connolly & Davison, 1996; Rettie & Brewer, 2000). Together with the fact that about 50% of all in-store purchase decisions are made unintendedly, this highlights the importance of truthful product packaging (Nancarrow, Wright, & Brace, 1998).

Product packaging serves multiple functions. Next to protecting and preserving the food to maintain its quality, packaging design serves as a means to communicate, draw attention and allow consumers to create expectations about the product and its quality (Chrysochou & Grunert, 2014; Silayoi & Speece, 2007). It is known that product expectations in turn, form and influence product perceptions. Furthermore, package design serves as a medium to draw inferences about the brand (Underwood & Klein, 2002). Concerning package design elements, a distinction can be made between visual and verbal (i.e. textual) stimuli to communicate a message, which both can affect consumer responses (Machiels & Karnal, 2016).

2.1.1. Effect of visual and verbal stimuli on product evaluation

Visual and verbal stimuli are both part of the product packaging elements. Benefits of using one over the other to communicate a product's message have been researched previously in the domain of advertising (Jaeger & Macfie, 2001; Phillips, 2000; Rotello, 2001; Van Rompay & Veltkamp, 2014). Research addressing this distinction in packaging cues has shown a contrast in the way of processing the information from visual and verbal sources, in terms of processing style and cognitive load (Kauppinen-Räisänen, Owusu, & Abeeku Bamfo, 2012). To process verbal cues, a higher level of cognitive load is needed in comparison to visual cues, as visual cues require more unintentional and unconscious processing, evoking a higher vividness effect (Mueller, Lockshin, & Louviere, 2010; Underwood & Klein, 2002). Also, visual stimuli tend to draw consumers' attention in store at the point of purchase (Honea & Horsky, 2012; Silayoi & Speece, 2007), which contributes to a quick evaluation allowing consumers to form expectations and inferences more easily compared to reading a text (Underwood & Klein, 2002). In other words, these visual cues, such as depiction of ingredient item images, may lead to a faster inference making process based on existing knowledge, previous experiences, and associations (Grunert, Scholderer, & Rogeaux, 2011).

Nonetheless, the impact of verbal cues, also known as textual cues, on information transmission should not be underestimated (Machiels & Karnal, 2016). The effect of certain textual

cues (e.g. product names and nutritional content) on product packaging design have increasingly gained attention in research in the last decade (Okamoto et al., 2009; Yeomans, Chambers, Blumenthal, & Blake, 2008), and have been found to explain a large part of product expectation formation (Lähteenmäki et al., 2010; Liem, Aydin, & Zandstra, 2012; Sütterlin & Siegrist, 2015). However, in comparison to verbal stimuli, consumers tend to rely more on visual stimuli in considering purchase decisions at the point of sale (Clement, 2007). Therefore, a literature background on visual cues affecting product evaluations in pre- and post-consumption evaluations will be discussed next.

2.1.2. Literature background on product evaluations from visual design elements

Different reasons appear to make consumers rely on visual elements of a product's packaging. At times, a product's aesthetic or symbolic packaging design may convince a consumer to choose it (Creusen & Schoormans, 2005; van Rompay & Pruyn, 2011), for instance for being the 'limited edition' of Pringles during a World Cup by having an attractive matching packaging design with the country colours. In addition, a lack of previous exposure to a product (e.g. with first time purchases) might steer consumers' reliance on the visual appearance of the packaging to extract information of the product. In this case, a product's packaging design allows consumers to draw inferences and create expectations about a product and its quality (Chrysochou & Grunert, 2014; Silayoi & Speece, 2007). Lastly, the visual appearance of the packaging design might affect the subsequent actual product experience (e.g. Mai, Symmank, & Seeberg-Elverfeldt, 2016; Becker, Van Rompay, Schifferstein, & Galetzka, 2011; Cardello, 1994; Schifferstein, Kole, & Mojet, 1999).

Previous research has extensively studied effects of visual design elements, such as colours, shape, typography and images concerning consumers' expectations and inference making. Packaging colour has been the most widely studied visual element of packaging design in research (e.g. Carrillo, Varela, & Fiszman, 2012; Machiels & Karnal, 2016; Mai et al., 2016; Prescott, Spence, Shankar, & Levitan, 2009) and has to be used by consumers as a cue to elicit its conceptual (Magnier & Schoormans, 2017) and functional characteristics (Bone & France, 2001). Typography used for the on-packaging textual elements such as product name, has shown to communicate price expectations (Orth, Campana, & Malkewitz, 2010) and healthiness perceptions (Machiels & Karnal, 2016). Also, differences in shape of packaging have shown to influence sensory expectations (Deliza, Macfie, & Hedderley, 2003). Next to affecting these higher level attributes, visual design elements have also shown to affect sensory attributes of the actual product such as smell and taste (Piqueras-Fiszman & Spence, 2011) and actual flavour perception (Becker et al., 2011).

Amongst all of these visual elements on packaging design, depiction of a picture or image on the front-of-pack (FOP) label is one of the most frequently used cues on products in the market. Images usually also get a prominent position on the FOP label (Simmonds & Spence, 2017). Recent studies

have focussed on the effect of image depiction of the whole product on the packaging of food products on expectation formation (e.g. Rebollar, Gil, Lidón, Marín, Fernández, & Rivera, 2017) and on willingness to buy (e.g. Kobayashi & Benassi, 2015). Madzharov & Block (2010) demonstrated that visualising more product units on the FOP label could increase actual consumption. Similar results were found by Neyens, Aerts, and Smits (2015), as consumption increased as a result of a larger depicted image of the product on the packaging. Deliza, MacFie & Hedderley (2003) found that adding pictures on a juice packaging significantly altered expected sensory attributes. This shows that consumers transferred their previous experiences with the pictures, to the product expectation of the drink. In addition, Rebollar et al. (2017) recently showed that sensory expectations were altered according to the way in which crisps were presented on the packaging, and that this accordingly changed willingness to buy. In comparing ready-to-eat crisps to raw potatoes on the packaging, consumers expected the actual crisps to be more crunchy and salty and ratings of willingness to purchase were higher in the former case.

As opposed to this growing domain of research on the image depiction of a product as a whole on the FOP label on consumers' product expectations, limited research has been done on the impact of depicting ingredient items on the FOP label as a means to communicate actual content on consumers' expectations. Moreover, even fewer studies have addressed consumers' corresponding actual flavour perception of showing such (in)congruent images with the actual content on the FOP label. The first and only study known by the researchers studying the effect of (in)congruency between the product content and the depiction of ingredient items on the FOP label on actual flavour perception, was published in Japanese by Sakai and Morikawa (2007) - the study was summarized in English by Mizutani et al. (2010). They analysed the influence on hedonic and sensory evaluations either showing congruent (e.g. depicting an orange on FOP label when drinking orange juice) or incongruent (e.g. depicting an apple on the FOP label when drinking orange juice) combinations. Scores on sensory attributes and palatability were found to be higher with congruent combinations. More recently, Machiels and Karnal (2016) conducted a study in which participants had to drink a glass of orange juice, whilst simultaneously being exposed to its commercial packaging. In a 2 x 2 between-subjects design, stimuli on image depiction (either a whole orange or a glass of orange juice) and textual cues (processed vs unprocessed) were manipulated to measure taste evaluations and willingness to buy. Their results showed that depicting the juice image led to purer taste evaluations and that for certain consumers, showing an image of an orange, increased purity of taste and willingness to buy.

This empirical research shows that visual cues indeed can alter product evaluations to a large extent, yet the explaining theories and underlying mechanisms are lacking. Some studies have focussed on expectation formation in the pre-consumption phase, whilst others have shown effects in

altering actual flavour perceptions in the post-consumption phase. This thesis will address effects of ingredient item depiction in both phases, to cover the entire product experience. The theories explaining these altered product evaluations and their corresponding underlying mechanisms are explained in the following sub chapters by theories on cue utilisation (2.2.1), expectation theory (incl. biased inference making) (2.2.2), the assimilation-contrast model (2.2.3) and fluency processing theory (2.2.4).

2.2. Potential mismatch perceptions

2.2.1. Cue utilisation process

To be able to make inferences about a certain product cue, it is important that the cue is noticed by the consumer. Salience of product packaging cues therefore plays a major role in the perception process of the actual product. Cue utilisation theory explains the effect of cue salience in terms of the expectation and inference making process.

The cues on a packaging design are used by consumers to predict the benefits of a certain product, based on personal beliefs and associations. This benefit extraction from product cues is called the cue utilisation process (Olson & Jacoby, 1972; Rao & Monroe, 1989; Steenis, van Herpen, van der Lans, Ligthart, & van Trijp, 2017) and is explained by two phases. First, a consumer must perceive a cue to be able to predict a certain benefit from it. Hence, only cues that are sufficiently salient will be noticed and perceived by a consumer (Olson & Jacoby, 1972; Steenkamp, 1990). Another term used for this phase is the belief formation process, as presented stimuli are perceived by the consumer using their cognitive structure. The second phase follows naturally in transforming the cue perceptions into inferences. The notion of these inferences lays in the predictive value of the cue perception towards a product benefit (Steenkamp, 1990). Differently stated, the cue utilisation process describes the extent to which perceived packaging cues are used to predict sensory pleasure, which in its place is linked to flavour intensity evaluation of the product.

However, as cue utilisation theory argues that people create a product percept by perceiving, evaluating and interpreting from a configuration of available cues, it is likely that this type of inference making mainly accounts for complex (e.g. buying a house) rather than simple products (e.g. buying a fruit juice). Therefore, the following subchapter will go deeper into the product perception process, and the role of expectations and (biased) inference making, focussing on decision making of more 'simple' products.

2.2.2. Perception process, the role of expectations and biased inference making

Perception process and the role of expectations

As explained by the cue utilization process, different cues together form the total visual

appearance of a product's packaging, which together create expectations about intrinsic product attributes and subsequent product perceptions (Deliza, MacFie, & Hedderley, 2003). However, continuously being exposed to millions of sensory stimuli, consumers cannot perceive all stimuli. Therefore, certain automatic processes in the brain help to make sense out of all the surrounding stimuli.

The basic model for food product perception was described by Solomon, Barmossy, Askegaards, and Hoggs (2006). They describe perception as the selection, organization and interpretation of sensations. The transduction of sensory information from the surrounding stimuli to our brain is what is referred to as sensation. Since the brain simply is unable to make sense of all sensations, part of the sensations are filtered. Parts of this processed information will be interpreted, subsequently leading to a response. The quality of this interpretation depends on previous experience with the same or a similar stimuli. As a person has certain information stored in memory, sense can be made of certain information exposed to, a process in which the brain applies what it knows and expects to perceive from previous experiences. Hence, the same stimulus can be interpreted in a different way, depending on the associations a person already has with it.

This is the assumed underlying the process of extrinsic attributes being transformed into product expectations. In other words, consumers use symbolic information carried by extrinsic attributes, such as product packaging (e.g. images, text) to form expectations about the intrinsic attributes of the product. For example, when consumers see a particular colour on a packaging and this colour is connected to a past experience or a specific memory, this past experience or specific memory is transformed into a product expectation about an intrinsic attribute of the product to which the packaging belongs.

Biases in inference making

Expectations and inferences of a product are partly formed from packaging design. However, these are not always corresponding with what the consumer actually tastes after trying the product at home. The disconfirmation of expectations could be explained by the notion of biased inference making in the pre-consumption phase.

Typically, inferences from packaging are made 'spontaneously' with low levels of involvement (i.e. a low level of cognitive elaboration), leading consumers to base their inferences on readily available information from memory, a process known as 'spreading activation' (Anderson, 1983). In such situations of unknown or incomplete information, inference making can be explained by schema-based deduction (Stayman, Alden, & Smith, 1992). These schemas are also known as mental links in memory built up from prior knowledge. Several cues on a product's packaging can activate these associative networks whenever a consumer looks at the FOP label. For example, a claim like 'no added

sugar' could activate a learned concept such as 'no added sugar equals more healthy'. As with cue utilisation theory, the more salient a cue on a package, the more reasonable it is to believe that this cue will be used to activate the mental links to fill in uncertain information.

Moreover, several effects that could potentially be misleading in interpreting food packaging cues have been listed by Roe, Levy, and Derby (1999) in an early research. First, a *positivity bias* could arise, implying that solely the fact that a claim or aesthetic image is present on the packaging, will lead to an overall increased positive evaluation of the product within, irrespectively of the type of claim content. A second bias that may occur in inference making is the *halo effect.* The halo effect occurs whenever a single positive aspect about one nutrient (low in sugar) causes an effect of overestimation in terms of another nutrient (low in fat) of the product within, although this is not explicitly mentioned by the claim nor existing at all. An extension of the halo effect is the *magic bullet effect*, which causes the consumer to overestimate the overall healthiness of the product, even assigning incorrect health benefits to the product within. In addition, especially interesting for the study at hand, an *interactive effect* may occur in the inference making process, in which the consumer stops searching for more information (e.g. back of packaging) after seeing a health claim or aesthetic image on the FOP label. In other words, the information obtained from the FOP label is trusted, without verification of the factual nutritional information available.

In conclusion, exposure to ingredient item depiction on the front of packaging labels is expected to have a greater impact on expectation formation of the product than the actual ingredient list on the back of packaging in the inference making process.

2.2.3. Size of (in)congruity

Matching packaging elements and product evaluations

In previous research, congruency (no mismatch) among different cues on a product's packaging design has shown to positively influence product evaluations such as brand impressions, perceived product value, and willingness to purchase (e.g. Bottomley & Doyle, 2006; Erdem & Swait, 1998, 2004). Congruency is defined as a certain extent of conformity between stimuli, cues, and features of the presented product (Krishna, Elder, & Caldara, 2010).

In an empirical research on congruency of product type and marketing colour, Bottomley, and Doyle (2006) showed that functional products (i.e. car tires) are best presented in a functional colour (i.e. blue) and that sensory-social products (i.e. perfume) benefit from presentation in corresponding sensory-social colours (e.g. red). Moreover, in food products and specifically fruit juices, effects of congruency between visual and actual food content have shown to positively affect hedonic evaluations. The previously mentioned Japanese study from Sakai and Morikawa (2007) showed that apple juice tasted better and flavours were perceived to be more intense accompanied with a visual

of an apple compared to visuals of an orange or the control (no visual). From these findings, research suggests that incongruence amongst different product cues, in contrast to congruence, elicits more negative product evaluations. Negative consumer responses after a perceived deviation from expectations, regardless of the direction of this deviation, can be explained by the basic model of *generalized negativity* proposed by Carlsmith and Aronson (1963). This model proposes that whenever a discrepancy is perceived between expectations and the actual product experience, a hedonically negative state in the individual is generated. Regardless of the direction of the discrepancy, this theory assumes a subsequent negatively affected judgement of the product. However, a more sophisticated model exists to explain deviations between inferred expectations and actual product perceptions, which will be elaborated in the next section.

Effects of a mismatch

Consumers' reaction to (their percept of) a product depends on the degree of (in)congruence. The relationship between the (dis)confirmation between inferred product expectations and actual product perceptions can best be explained by means of the '*assimilation-contrast model*' (Hovland, Janis, & Kelley, 1953; Piqueras-Fiszman & Spence, 2015) (Figure 1), a hybrid model combining the two models of *assimilation* and *contrast*. This model explains that whenever moderate incongruity occurs, incongruence between inferred expectations and actual perception, the percept could assimilate to what is expected. When the difference between inferred expectations and actual perception is large enough, contrast (i.e. mismatch perception) might occur instead. This will be further explained in the following paragraphs.

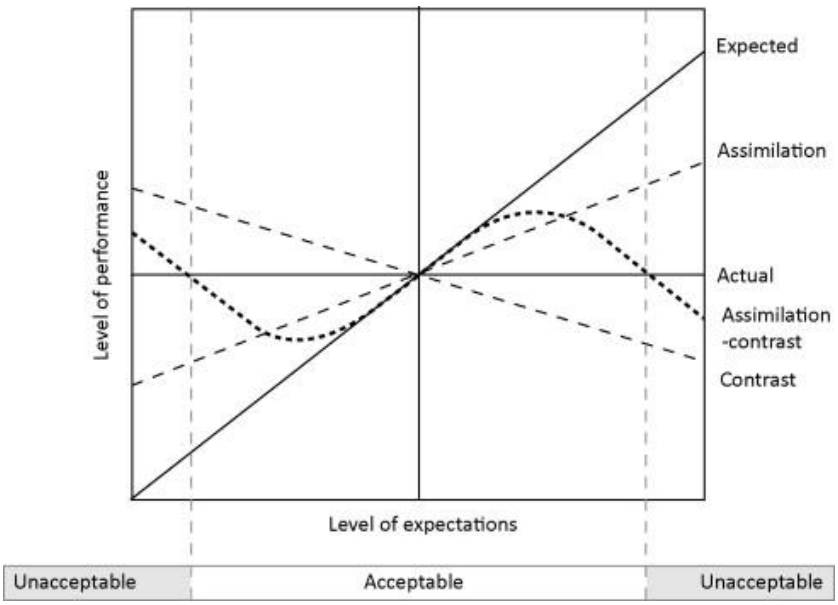

Figure 1. Assimilation contrast model. Retrieved from Piqueras-Fiszman & Spence, 2015.

In the case of food packaging, after having generated product expectations based on the extrinsic product attributes in the pre-consumption phase, the consumer will compare these product expectations with the actual product experience after tasting in the post-consumption phase. The brain will try to avoid discrepancies between what was expected and what is experienced (Piqueras-Fiszman & Spence, 2015). Discrepancy in this case could be the difference in perceived flavour ratio between what was expected and what is experienced. When the discrepancy between these two is relatively small, assimilation between the expectation and the experience will be likely to occur. The evaluation of the product will then shift into the direction of the expectation and the product perception will become similar or equal to the product expectation. However, when the discrepancy between expectation and experience is too big, contrast (i.e. mismatch) will occur (Anderson, 1983; Cardello, 2007; Deliza et al., 2003). As a result, the consumer will magnify the mismatch, and the evaluation of the product will shift in the opposing direction of the product expectation. Consequently, the product perception will become (very) different from the product expectation (Davidenko et al., 2015), with potential negative consequences as a result.

Translating this to the research at hand, with the depiction of a certain ratio of ingredient item on the packaging design, a perceived mismatch might occur in the post-consumption phase when flavour expectations of certain ingredients are high whilst the actual content of the depicted ingredients is low, thus then contrast is expected. The assimilation-contrast model will result in an advantage if the flavour expectation is high and the actual flavour perception is around average. Then the actual experience is similar enough to the expected flavour and will result in assimilation. In other words, the flavour experience will shift even more towards the flavour expectation and perception will assimilate with the expectation.

2.2.4. Processing fluency

Theory on processing fluency might be insightful in explaining the effects of (in)congruency amongst different stimuli on a product packaging and its effect on consumer response. According to fluency processing theory, stimuli that are easily processed (e.g. graphics and propositions), in general, are favourably evaluated and induce more positive attitudes (Lee & Labroo, 2004; Reber, Schwarz, & Winkielman, 2004).

The theory of fluency processing distinguishes perceptual and conceptual processing as two levels of processing. Perceptual processing involves the ease in which perceptual features (e.g. visual elements) of a certain stimuli (e.g. product packaging design) are being identified (Lee & Labroo, 2004; Reber et al., 2004). Conceptual fluency, by contrast, focusses on the ease of giving meaning to a certain stimuli (e.g. to the product), such as categorization of the product in a specific product group based on previous knowledge, making it unique for each consumer (Huber, Clark, Curran, & Winkielman, 2008).

Specifically relevant for this research, findings on fluent stimuli have shown to be perceived more credible compared to non-fluent stimuli, increasing consumer satisfaction (Reber et al., 2004; Unkelbach, 2007). This effect of congruency and fluency will be further discussed in the following subchapter (2.3) on perceived deception.

2.3. Perceived deception and (re)purchase intention

Perceived mismatch and perceived deception

Using ingredient item depiction on a product's packaging has shown to have positive effects on product evaluations, such as quality expectations. However, it is pertinent the bear in mind that these vivid images should not deviate too much from the actual product contained, to avoid the imagery to be perceived dishonest, potentially evoking feelings of deception.

Literature on deception essentially states that deception is viewed as an act that misleads the target party (Aditya, 2001), in this case the consumer. In the domain of marketing, Gardner (1975) developed a product and consumer based definition, describing the concept more behaviourally oriented and adding a dimension of perception. In his definition, Gardner (1975) states that deception occurs whenever a marketing element leaves a consumer with an impression or belief deviating from what could have been known with proper knowledge and that this impression or belief is factually untrue or potentially misleading. Moreover, he used the term *perceived deception* as the feeling of being fooled or tricked by marketing. In this study, incongruence amongst packaging elements could enhance perceived deception.

The importance of effective communication through packaging in order to prevent (perceived) deception was emphasized by a qualitative research executed by Underwood and Ozanne (1998). In their study, participants were guided through a grocery store and interviewed about their opinions and interpretations of 50 self-picked packages. The communication from manufacturer (package) to the consumer was found to be typified by a lack of trust. A reoccurring topic was that consumers frequently felt betrayed or duped by different packaging elements, of which the depicted imagery was often mentioned as an intentional form of misleadingness such as unrealistic image size on the packaging and exaggerated nutrition-oriented cues compared to the actual nutritional information. In order to create a good consumer-package relationship, the authors argued that four norms should be adhered in designing a product packaging: truthfulness, sincerity, legitimacy and comprehensibility. Defying these norms led consumers to avoid the products.

Whenever stimuli on a packaging are incongruent and with this communicate an ambiguous message towards the consumer, no accurate or clear inferences about the product can be made. In addition to creating confusion in assessing the identity of a product, incongruent stimuli might also lead to perceived deception. For instance, a product that claims to be 'lowered in sugar' but still has

50 percent of sugar per 100 grams, may lead consumers to confusion in assessing the healthiness of the product and the product's benefits, but also might leave the consumer with a feeling of being fooled or tricked. Following the statement that fluent information processing in general leads to more positive product evaluations (Lee & Labroo, 2004) and taken into account that stimuli congruence in product appearance have earlier shown to stimulate credibility evaluations (Hekkert, 2006), congruence expressed across ingredient item depiction on the packaging and the actual presented ingredient item list (no mismatch in pre- and post-consumption evaluations) is expected to lower the perceived deception.

In other words, whilst depicting images on a product's packaging serves several positive benefits, being potentially dishonest in overemphasising product visuals should be taken into account as this might affect consumers' perceived deception and corresponding willingness to (re)purchase. In this paper, it is proposed that the perceived deception of the product packaging serves as a mediator between the (mis)match and the purchase intention of these products.

Purchase intention following perceived deception

In this research, it is proposed that perceived deception leads to lower intentions to purchase the product. Research has shown that perceived deception leads to lower ratings of satisfaction (Mittal & Kamakura, 2001; Olsen, 2002). Moreover, it is known that satisfaction with a certain product increases the attitude towards that product (Olsen, 2002). The attitude of a consumer towards a product is in turn considered as the most important predictor of the behavioural intentions of consumers (Fishbein & Ajzen, 1975).

In addition, satisfaction has shown to have a direct effect on the trustworthiness of the product by the consumer (Erdem & Swait, 1998; Keller, 1993). However, whenever stimuli on the product's packaging are communicating inconsistent information, this is likely to cast doubt on a product's functioning (i.e. incongruence negatively affects credibility) and with this questioning the trustworthiness of the product (Underwood & Ozanne, 1998). Since trustworthiness of a product can be seen as a mediator for intentions to purchase the product, higher ratings of perceived deception are expected to lower a consumer's intention to purchase the product.

Overall, is expected that a perceived mismatch in both the pre- or post-consumption phase between the ingredient item depiction and the actual content negatively affects willingness to purchase the product via higher evaluations of perceived deception.

2.4. Individual differences in cognitive processing style

Individual differences in thinking style

Dominant cognitive processing style can have an impact on behaviour, product evaluation and food choice (Ares, Mawad, Giménez, & Maiche, 2014; Mawad, Trías, Giménez, Maiche, & Ares, 2015). Previous research on packaging design elements has found moderating effects of individual differences in information processing styles on consumer responses. Kollöffel (2012) made a distinction between so called *visualisers* and *verbalizers.* In addition, the way information is processed is determined by an individual's thinking style and differs among consumers (Kollöffel, 2012). In other words, in evaluation of both visual and textual packaging design elements to make inferences about a product, a preference for reliance on visual over verbal stimuli or vice versa could be influenced by an individual's cognitive processing style. Therefore, this potential effect will be considered in the following subchapter and explained by dual processing theory.

2.4.1. Dual processing theory

Within decision-making research, two broad basic preferences are distinguished: intuitive and deliberative decision-making, which is rooted in several dual process theories (e.g. Betsch & Kunz, 2008; Chaiken, 1980; Gawronski & Bodenhausen, 2006; Kahneman, 2011; Strack & Deutsch, 2004). Most widely acknowledged in dual processing theory on decision making is Kahneman's System 1 and System 2. System 1 can be described as the more implicit, intuitive, automatic, effortless, associative and fast system. In contrast, system 2 is characterised by reasoning in which processing goes slower, takes more effort, and happens more conscious. A general assumption in dual processing theory is that individuals differ in the degree they use intuition and deliberation in perception, thinking and solving problems.

2.4.2. Cognitive-experiential self-theory

Cognitive-experiential self-theory (CEST) is another dual processing theory described by Epstein, Pacini, Denes-Raj, and Heier (1996). The authors argue that individuals use an analytical-rational and an intuitive-experiential system for information processing. Although CEST conveys similar components to other dual processing theories, the uniqueness of this theory lays in the fact that it places a dual-process model within the context of a global theory of personality, instead of regarding it as an independent cognitive shortcut or construct (Epstein et al., 1996; Seymour Epstein, 2003). Also, in contrast to System 1 and System 2 processing, these systems are not inversely related, but rather operate in parallel. In general, the experiential system is argued to be the default mode in each situation, however, reliance on one over the other system differs amongst consumers and depends on a person's preference (Epstein, Pacini, Denes-Raj, & Heier, 1996). Another feature that differentiates CEST from other dual-processing theories, is that individual tendencies to rely on rational or

experiential thinking styles can be measured using a self-report inventory, the Rational-Experiential Inventory (REI) (Epstein, Pacini, Denes-Raj, & Heier, 1996; Epstein, 2003; Pacini & Epstein, 1999).

The REI consists of two scales, one to measure each thinking style. The first scale, built upon the original Need For Cognition (NFC) scale as developed by Cacioppo and Petty (1982), measures rational thinking. The second scale, established from questions of the Faith of Intuition (FI) scale as developed by Epstein, Pacini, Denes-Raj, and Heier (1996), measures experiential thinking. Whereas the NFC was designed to measure to what extent individuals have a tendency to invest cognitive effort in performing judgemental tasks (Cacioppo, Petty, Feinstein, Blair, & Jarvis, 1996), contrastingly, the FI scale measures individuals' tendency to rely on initial impressions and to trust their feelings in making decisions (Shiloh et al., 2002). In-depth, factual, logical information in making judgements is preferred by individuals scoring high on NFC (Cacioppo & Petty, 1982), whilst high scores on FI shows a more holistic way of judgement making, relying on an irrational degree positive thinking (Epstein, Pacini, Denes-Raj, & Heier, 1996).

A study of Ares, Mawad, Giménez, and Maiche (2014) was the first and only study known by the authors evaluating the effect of measured rational or intuitive cognitive style on information processing and consumer choices based on FOP labels. By means of an eye-tracking experiment, differences between rational and experiential processers could be distinguished in terms of their reliability on various elements of the label. A distinction between rational and intuitive thinkers was found in reliability on complex information, such as nutritional information, or on graphic design to make inferences about the product and base decisions on respectively.

Based on the above mentioned literature and the preliminary findings about the influence of thinking style on consumer evaluations of food products, it seems reasonable to expect that individual differences, within the context of CEST, will moderate the reliability on visual or verbal packaging cues in expected fruit ratio and perceived mismatch between the actual and depicted ingredient items on the packaging.

2.5. Conceptual model and hypotheses

Based on the theoretical findings concerning product evaluations and the use of ingredient item depiction on the FOP labels in marketing to alter these evaluations, a conceptual model with corresponding hypotheses was developed. The model presented in Figure 2, aims to serve as a basis for the empirical research in which the hypotheses will be tested.

This research assumes that after exposure to a food package design containing ingredient item depiction on the front of packaging inconsistent with the actual product within, dependent on individual cognitive processing style, a (mis)match of information perception could occur in both the

pre-consumption and post-consumption evaluation phase. Such a (mis)match perception, in turn, is assumed to lead to (higher) lower ratings of perceived deception, which will have (negative) positive consequences for the intention to purchase the product.

The first hypotheses consider the effect of visual and textual stimuli on the expected and perceived flavour ratio of the juice. As supported by literature and empirical research, imagery tends to be a significant factor in creating flavour expectations and perceptions (e.g. Chrysochou & Grunert, 2014). Moreover, consumers tend to spend little time evaluating packaging information and often form expectations by heuristics. Accordingly, hypothesis 1 and 2 were formulated:

Hypothesis 1: Regardless of the ingredient list shown, expected flavour ratio will be assimilated to the depicted ingredient item images on the front of packaging.

Hypothesis 2: Regardless of the ingredient list shown and the flavour of the juice, perceived flavour ratio will be assimilated to the depicted ingredient item images on the front of packaging.

The following hypothesis considers the effect of incongruence between packaging elements on mismatch perceptions. Effective communication through packaging has shown to be a predictor for trust in the product and higher ratings of willingness to purchase (Underwood & Ozane, 1998). As research has shown that consumers felt betrayed after perceiving discrepant packaging information such as unrealistic image size or exaggerated nutrition-information, it is expected that incongruity between the visual image on the front of pack and the ingredient list, will lead to mismatch perceptions.

Hypothesis 3: In both the pre- and post-consumption evaluation, (in)congruency between the visual and textual packaging elements will lead to (mis)match perceptions.

Perceived deception by a product may lead to negative consequences for a brand or retailer. As intention to purchase a product is largely determined by the attitude towards the product acquired from packaging information (Underwood & Klein, 2002), lowered feelings of deception are expected to increase intention to purchase. Perceived deception, in turn, is expected to be lower whenever a consumer is able to fluently process the information presented with, which is enhanced whenever congruent stimuli are presented (Hekkert, 2006). Therefore, overall it is expected that in both the pre— and post-consumption evaluation willingness to purchase is (negatively) positively influenced by (in)congruent packaging information, as this will lead to feelings of perceived deception, mediated by the perceived (mis)match from packaging. Hypothesis 4 and 5 are formulated accordingly:

Hypothesis 4: A perceived mismatch in both the pre- or post-consumption phase will increase ratings of perceived deception.

Hypothesis 5: Perceived deception will negatively affect an individual's intention to purchase the product.

The next hypotheses concern the moderating effect of cognitive processing style on the relation between the packaging design elements and the expected flavour ratio in the pre-consumption (H6a, H6b) and the perceived flavour ratio in the post-consumption phase (H7a, H7b). Also, a proposition on the moderating effect of cognitive processing style on a perceived (mis)match is made (H8).

In the pre-consumption phase, an individual's cognitive processing style is expected to affect the relationship between exposure to packaging design elements (ingredient item depiction vs actual ingredient list) and the expected flavour ratio, as well as the perceived mismatch between these elements from solely viewing the packaging. Since individuals high in need for cognition, rational processors, are analytical in their evaluations and enjoy engagement in deep cognitive processing, it is argued that consumers classified as 'dominant rational processors' are expected to evaluate both visual and textual cues on the packaging extensively, which makes them more prone to perceive a mismatch between these types of information in the pre-consumption phase in comparison to consumers classified as 'dominant experiential processors' who do not prefer to rely on informational packaging cues and might even be verbal information aversive (Lee & Labroo, 2004). Leading to the following hypotheses for the moderating effect of cognitive processing style on expected flavour ratio.

Hypothesis 6a: Before tasting the juice, consumers classified as *dominant experiential processors* will rely more on *visual stimuli* of the packaging in their expectation formation compared to *textual stimuli* and therefore assimilate their expected flavour ratio towards the depicted ingredient item images.

Hypothesis 6b: Before tasting the juice, consumers classified as *dominant rational processors* will rely more on *textual stimuli* of the packaging in their expectation formation compared to *visual stimuli* and therefore base their expected flavour ratio on the shown ingredient item list.

In addition, in the post-consumption phase, consumer classified as 'dominant experiential processors' are expected to rely more on visual design elements of a packaging in evaluating the product before tasting. In other words, following the notion of biased inference making from packaging design elements (Roe et al., 1999), such as halo effects and interactive effects, exposure to ingredient item depiction on the front of packaging is expected to have a greater impact on expectation formation of flavour ratios of the product than the actual ingredient list on the back of packaging in the inference making process. Therefore, consumers classified as 'dominant experiential processors' are expected to stop searching for more information after being exposed to an aesthetic ingredient item image on the FOP label and with this are less likely to perceive a mismatch whenever incongruent information

is displayed on the packaging (pre-consumption). Hence, they are expected to assimilate their actual flavour perception to whatever the visual packaging elements display. In contrast, since consumers classified as 'dominant rational processors' are expected more extensively analyse the packaging elements before tasting the product, they are expected to more consciously form expectations and with this are more likely to perceive the contrast between packaging and the product they taste, enhancing contrasting flavour evaluations. Therefore the following propositions are made:

Hypothesis 7a: After tasting the juice, consumers classified as *dominant experiential processors* will rely more on *visual stimuli* compared to *textual stimuli* and will therefore assimilate their perceived flavour ratio towards the depicted ingredient item images.

Hypothesis 7b: After tasting the juice, consumers classified as *dominant rational processors* will rely more on *textual stimuli* compared to *visual stimuli* and will therefore assimilate their perceived flavour ratio towards the ingredient item list.

Hypothesis 8: In both the pre- and post-consumption phase, consumers classified as *dominant rational processors* are significantly *more likely* to consciously perceive a (mis)match between visual ingredient item depiction on the FOP and the textual ingredient item list, compared to *dominant experiential processors.*

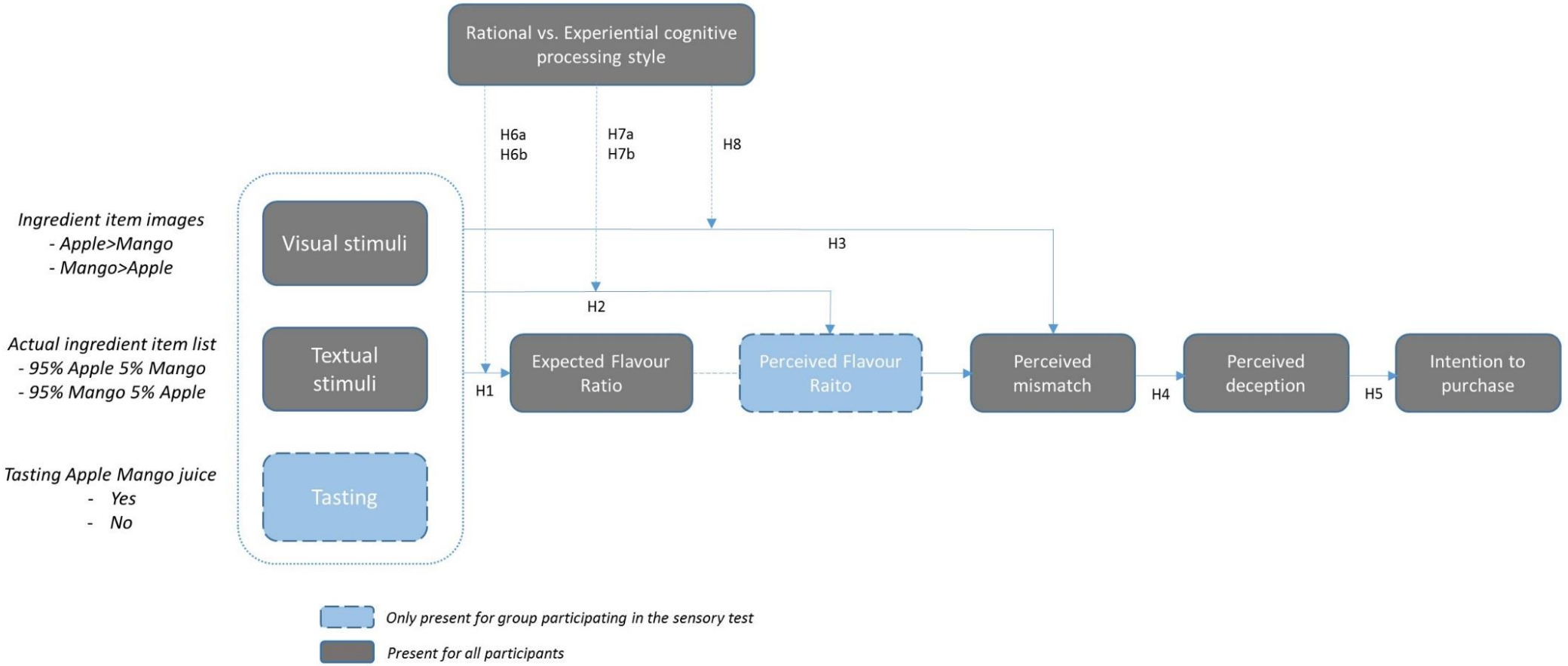

Figure 2. Conceptual model and corresponding operationalisation of levels to the factors

Main study

This study was conducted in order to reveal the role of ingredient item information on evoked feelings of deception by a product's packaging before and after tasting the product. When considering either congruence (matching) or incongruence (mismatching) with the actual content of a product displayed in the ingredient list, the effect of depicting ingredient images on the product's packaging on consumer evaluations was measured.

3. Methods

3.1. Design and Participants

Design

In this study, the effect of ingredient item depiction in the pre- and post-consumption phase was investigated by means of a 2x2x2 between-subjects experiment, in which respondents were asked to which extent they perceived a mismatch amongst the stimuli presented with (100% fruit juice packaging). The influence of three manipulated variables was tested; *visual ingredient elements* in terms of ingredient item depiction (high-expensive ratio vs low-expensive ratio), *textual ingredient elements* in terms of actual ingredient list (high-expensive ratio vs low-expensive), and a sensory test (either absent or present). Besides questions on the perceived (mis)match, other questions regarding the packaging were asked. These questions covered the feelings of deception evoked by the packaging and intentions to purchase the product. Subsequently, participants were asked questions about their personal characteristics, including cognitive processing style.

Respondents who participated in the sensory test, were also asked to rate their perceived flavour intensities of the ingredients presented with. They first got to see one of the four packages on a computer screen and were then asked to finish a 40 mL sample of a 100% Apple Mango juice after rating their expected flavour ratio. The sample was from the brand 'Innocent' was kept identical in each condition and was served within half an hour after pouring from fridge temperature (4°C). The juice contained the same two ingredients as the manipulated stimuli (apple *93.5%* and mango *6.5%* juice) and was used to calculate a respondent's perceived flavour ratio from the perceived flavour intensities, which was asked for after finishing the questions on perceived deception and intentions to purchase (dependent variables). Then, the questionnaire followed the same flow as described in 3.2 for all participants (tasting and non-tasting group).

Participants

An amount of at least 40 Dutch students per condition irrespectively of age and gender was aimed for, resulting in a minimum response of 320 respondents finishing the questionnaire, of which at least 160 in the sensory test (*post-consumption evaluation*). Respondents were recruited via

convenience sampling at the Wageningen University by randomly approaching people at the university, posting a message onto different Facebook pages, via flyers, and by means of the researcher's personal network. The test took place in a computer room at the Wageningen University being a so called, Central Location Test (CLT). The only requirements were that participants had to like 100% fruit juice in general and had to be of Dutch nationality, to limit familiarity with the product stimuli. This factor was controlled for during the gathering of participants. Participants were also asked for any allergies before starting the sensory testing.

3.2. Image stimuli

A "100% fruit juice" was chosen as the research object. This research object was chosen because it is a product often depicting ingredient items on the FOP label, which has earlier shown to be perceived as misleading by the Dutch consumer[1]. In addition, a wide variety of 100% fruit juices is available in the Dutch supermarket in terms of both flavours and brands. This wide range of alternatives is considered interesting, as it easily allows consumers the option of substitution to an alternative product or brand in case of perceptions of deception. Lastly, 100% fruit juice was chosen as a research object, because juices are frequently being researched in flavour evaluation studies for its homogeneous character in each sample (Machiels & Karnal, 2016; Sakai & Morikawa, 2007), it is assumed to be a relevant product category for the purpose of this research as well.

Four 100% fruit juice labels were designed in which only two factors were modified; the ingredient item depiction on the FOP label (Visual) and the actual ingredient list containing the percentages per ingredient of the juice (Textual). These two design elements were chosen in order to evaluate their contribution to the expected and perceived flavour ratios and (mis)match perceptions on consumer perceived deception evaluations and following intentions to purchase. Two levels were considered in the depiction of ingredient items, with on the one hand a *high-expensive ratio* for the expensive ingredient (mango) compared to the cheap ingredient (apple) and on the other hand a *low-expensive ratio* of these fruits. From now on these two levels will be simplified as "Visual High-Expensive" (V:A<M) and "Visual Low-Expensive" (V:A>M) respectively. Similarly, two levels were also used for the actual ingredient ratios in the ingredient list in percentages, from now on simplified as "Textual High-Expensive" (T:A<M) and "Textual Low-Expensive" (T:A>M) (Table 1).

[1] *In the Netherlands, non-profit campaigning organisation 'Foodwatch' is fighting misleading packaging information by handing out the 'Gouden Windei', a yearly audience award for the most misleading product. This campaign serves as a medium to addresses consumers in creating awareness to not always fully rely on the FOP marketing tricks, as well as a call to action to the Government, which according to Foodwatch still allows many forms of misleading by package design (FoodWatch, 2014). In 2017, 'Fruit Juice Healthy People" won the price for most misleading product because of their misleading ingredient item depiction on the FOP label.*

Table 1. Operationalisation of the two levels (High-Expensive with more mango and Low-Expensive with more apple) for both independent variables (visual and textual).

	Visual (V)	Textual (T)
High-Expensive (A<M)		93.5 % Mango 6.5 % Apple
Low-Expensive (A>M)		93.5 % Apple 6.5 % Mango

Combining these levels to create the stimuli for this research resulted in two congruent combinations and two incongruent combinations (Table 2). A visual representation of one of the four conditions can be seen in Figure 3.

All other elements of the packaging; shape, colour, typology, weight, size and brand were kept identical amongst the designs. The stimuli were adapted from the Apple Mango juice packaging of the British brand "Cawston" using Adobe Photoshop software. As the study took place in the Netherlands were Cawston juice is not retailed, recognition bias should be minimal and participants could not base their evaluations on prior experiences with the brand. A pre-test amongst Dutch students (*N*=16) of which 10 females, was ran to ensure an appropriate measurement tool regarding noticeability of the visuals on the packaging. Also, all manipulated stimuli were checked on 'realistic looks' by the same students.

Table 2: Overview of the 2 (visual) x 2 (textual) x 2 (tasting) experimental conditions in which 1-4 represent the pre-consumption evaluation and 5-8 the post-consumption evaluation.

Condition	Visual	Textual	Tasting	(In)congruity
1	V:A<M	T:A<M	No	Congruent
2	V:A<M	T:A>M	No	Incongruent
3	V:A>M	T:A<M	No	Incongruent
4	V:A>M	T:A>M	No	Congruent
5	V:A<M	T:A<M	Yes	Congruent
6	V:A<M	T:A>M	Yes	Incongruent
7	V:A>M	T:A<M	Yes	Incongruent
8	V:A>M	T:A>M	Yes	Congruent

INGREDIENTEN

8 geplette mango's (93,5%)

½ geperste appel (6,5%)

Figure 3. Example of one of the combinations of the packaging including the ingredient list from the Main Study

3.3. Procedure

Survey procedure

A short introduction to the questionnaire was given. Confirmation of Dutch nationality and liking of 100% fruit juice were stated as requirements to take part in the experiment. Also, participants agreed with the informed consent by proceeding with the questionnaire.

Then, respondents were presented with one of the four images of a 100% juice package. First, they were asked to answer three general statements about the package, in order for them to pay attention to this package (e.g., "I like the design of this package," "The packaging of this 100% fruit juice looks attractive to me," "The text on the front of the package is easy to read," all on a seven-point scale ranging from completely disagree to completely agree). None of these questions specifically focused on the ingredients of the juice.

After clicking on the next page, the image of the juice was no longer visible and respondents were asked to answer several questions about this packaging, concerning the dependent variables. The first page contained a question concerning the expected flavour intensities. After this point, participants in the tasting-conditions received a sample of the juice, after which the survey continued identically to the non-tasting conditions and questions on perceived deception and intentions to purchase were asked. By clicking on the next page, a specific question on the perceived mismatch between the stimuli presented with was asked for. After all questions on the dependent variables were asked, the juice sample was provided again in the tasting-condition and respondents were asked to rate their perceived flavour intensities. Moreover, some control questions on consumption of fruit

juices in general and liking of the combination of ingredients of this juice have to be filled in by all respondents.

In the next part of the experiment, respondents were asked questions about their dominant cognitive processing style, in order to test for possible moderating factors of individual processing style on expected/perceived flavour ratio and (mis)match perceptions regarding the packaging elements.

Lastly, the participants were asked to provide their demographic information. This included questions regarding gender, age, and current study status.

Central Location Test procedure

After entering the room, participants were seated behind a computer screen. Desks were separated by screens, so that participants could not see each other or the packages that other participants received. First, an oral instruction was given about the procedure. Participants were told to first read the introduction and informed consent on the screen. If this was clear and the respondents had no further questions, they were asked to start the survey which was almost identical in all conditions, starting with the questions to let them focus on the packaging. After rating the expected flavour intensities for the various ingredients, participants in the tasting-conditions were notified to raise their hand to receive a sample to taste (40 mL). The sampled juice (a premium brand of not-from-concentrate apple-mango juice) was kept identical in each condition and was served within half an hour after pouring from fridge temperature (4°C). The juice contained the same two ingredients as the manipulated stimuli (apple *93.5%* and mango *6.5%* juice). A blind pre-test (n=11) showed that participants were unable to clearly identify mango or apple from the juice.

After tasting the sample, the questionnaire as described in section 3.1.4. followed, containing questions on *willingness to purchase, perceived deception, (mis)match perceptions, control questions, cognitive processing style,* and *background characteristics.* Participants in the tasting-conditions were asked to raise their hand to receive the same sample again after which they were asked to rate their *perceived flavour intensities* after all questions concerning the dependent. In this way, respondents in the tasting condition could not be influenced from filling in the question on perceived flavour intensity during the questions concerning the other dependent variables, and only from tasting the juice itself.

3.4. Measures

In this section, the scales used to measure the constructs of interest are described. In this experiment, three independent variables were present. These independent variables considered two packaging elements regarding ingredient item communication; *visual ingredient item depiction* and *textual ingredient item list* and one sensory element; *tasting the product* either being absent (pre-consumption evaluation) or present (post-consumption evaluation). The effect of these three variables

on product evaluations was measured with help of five dependent variables: *expected flavour ratio, perceived flavour ratio, (mis)match perceptions*, *perceived deception,* and *purchase intention.* Furthermore, control variables were added to check whether participants were equally distributed among the eight different conditions. To check this randomisation, the following background and control variables were used; '*gender, age, student enrolment, frequency of 100% fruit juice consumption in general, liking of the combination of ingredients of the juice presented with (apple mango juice),* and *familiarity with the brand'.* Moreover, questions about an individual's cognitive processing style (i.e. either dominant *rational* or *experiential* processor) were asked to test whether these variables measuring individual differences had an influence on the constructs measured. As most items were adapted from previous studies in English, but the target group of this study are Dutch students, all chosen items were translated independently by two Dutch native researchers and translated back to English by a third to avoid interpretation bias (see Appendix I for complete questionnaire).

Dependent variables

Expected Flavour Ratio

In order to check whether the (in)congruent combinations in terms of ratios of the textual ingredient item list and the visual ingredient item images of the apples and mango's on the packaging had an effect on the expected flavour ratio of the participants, the following question was asked.

- Please rate the expected intensity of the following ingredients:

  Mango |----------|
  Orange* |----------|
  Banana* |----------|
  Apple |----------|

* *Banana and orange were added to distract from solely apple/mango*

In order to measure a participant's expected flavour *ratio* of the flavours interested in, a new variable of the relative measure between expected apple flavour intensity and expected mango flavour intensity was created, further referred to as 'expected flavour ratio'. Whenever a respondent had an expected flavour ratio greater (smaller) than zero, this means the participant expected the apple flavour of the juice to be more (less) intense compared to the mango flavour of the juice.

Perceived flavour ratio

For respondents in the post-consumption phase, perceived flavour ratio was measured by the same question as for the expected flavour ratio after trying the sample.

Two extra items were added to the questionnaire for respondents in the post-consumption group regarding perceived flavour ratio. The first considered the perceived flavour intensities and the other

was added to the statements considering the perceived (mis)match between expected flavour perception from the packaging and the actual flavour ratio perception after tasting.

- Please rate the how strong you perceive the intensities of the following ingredients

  Mango |----------|
  Orange* |----------|
  Banana* |----------|
  Apple |----------|

* *Banana and orange were added to distract from solely apple/mango*

Following the same procedure as for the expected flavour ratio, a subtraction variable was made to measure an individual's perceived flavour *ratio.* A subtraction was made between perceived flavour ratio of apple and perceived flavour ratio mango, further referred to as 'perceived flavour ratio'. With a score greater (smaller) than zero indicating that a respondent perceived the apple flavour of the juice as more (less) intense compared to the mango flavour of the juice.

Purchase intention

'Intention to purchase the product' was measured, adapted from scales on findings of previously held studies on this construct (Mathur 1998; Grewal et al., 1998; Dodds et al., 1991; Marketing Scales, 2016). The statements were adapted for this research object and measured with a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Reliability analysis resulted in an acceptable Cronbach's Alpha score of .84.

- It is very likely that I would consider this product
- I would definitely intend to buy this product
- If I were going to buy a 100% apple mango juice in the future, there would be a high probability of choosing this product

Perceived deception

The items chosen to measure the construct 'perceived deception', are based on previous research in the domain of consumer behaviour literature. Based on the operationalised definition of deception by Gardner (1975), two items were created by Darke and Ritchie (2007) to measure perceived deception. These items were adjusted for this research and were measured on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Reliability analysis showed that the items were internally consistent with a Cronbach's Alpha of .88.

- I feel tricked by the packaging of the 100% Apple Mango juice
- I feel betrayed by the packaging of the 100% Apple Mango juice

Mismatch perceptions

In order to test whether consumers were able to consciously detect a match or a mismatch between the two packaging elements, respondents were asked if they perceived a mismatch amongst the stimuli presented with to be answered with yes or no.

- Did you perceive a mismatch among the shown stimuli?

Whenever this question was answered with *yes,* the respondent was automatically guided to a question to check to what degree this mismatch was perceived between the depicted ingredient images and the actual ingredient item list. For the post-consumption group, it was also checked to which degree this mismatch was caused by a discrepancy between their expected and perceived flavour ratio. If the response to the first question was negative, these questions were automatically skipped.

- The mismatch I perceived was completely determined by the combination of the depicted ingredient item images and the ingredient list next to the packaging.
- The mismatch I perceived was completely determined by the flavour intensity I expected from the packaging and the actual flavours I perceived during tasting the sample.

<u>Moderating variable</u>

Cognitive processing style

In order to determine a respondent's dominant cognitive processing style, items from the revised version of the REI scale, developed by Pacini and Epstein (1999) was used. Originally, the revised Rational-Experiential Inventory (REI-40) has a separate scale for rational and experiential thinking styles, corresponding to analytic and heuristic processing respectively. The two subscales consist of *need for cognition* (NFC) (α = .90) and *faith in intuition* (FI) (α = .82). Respectively to NFC and FI, both scales consist of 20 items, divided by another subscale of engagement and ability, all measured on a 5-point scale ranging from 1 (*completely false)* to 5 *(completely true).* Reliable shortened versions of the REI-40 have been used previously (e.g. Novak & Hoffman, 2009), solely focussing on one's cognitive engagement, referring to one's reliance on and enjoyment of thinking either in an analytical, logical manner (rational scale) or on one's reliance on and enjoyment of feelings and intuitions in making decisions. Therefore, in this study, also the shortened version of the REI was used, consisting of the 5 highest scoring items in the factor analysis on NFC and 5 highest scoring items in the factor analysis on FI. To minimize order effect, the statements were presented in a randomized order. A previously created Dutch translation of the REI, developed by Witteman, van den Bercken, Claes, and Godoy (2009) was used, as this study was aimed at the Dutch consumer.

Need for Cognition

- I try to avoid situations that require thinking in depth about something. (reversed)
- I enjoy intellectual challenges.
- I don't like to have to do a lot of thinking. (reversed)
- I enjoy solving problems that require hard thinking.
- Thinking is not my idea of an enjoyable activity. (reversed)

Faith in Intuition

- I like to rely on my intuitive impressions.
- Intuition can be a very useful way to solve problems.
- I often go by my instincts when deciding on a course of action.
- I don't like situations in which I have to rely on intuition. (reversed)
- I think it is foolish to make important decisions based on feelings. (reversed)

Background characteristics and Control variables

Gender, age, and study status

Demographic classification of the respondent was measured, asking for *gender, age* and *study enrolment*. Gender was measured by asking respondents to indicate being "male", "female", or "other". Age was measured by asking "What is your age?". Subjects could indicate their age on a slider ranging from 15 to 85. To check whether respondents currently were students, the last question was "Are you currently enrolled as a student*?"* to be answered with either yes or no.

Frequency of fruit juice consumption

Participants were asked for their frequency of buying 100% fruit juices in general by choosing from "daily", "weekly", "monthly", "yearly", or "never". Also, they could indicate the degree to which they like 100% fruit juices in general and the specific combination of fruit they were showed with, by checking one of the boxes on a 7-point scale. In addition, two control questions were asked in order to check whether participants were familiar with the brand Cawston and if they ever consumed a juice from the brand before.

3.5. Data analysis

Descriptive information

First, before the dependent variables were studied to answer the hypotheses, the control variables were used to check whether respondents were equally distributed among the conditions. The variables used to check the randomised distribution were *gender, age, frequency of 100% fruit juice consumption, liking of 100% fruit juices in general, liking of the combination of ingredients of the*

juice presented with (apple mango juice), attractiveness of the packaging design (attractiveness) and *familiarity with the brand.* Differences between the groups were checked by making use of an ANOVA with a Bonferroni post-hoc test. The ANOVA test identified whether the mean values of each item scale of the eight conditions significantly differed from each other. The primary test results used to interpret the analysis were significance level and effect size. Significant variables were treated as covariates in further data analysis.

Main and interaction effects

In this study, the independent variables were *visual ingredient item depiction, textual ingredient list* and *tasting.* The hypothesis concerned the effect of these variables on product evaluations, which were measured with help of five constructs: *expected/perceived flavour ratio, (mis)match perceptions, perceived deception,* and *intention to purchase.* Statistical analysis of the main- and interaction effects of the packaging elements on these constructs were measured by means of Test of Equal Proportions and Factorial ANOVAs, reporting the effect size, for both pre- and post-consumption evaluations of the packages.

Furthermore, the influence of mismatch perception on perceived deception was tested with a One-Way ANOVA and the influence of perceived deception on intention to repurchase was measured by doing a linear regression analysis.

Moderation effect

In order to check for possible moderating effects of cognitive processing style, the REI questionnaire had to be analysed to verify that the scale indeed measured the two constructs of interest (rational and experiential thinking). First, responses on items 1, 3, 5, 9, and 10 of the REI scale were reversed as these were negatively framed in the survey. Then, the data was screened for univariate outliers, which were absent. The minimum amount of data for factor analysis was satisfied with a final sample of 436, providing a ratio of over 12 cases per variable.

A maximum likelihood analysis with orthogonal (Varimax) rotation was conducted on the 10 items of the REI. Reasonable factorability was suggested as each item correlated at least .3 with one other item and because the Kaiser-Meyer-Olkin measure of sampling adequacy was .78, which is above the commonly recommended value of .6 (Field, 2009). The two factors clearly showed eigenvalue's greater than 1 and together explained 37.75% of the variance of which 23.15% and accounted for the factor "Intuitive" (α = .796) and "Rational" (α = .647) respectively. The summary of exploratory factor analysis results for the REI-10 questionnaire (Appendix II, Table 2.1.) shows the factor loadings after rotation, percentage of variance and internal consistency scores per factor. The items clustering on the same components are indeed similar to the division between the NFC and FI scales of the REI.

Traditionally, REI results have been analysed in one of two different ways. The first is by taking the unadjusted continuous rational and experiential scales, performing regression analysis (Epstein et al., 1996; Pretz & Totz, 2007). The quadrant sorting analysis is the second mode of analysis and takes the median population splits to create four groups or quadrants (high experiential/low rational [Q1], high experiential/high rational [Q2], low experiential/low rational [Q3], low experiential/high rational [Q4]) (Figure 4) (Berger, 2007; Shiloh, Salton & Sharabi, 2000).

More recently, Gunnell and Ceci (2010) created a novel scale to capture and interpret the influence of one system over the other for each individual by calculating the distance from the median on each scale in relation to the other's distance from its median (Figure 5). This so called, Processing Style Influence (PSI) score, was developed to make finer predictions. The advantage of PSI scoring lies in its splitting the participants in Q2 and Q3, depending on their behaviours (see contrast between the traditional quadrant method in Figure 4 and the PSI method in Figure 5). By drawing a diagonal across the quadrant grid through the origin, Q3b and Q2b are included with the Q4 participants. Together, this group (Q2b, Q3b, Q4) represents the group of participants scoring higher on the rational than on the experiential scale (Gunnell & Ceci, 2010). Similarly, Q2a and Q3b can be merged with the individuals in Q1, together forming the more experientially oriented participants.

PSI-score = $[(\textit{Median Rationality Score}) - (\textit{Actual Rationality Score})]$

$+ [(\textit{Actual Experientiality Score}) - (\textit{Median Experientiality Score})]$

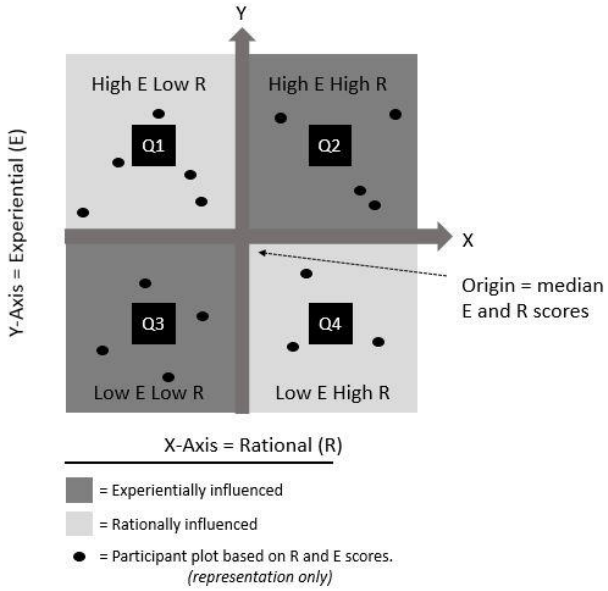

Figure 4. Illustration of traditional REI quadrant sorting. *Adapted from:* Gunnell and Ceci (2010).

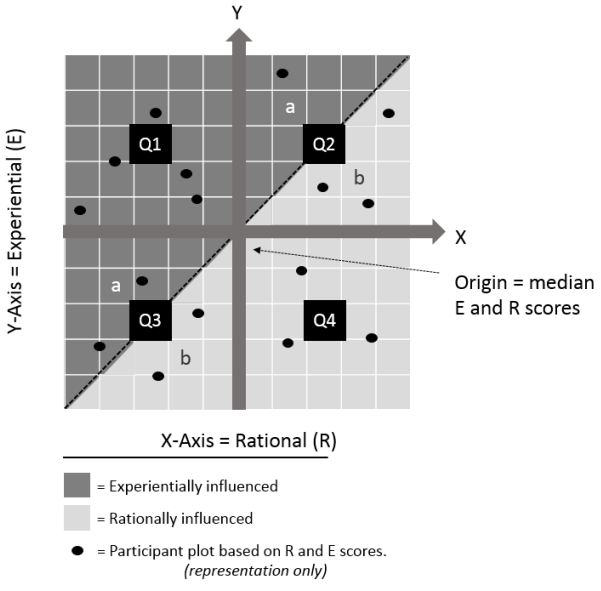

Figure 5. Illustration of how traditional Q2 and Q3 quadrants are parsed into High Experiential/Low Rational and Low Experiential/High Rational categories on the basis of PSI scores. *Adapted from:* Gunnell and Ceci (2010).

In this research, the PSI measure was used to interpret results of the REI to be able to test the hypotheses on the moderation effect of dominant processing style. As the PSI generates a numerical

measure, these numerical PSI-*scores* per participant can be used to *categorize* participants into dominant experiential processors (E-processors) and dominant rational processors (R-processors). A negative PSI-score reflects a dominant R-processor and a positive PSI-score places a participant in the dominant E-processor category. These PSI-*categories* were used to test the hypotheses on dominant thinking style (Gunnell & Ceci, 2010). If a significant effect of PSI-category was found, PSI-scores were considered to check *the degree of difference*. Factorial ANOVA and a test of equal proportions analysis were performed to check for the possible moderating effect of cognitive processing style on expected flavour ratio and (mis)match perceptions respectively.

Variable transformation and effect size

All data was analysed via the statistical software package IBM SPSS Statistics 22.0 by using a significance level of $p \leq 0.5$. To prevent multicollinearity, all predictors were rescaled by using effect coding (Aiken & West, 1991; Field, 2013). Visual, Textual, Tasting and PSI_category were centred around their means before computing the interaction terms, which were together with the main effects entered into the models (Appendix II, Table 2.1. and 2.2.). When a significant difference between the conditions was detected, the strength of the effect of the factor on the affected dependent variable was of interest. The effect size in ANOVA was measured by calculating the appropriate statistic omega squared (ω^2) (Appendix II, Figure 2.1) where its value varies between 0 and 1 where 0.01 accounts for a small effect, 0.06 for a medium and 0.14 accounts for a large effect size of the factor on the variable (Malhotra, 1981; Field, 2013). For a complete overview of the statistical tests used to check each hypothesis, see Appendix II (Table 2.2.).

4. Results

4.1. Descriptive information

4.1.1. Filtering invalid responses

A total of 475 respondents participated in the study of which 229 in the tasting conditions (post-consumption evaluation) and 246 in the non-tasting (pre-consumption evaluation). Six respondents who were familiar with the brand "Cawston" were deleted to prevent familiarity bias. Three respondents who indicated gender as 'other' also were deleted to foster equal gender distribution amongst the eight conditions.

Although the dataset only contained completed responses, this does not guarantee that each respondent completed the questionnaire with care. Therefore, the quality of the dataset was checked for response duration. In the non-tasting conditions, all respondents finishing the questionnaire in less than four minutes (*N*=30) were deleted, whereas in the tasting condition less than 7 minutes was set as the boundary (*N*=0). The final sample consisted of 436 Dutch students (*M*=20.85, *SD*=2.30) of which 214 in the pre-consumption conditions (104 males) and 222 in the post-consumption conditions (108 males) and were taken into account for data analysis. The distribution of respondents amongst the eight conditions can be found in Appendix III (Table 3.1.)

4.1.2. Distribution of gender and PSI-category across conditions

A chi-square test of independence was conducted in order to check whether dominant thinking style and gender distribution across all conditions (*N*=436) could influence the results. 'Condition' as independent variable was set out to 'gender' and 'PSI_category' as dependent variables. The result shod that both the distribution of gender ($X^2(1)=3.99$, $p=.780$) as well as PSI-category ($X^2(7)=2.98$, $p=.887$) were not significantly different amongst the eight conditions. Thus it can be concluded that gender did not influence the results. The distribution of gender and PSI-category amongst the eight conditions can be found in Appendix III (Table 3.2. and 3.3. respectively).

4.1.3. Randomisation check control variables

A randomization check was performed for the control variables *age, consumption frequency of 100% fruit juice in general (general frequency), liking of 100% fruit juice in general (liking 100% FJ), attractiveness of the pack (attractiveness)* and *liking of apple/mango juice in general (Liking AM FJ)* to check whether participants were equally distributed among the different conditions. A One-Way ANOVA was conducted to find out whether these variables could influence results because of the way in which they were distributed across the eight different conditions. These five control variables were set out against the factor 'condition' to check an equal distribution to be seen in Table 3.

Table 3. Differences across all conditions regarding randomisation checks, including a differentiation between the four non-tasting (pre-consumption) and the four tasting (post-consumption) conditions.

	Pre-consumption conditions					Post-Consumption conditions					
Randomisation checks	**1 Mean (SD) *N*=52**	**2 Mean (SD) *N*=53**	**3 Mean (SD) *N*=55**	**4 Mean (SD) *N*=54**	***P* value PreC *N*=214**	**5 Mean (SD) *N*=55**	**6 Mean (SD) *N*=56**	**7 Mean (SD) *N*=55**	**8 Mean (SD) *N*=56**	***P* value PostC *N*=222**	***P* value Comb N=436**
Age	20.86 (2.07)	20.66 (2.14)	21.25 (2.44)	20.43 (2.29)	.265	21.05 (2.23)	21.04 (2.64)	20.96 (2.17)	20.5 (2.38)	.550	.520
General Frequency	2.69 (0.67)	3.02 (0.87)	2.90 (0.88)	3.09 (0.94)	.081	3.16 (0.98)	3.00 (0.79)	2.78 (0.76)	2.84 (0.80)	.075	.056
Liking 100% FJ	5.29 (1.65)	5.28 (1.83)	5.15 (1.63)	4.69 (1.89)	.240	4.87 (1.81)	5.21 (1.70)	5.38 (1.56)	5.55 (1.61)	.175	.184
Liking AM FJ	5.42 (1.72)	5.55 (1.61)	5.38 (1.78)	5.07 (1.74)	.530	5.35 (1.36)	5.82 (1.52)	5.85 (1.39)	5.5 (1.39)	.168	.184
Attractiveness	5.46 (1.28)	5.43 (1.32)	5.09 (1.32)	5.09 (1.1)	.091	5.45 (1.57)	5.61 (1.31)	5.24 (1.47)	5.66 (0.94)	.346	.193

Note: Numbers (except *age* and *PSI_score*) represent mean scores on each of the scales (7-point scales for Liking 100% FJ, Liking AM FJ and attractiveness; 5-point scale for general frequency).

This test showed that 'Age' ($F(7,435)=0.88$, p=ns), 'General Frequency' ($F(7,435)=1.98$, $p=.056$), 'Liking of 100% FJ' ($F(7,435)=1.45$, $p=.184$), and 'Liking AM FJ' ($F(7,435)=1.45$, $p=.184$) were not significantly different on the $p < .05$ level between the eight different conditions. Thus, it can be concluded that outcomes of all control variables were equally distributed among conditions.

4.2. The effect of visual and textual packaging elements on expected flavour ratio

Table 4 provides an overview of the means and standard deviation for the outcome on different dependent variables in every condition. The first step in the analysis was to check whether the independent variables affect expected flavour ratio measured on a subtraction scale expected Apple-Mango (N=436). A Full Factorial ANOVA was run with IVs *visual* and *textual* on the DV *expected flavour ratio.*

Table 4. ANOVA Table with Mean (S.D) for each condition on the dependent variables (DV) including F values with corresponding significance levels and effect sizes for the main and all possible two- and three-way interaction effects of *visual* (V), *textual* (T) and *tasting* (TA). Whenever a respondent had an expected flavour ratio greater (smaller) than zero, this means the participant expected the apple flavour to be more (less) intense compared to the mango flavour of the juice.

DV	Non-tasting conditions				Tasting conditions				Factors in the model for each DV						
	V:A<M T:A<M N = 52	V:A<M T:A>M N = 53	V:A>M T:A<M N = 55	V:A>M T:A>M N = 54	V:A<M T:A<M N = 55	V:A<M T:A>M N = 56	V:A>M T:A<M N = 55	V:A>M T:A>M N = 56	Visual F (p value) **ω²**	Textual F (p value) **ω²**	Tasting F (p value) **ω²**	V x T F (p value) **ω²**	V x Ta F (p value) **ω²**	Ta x T F (p value) **ω²**	V x Ta x T F (p value) **ω²**
Expected Flavour Ratio *	-46.9[a] (33.6)	10.6[b] (42.9)	-46.6[c] (34.5)	20.2[d] (42.9)	-	-	-	-	1.82 (.178) n.s.	**280.05 (<.001) 0.394**	-	1.58 (.209) n.s.	-	-	-
Perceived Flavour Ratio	-	-	-	-	-0.7 (47.9)	0.7 (44.8)	-10.2 (50.7)	16.6 (46.0)	0.26 (.610) n.s.	**4.89 (.028) 0.017**	-	**3.98 (.047) 0.013**	-	-	-
Perceived Deception	2.5 (1.4)	2.7 (1.6)	3.3 (1.6)	2.6 (1.4)	2.9 (1.5)	2.6 (1.4)	2.7 (1.4)	2.7 (1.5)	1.14 (.286) n.s.	1.78 (.182) n.s.	0.25 (.617) n.s.	1.41 (.236) n.s.	2.13 (.145) n.s.	0.17 (.682) n.s.	3.59 (.059) n.s.
Purchase Intention	4.5 (1.3)	4.5 (1.1)	3.9 (1.4)	4.4 (1.2)	5.0 (1.3)	4.9 (1.1)	5.1 (1.1)	4.9 (1.3)	1.38 (.241) n.s.	0.23 (.634) n.s.	**28.71 (<.001) 0.06**	.17 (.677) n.s.	2.99 (.106) n.s.	2.62 (.106) n.s.	1.15 (.285) n.s.

Note 1: In bold the significant values on significance level p < .05
Note 2: V stands for visual, T stands for textual, A<M stands for dominant mango, A>M stands for dominant apple

* A total *N* = 436 was taken for Expected Flavour Ratio as no division between tasting and non-tasting condition can be made at this point. Therefore N for tasting and non-tasting in each combination of visual and textual ingredient information is added up forming 4 conditions a *N* = 107, b *N* = 109, c *N* = 110, d *N* = 110. Negative values for Expected/Perceived Flavour Ratio indicate a dominant expected/perceived mango flavour, positive scores indicate a dominant expected/perceived apple flavour.

A significant main effect of the ingredient list shown next to the package (textual) on the expected flavour ratio with a large effect size ($F(1,432)=280.05$, $p < .05$ $\omega^2 = .394$) was found. This indicates that a significant difference exists between showing a higher percentage of mango in the ingredient list (*M*=-46.7, *SD*=2.6), compared to showing a higher percentage of apple on the ingredient list (*M*=15.4, *SD*=2.7) on an individual's expected flavour ratio.

No main effects of the ingredient item depiction (visual) on the expected flavour ratio ($F(1,432)=1.82$, $p=.178$) and the interaction effect of visual and textual ingredient item information ($F(1,432)=1.58$, $p=.209$) were found.

In other words and contrasting the hypothesis, regardless of the depicted ingredient image on the front of the package, consumers assimilated their expected flavour ratio towards the ingredient item list shown.

4.2. The effect of visual and textual packaging elements on perceived flavour ratio

The second step in the analysis was to check whether the independent variables affect perceived flavour ratio of the participants who took part in the sensory test measured on a subtraction scale perceived Apple-Mango (*N*=222). Whenever a respondent had an expected flavour ratio greater

(smaller) than zero, this means the participant perceived the apple flavour to be more (less) intense compared to the mango flavour of the juice. A Full Factorial ANOVA was run with IVs *visual* and *textual* on the DV *perceived flavour ratio* (Table 4).

Opposite to expectations, again a no main effect was found for the ingredient item depiction (visual) on the perceived flavour ratio ($F(1,218)=0.26$, p=ns). A main effect with a rather small effect size was found for the ingredient list shown next to the package (textual) on the perceived flavour ratio ($F(1,218)=4.89$, $p<.05$ $\omega^2=.017$). This indicates that a significant difference exists between showing a higher percentage of mango in the ingredient list (M=-5.4, SD=4.5), compared to showing a higher percentage of apple on the ingredient list (M=8.6, SD=4.8) and thus assimilation of an individual's perceived flavour ratio towards the textual packaging cue.

Furthermore the interaction effect between visual and textual ingredient items on the perceived flavour ratio showed a significant result with a small effect size ($F(1,218)=3.98$, $p<.05$ $\omega^2=.013$). Indicating that the different images were affected differently accompanied by the different ingredient lists (see Figure 6). If the picture with more apples compared to mangos was shown, dependent on the ingredient list shown next to it, participants either perceived a dominant mango flavour (M=-10.2, SD=6.4) or a dominant apple flavour (M=16.6, SD=6.3), indicating assimilation towards the ingredient list shown whenever more apples were depicted on the front of packaging.

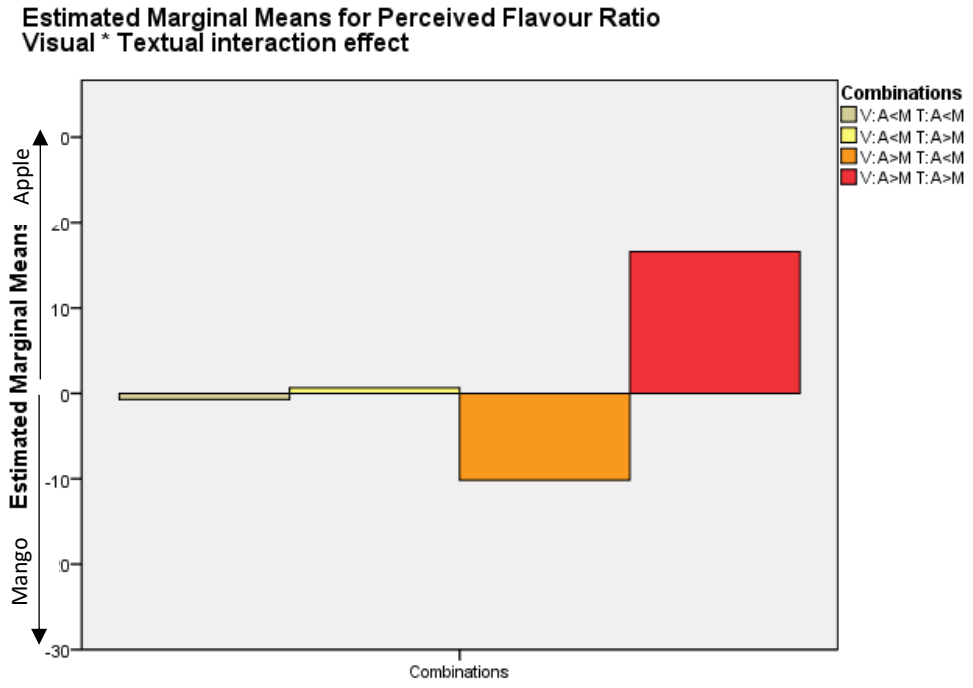

Figure 6. Perceived Flavour Ratio of different FOP-images for the different ingredient lists shown.
Note: V stands for visual, T stands for textual, A<M stands for dominant mango, A>M stands for dominant apple, A<M stands for dominant mango.

However, the figure shows that for the visual with more mango compared to apple, perceived flavour ratio for apple and mango only marginally differs, in both cases being nearly zero, indicating a 50:50 flavour ratio regardless of the ingredient list shown next to it. Meaning that the apple percept gets diminished by the label. In other words and contrasting the hypothesis, textual packaging cues are a stronger predictor of perceived flavour ratio compared to visual packaging information, but mostly when more apples (v.s. more mangoes) are displayed.

4.3. The effect of (in)congruency amongst visual and textual packaging elements on (mis)match perceptions

Mismatch perceptions from (in)congruent information were measured for both the participants in the tasting (*N*=222) as well as the non-tasting conditions (*N*=214). Therefore, a cross-tabulation with congruency and mismatch perceptions including chi-square test of equal proportions was conducted twice to measure both mismatch perceptions solely from packaging information and for mismatch perceptions after tasting the product (Table 5) in order to answer the hypothesis on both the pre- and post-consumption evaluation.

Table 5. Proportions of perceived mismatch amongst (in)congruent conditions in pre- and post-consumption evaluation

	Conditions		Perceived mismatch		Total
			Yes	No	
Pre-consumption	Congruent	Count (%)	17 (16.0%)	89 (84.0%)	106 (100%)
N=214	Incongruent	Count (%)	30 (27.8%)	78 (72.2%)	108 (100%)
Post-consumption	Congruent	Count (%)	33 (29.7%)	78 (70.3%)	111 (100%)
N=222	Incongruent	Count (%)	37 (33.3%)	74 (66.7%)	111 (100%)

Pre-consumption evaluation

A chi-square test of equal proportions was conducted in order to check whether mismatch perceptions differed between the congruent and incongruent conditions in the pre-consumption phase. A significant test result ($X^2(1)=3.99$, $p=.038$) showed that a mismatch perceptions differed amongst congruent and incongruent conditions. In line with the proposition, in the congruent conditions 16.0% of respondents perceived a mismatch, which is substantially lower compared to 63.8% in the incongruent conditions.

Additionally, to check for which conditions this was the case, another cross tabulation was created with perceived mismatch set out against the four conditions of which two were congruent and two were incongruent (Table 6). Chi-square test of independence again showed a significant result ($X^2(1)=1.289$, $p=.001$). Unexpectedly, but in line with the interaction effect in figure 6, in the incongruent condition visualising more mango in the picture accompanied with an ingredient list indicating a large amount of apple, the mismatch was not clearly perceived. Only in the incongruent

condition depicting more apples on the front of pack accompanied with an ingredient list showing more mangos, 41.8% of the respondents perceived this incongruity as a mismatch.

In the congruent conditions, no mismatch between the ingredient image on the front of packaging and the ingredient list on the bottom of the pack was present. Therefore, additionally the answers of the 17 respondents indicating a mismatch in the congruent conditions were further analysed. Out of 17 perceived mismatches in the congruent conditions, 15 were completely unrelated to the ingredient information on the packaging (e.g. "I think a lot of sugar is added to these kind of drinks", "I think a transparent packaging would suit 100% juice better", "I did not taste so I do not know"). The other 2 did indicate a mismatch between ingredient item depiction and the ingredient list, of which one respondent commented on the name of the juice being 'Apple Mango' juice, suggesting more apple whilst (in their condition) mango was the main ingredient which was considered mismatching.

Table 6. Proportions of perceived mismatch amongst (in)congruent conditions in pre-consumption evaluation.

Conditions		Perceived mismatch		Total
		Yes	No	
Congruent VT:A<M	Count (%)	9 (17.3%)	43 (82.7%)	52 (100%)
Congruent VT:A>M	Count (%)	8 (14.7%)	46 (85.2%)	54 (100%)
Incongruent V:A<M T:A>M	Count (%)	7 (13.2%)	46 (86.8%)	53 (100%)
Incongruent V:A>M T:A<M	Count (%)	23 (41.8%)	32 (58.2%)	55 (100%)

Note: V stands for visual, T stands for textual, A<M stands for dominant mango, A>M stands for dominant apple

Post-consumption evaluation

A chi-square test of equal proportions was conducted in order to check whether mismatch perceptions differed between the congruent and incongruent conditions in the after tasting the product in the post-consumption evaluation. In contrast to the non-tasting group, for the tasting group in the post-consumption evaluation, a non-significant test result ($X^2(1)=.334$, p=.563) showed that mismatch perceptions did not differ amongst congruent and incongruent conditions.

As the results for mismatch perception between congruent and incongruent conditions was inconsistent in the pre-consumption evaluation and non-significant in the post-consumption evaluation, no conclusions can be drawn on the effect on incongruity between visual and textual packaging elements on mismatch perceptions.

4.4. Influence of mismatch perception on perceived deception

In the created model, it was assumed that in both the pre- or post-consumption evaluation (N=436), a perceived mismatch would increase ratings of perceived deception and vice versa. Whether mismatch perceptions indeed influence feelings of perceived deception, was investigated by a One-

Way ANOVA (Table 4). In this ANOVA, 'a perceived mismatch in depicted images vs ingredient list' was the independent variable and 'perceived deception' the dependent variable. In line with expectations, a significant effect was found between mismatch perceptions and perceived deception (F(1,434)=178.98, p=< .05), indicating that people who perceived a mismatch (M=4.1, SD=1.4) felt more deceived by the packaging of the juice compared to people who did not perceive a mismatch (M=2.9, SD=1.2). Hypothesis 4 could therefore be accepted.

Additionally, to check whether mismatch perceptions serve as a mediator between packaging information and perceived deception, a Full Factorial ANOVA was run with IVs *visual, textual,* and *tasting* and their two- and three-way interactions on the DV *perceived deception.* No significant main effects were found from the image shown on the package (F(1,428)=1.14, p=.286), the ingredient list shown next to the package (F(1,428)=1.78, p=.182), or from tasting the product (F(1,428) = 0.25, p=ns) on perceived deception. Furthermore, none of the interaction effects between these variables was found to be significant either, with *visual x textual* (F(1,428)=1.41, p=ns), *visual x tasting* (F(1,428)=2.13, p=.145), *textual x tasting* (F(1,428)=0.17, p=ns), and *visual x textual x tasting* (F(1,428)=3.59, p=.059). In other words, neither the packaging information nor tasting the product had a direct effect on perceived deception. However, from the strong significant effect of the ANOVA from perceived mismatch on perceived deception as described in the previous a mediating role of mismatch perceptions on perceived deception is evident. Therefore, it can be concluded that perceived deception is mediated by perceived mismatch.

Additionally, and to see which of the two possible mismatches plays a larger role in feelings of perceived deception, two linear regressions were performed on the scores among the people who did perceive a mismatch (N_{total}=117). In the non-tasting group (N=47) the regression only contained mismatch perceptions between visual and textual ingredient information and amongst the perceived mismatches in the tasting conditions (N=70) both mismatch perceptions; between *visual and textual ingredient information* and between the *expected and perceived flavour intensities* were included in the model.

For the mismatch perceptions in the non-tasting group, a significant regression equation was found for mismatch perceptions between the depicted ingredient items and the actual ingredient list in the non-tasting group (F(1,45)=17.27, p <.05), with an R^2 of .190. The linear regression showed that mismatch perceptions between the depicted ingredient items and the actual ingredient list indeed affect perceived deception, with an increase of perceived deception with .21 points out of 7 for each point increase in perceived mismatch.

For mismatch perceptions in the tasting-group, again a significant regression equation was found (F(2,67)=8.36, p<.05), with an R^2 of .200. Here, the mismatch from packaging elements was

found to be non-significant (p=.062). However, in this model only the mismatch between expected and perceived flavour ratio was significant (p <.05) with a constant of 1.840 and an B of .402. Indicating that an increase in mismatch perception between the expected and perceived flavour ratio of one unit, increases perceived deception by .4 point out of seven, which is much larger compared to the increase in perceived deception from the mismatch in the non-tasting group. These results suggest that a mismatch between the expected and perceived flavour ratio plays a larger role on perceived deception than the mismatch in visual and textual packaging elements.

Also, an independent-samples t-test was conducted to compare perceived deception between respondents getting to see the congruent (non-misleading) ingredient information pack and the incongruent (misleading) ingredient information pack (N=436). Results indicated a non-significant trending in the predicted direction indicating higher ratings of perceived deception for the incongruent condition (M=2.7, SD=1.4) compared to the congruent condition (M=2.9, SD=1.5), t(434)=-1.17, p=.243.

4.5. Influence of perceived deception on willingness to purchase

In the created model, it was hypothesised that the greater feelings of perceived deception, the lower the willingness to purchase would be. Whether perceived deception indeed influences willingness to purchase was investigated by a simple linear regression. In this linear regression, 'perceived deception' was the independent variable and 'willingness to purchase' the dependent variable. A significant regression equation was found (F(1,434)=50.35, p=.001), with an R^2 of .104. Participants' predicted willingness to purchase the juice decreased with 0.29 point out of 7 whenever perceived deception increased with one point measured on a 7-point scale. In other words and in line with the proposition, the more deceived a person feels from the product, the lower their willingness to purchase it will be.

Additionally, an independent-samples t-test was conducted to compare willingness to purchase between respondents getting to see the congruent (non-misleading) ingredient information pack and the incongruent (misleading) ingredient information pack (N=436). Results indicated a non-significant trending in the predicted direction indicating higher willingness to purchase for the congruent condition (M=4.7, SD=1.3) compared to the incongruent condition (M=4.6, SD=1.3), t(434)=0.43, p=.668.

4.6. Processing Style Influence as a moderating factor

Hypotheses 6 through 8 state that the main effects of visual and textual stimuli on expected flavour ratio, perceived flavour ratio, and mismatch perceptions are influenced (moderated) by the preference for and reliance on a certain cognitive processing style. The paragraphs below will show the results of each of the hypotheses.

4.6.1. The effect of dominant processing style on expected flavour ratio

Hypothesis 6a and 6b consider the moderating effect of dominant cognitive processing style on expected flavour ratio. A Full Factorial ANOVA (*N*=436) was performed with IVs *visual, textual,* and *PSI_category* on the DV *expected flavour ratio.*

The analysis of interest for hypothesis 6a and 6b tests whether a significant interaction occurs between dominant thinking style, visual and textual packaging elements. Nevertheless, this interaction showed a non-significant result ($F(1,428)=0.01$, $p=.970$). Indicating that reliance on one over the other packaging element in creating an expected flavour ratio is not affected by dominant thinking style.

4.6.2. The effect of dominant processing style on perceived flavour ratio

Hypothesis 7a and 7b consider the moderating effect of dominant cognitive processing style on perceived flavour ratio. A Full Factorial ANOVA was performed on the group tasting the juice (*N*=222) with IVs *visual, textual,* and *PSI_category* on the DV *perceived flavour ratio.*

The analysis of interest for hypothesis 7a tests whether a significant interaction occurs between dominant thinking style, visual and textual packaging elements. Nevertheless, this interaction showed a non-significant result ($F(1,214)=2.08$, $p=.150$). Indicating that reliance on one over the other packaging element in creating an perceived flavour ratio is not affected by dominant thinking style.

4.6.3. The effect of dominant processing style on mismatch perceptions

The moderating effect of dominant thinking style on mismatch perceptions was measured for both the participants in the tasting (*N*=222) as well as in the non-tasting (*N*=214) conditions. Therefore, after splitting the data by dominant thinking style, a cross-tabulation with congruency and mismatch perceptions including chi-square test of equal proportions was conducted twice to measure both mismatch perceptions solely from packaging information (Table 7) and for mismatch perceptions after tasting the product (Table 8) in order to answer the hypothesis on both the pre- and post-consumption evaluation.

Table 7. Proportions of perceived mismatch amongst (in)congruent conditions in pre-consumption evaluation for primary E-processors and primary R-processors.

	Conditions		Perceived mismatch Yes	Perceived mismatch No	Total
Primary E-processors *N*=93	Congruent	Count (%)	11 (22.0%)	39 (78.0%)	50 (100%)
	Incongruent	Count (%)	13 (30.2%)	30 (69.8%)	43 (100%)
Primary R-processors *N*=121	Congruent	Count (%)	6 (10.7%)	50 (89.3%)	56 (100%)
	Incongruent	Count (%)	17 (26.2%)	48 (73.8%)	65 (100%)

Pre-consumption evaluation

A chi-square test of equal proportions was conducted in order to check whether mismatch perceptions differed amongst primary E-processors and primary R-processors between the congruent and incongruent conditions in the pre-consumption phase (Table 7). A non-significant test result ($X^2(1)=0.76$, $p=.383$) showed that a being able to perceive a mismatch in the congruent or incongruent conditions was not enhanced by dominant cognitive processing style. In other words, no moderating effect of dominant processing style on mismatch perceptions from visual packaging cues in combination with textual information was found.

Table 8. Proportions of perceived mismatch amongst (in)congruent conditions in post-consumption evaluation for primary E-processors and primary R-processors.

	Conditions		Perceived mismatch Yes	Perceived mismatch No	Total
Primary E-processors *N*=97	Congruent	Count (%)	12 (25.0%)	36 (75.0%)	48 (100%)
	Incongruent	Count (%)	16 (32.7%)	33 (67.3%)	49 (100%)
Primary R-processors *N*=125	Congruent	Count (%)	21 (33.3%)	42 (66.7%)	63 (100%)
	Incongruent	Count (%)	42 (33.9%)	83 (66.1%)	125 (100%)

Post-consumption evaluation

A chi-square test of equal proportions was conducted in order to check whether mismatch perceptions differed amongst primary E-processors and primary R-processors between the congruent and incongruent conditions in the pre-consumption phase (Table 8). A non-significant test result ($X^2(1)=0.369$, $p=.544$) showed that a being able to perceive a mismatch in the congruent or incongruent conditions was not influenced by dominant cognitive processing style. Therefore, hypothesis 8 can also not be supported for mismatches after tasting the juice. Overall, no moderating effect of dominant processing style on mismatch perceptions from visual packaging cues in combination with textual information was found.

Interim discussion

A conceptual replication of the main study was conducted to check whether the deviating findings from the main study could be due to the cue salience of the textual information. In the main study, the manipulation showed the packaging including a visual of the ingredient items, accompanied with the corresponding textual information in a box next to the packaging. The salience of the textual information, which is normally represented on the back of the packaging, might have drawn attention. Therefore, the main study was replicated for the pre-consumption evaluation online (Study 2), with a new design of the stimuli (see Figure 7 for an example). In this manipulation, the textual information

was put less salient on the package to create a more realistic design. Furthermore, the analysis as performed were the same as in the main study.

Figure 7. Example of one of the combinations of the packaging including the ingredient list as used in Study 2.

Study 2

5. Methods

5.1. Data preparation and sample description

A total of 335 respondents filled in the online questionnaire, of which 87 did not finish. Non-students (*N*=11) and respondents familiar with the brand "Cawston" were deleted (*N*=1). All respondents filling in the survey in less than four minutes also were deleted (*N*=20). The final sample consisted of 216 Dutch students (57 males) (*M*=22.84, *SD*=4.9) that were taken into account for data analysis.

For this second study, internal consistency of the scale items was measured again using SPSS, in computing reliability coefficients for each construct. All scales used to measure the constructs had an adequate internal consistency; willingness to purchase (α=.87), perceived deception (α=.82).

Furthermore, factor analysis with varimax rotation was performed on the 10 items of the REI. The two factors clearly showed eigenvalue's greater than 1 and together explained 38.74% of the variance of which 24.17% and accounted for the factor "Intuitive" (α = .76) and "Rational" (α = .68) respectively. The PSI measure as described in section 3.1.5. of the data analysis was performed on the mean of the two constructs to indicate the PSI-category of each respondent.

A chi-square test of independence was conducted in order to check whether dominant thinking style and gender distribution across all conditions (*N*=216) could influence the results. The result showed that both the distribution of gender (X^2(1)=5.03, *p*=.173) as well as PSI-category (X^2(1)=3.45, *p*=.327) were not significantly different amongst the eight conditions. Thus it can be concluded that gender did not influence the results. The distribution of gender and PSI-category amongst the eight conditions can be found in Table 9.

Table 9. Distribution (N) of gender and PSI category across conditions.

	VT:A<M	V:A<M T:A>M	V:A>M T:A<M	VT:A>M	Total
Males	20	10	14	13	57
Females	34	44	40	41	159
E-processor	17	25	24	25	91
R-processor	37	29	30	29	125

Note: V stands for visual, T stands for textual, A<M stands for dominant mango, A>M stands for dominant apple

A randomization check was performed for the control variables *age, consumption frequency of 100% fruit juice in general (general frequency), liking of 100% fruit juice in general (liking 100% FJ), liking of apple/mango juice in general (Liking AM FJ)* and *attractiveness of the design* (*attractive*) to check whether participants were equally distributed among the different conditions. A One-Way ANOVA was conducted to find out whether these variables could influence results because of the way

in which they were distributed across the eight different conditions. These five control variables were set out against the factor 'condition' to check an equal distribution to be seen in Table 10.

Table 10. Differences across all conditions regarding randomisation checks.

Randomisation checks	V:A<M T:A<M Mean (SD) *N*=54	V:A<M T:A>M Mean (SD) *N*=54	V:A>M T:A<M Mean (SD) *N*=54	V:A>M V:A>M Mean (SD) *N*=54	*F Value N=216*	*P* Value *N*=216
Age	22.2 (2.4)	22.6 (4.0)	24.0 (7.4)	22.5 (4.3)	1.51	.214
General Frequency	2.8 (0.9)	2.8 (0.8)	3.0 (0.89)	2.9 (1.0)	0.85	.417
Liking 100% FJ	4.9 (2.1)	4.9 (1.9)	4.7 (1.7)	5.2 (2.0)	0.63	.598
Liking AM FJ	5.5 (1.7)	5.0 (2.0)	5.2 (1.9)	5.2 (2.0)	0.51	.676
Attractive	5.2 (1.3)	4.8 (1.7)	4.8 (1.5)	4.6 (1.6)	1.25	.291

Note 1: V stands for visual, T stands for textual, A<M stands for dominant mango, A>M stands for dominant apple
Note 2: Numbers (except *age* and *PSI_score*) represent mean scores on each of the scales (7-point scales for Liking 100% FJ, Liking AM FJ and attractiveness; 5-point scale for general frequency).

This test showed that 'Age' ($F(3,213)=1.51$, $p=.214$), 'General Frequency' ($F(3,213)=0.85$, p=ns), 'Liking of 100% FJ' ($F(3,213)=0.63$, p=ns), and 'Liking AM FJ' ($F(3,213)=0.51$, p=ns) were not significantly different on the $p < .05$ level between the eight different conditions. Thus, it can be concluded that outcomes of all control variables were equally distributed among conditions.

6. Results

6.1. The effect of visual and textual packaging elements on expected flavour ratio

Table 11 provides an overview of the means and standard deviation for the outcome on different dependent variables in every condition. The first step in the analysis was to check whether the independent variables affect expected flavour ratio measured on a subtraction scale expected Apple-Mango (*N*=436). A Full Factorial ANOVA was run with IVs *visual* and *textual* on the DV *expected flavour ratio* (Table 11).

Table 11. ANOVA Table with Mean (S.D) for each condition on the dependent variables including F values with corresponding significance levels for each main and interaction effect of *visual* (V), *textual* (T). Whenever a respondent had an expected flavour ratio greater (smaller) than zero, this means the participant expected the apple flavour of the juice to be more (less) intense compared to the mango flavour of the juice.

	V:A<M T:A<M N = 54	V:A<M T:A>M N = 54	V:A>M T:A<M N = 54	V:A>M T:A>M N = 54	V F (p-value) ω^2	T F (p-value) ω^2	V x T F (p-value) ω^2
Expected Flavour Ratio*	-35.5 (33.7)	-8.9 (44.1)	-29.6 (38.8)	11.4 (44.9)	**5.58 (.019) 0.018**	**37.40 (<.001) 0.141**	1.68 (.197) n.s.
Perceived Deception	3.0 (1.6)	3.4 (1.3)	3.1 (1.4)	2.8 (1.4)	1.53 (.218) n.s.	0.02 (.887) n.s.	3.26 (.072) n.s.
Purchase Intention	3.8 (1.5)	3.9 (1.4)	3.9 (1.5)	3.7 (1.2)	0.21 (.650) n.s.	0.04 (.846) n.s.	.34 (.560) n.s.

Note 1: In bold the significant values on significance level p < .05
Note 2: V stands for visual, T stands for textual, A<M stands for dominant mango, A>M stands for dominant apple
* Negative (positive) values for Expected Flavour Ratio indicate a dominant expected mango (apple) flavour

Similarly to the main study, a main effect of textual package element on the expected flavour ratio with a large effect size was found ($F(1,214)=27.40$, $p<.05$ $\omega^2=.141$). This indicates that a significant difference exists between showing a higher percentage of mango in the ingredient list (*M*=-32.5, *SE*=3.9), compared to showing a higher percentage of apple on the ingredient list (*M*=1.3, *SE*=3.9) on an individual's expected flavour ratio.

In line with previous expectations and in contrast to the main study, a main effect of visual package information was found ($F(1,214)=5.58$, $p<.05$ $\omega^2=.018$). The rather small F value and effect size indicate that the images on the front of the packaging had a smaller effect on expected flavour ratio compared to the ingredient list. With both visuals, consumers expect the juice to be dominant in mango flavour, with a mean difference of 13.1 (compared to a non-significant mean difference of 5.1 in the main study).

No interaction effect of visual and textual ingredient item information on expected flavour ratio was found ($F(1,214)=1.68$, $p=.197$). This indicated that either congruence or incongruence

between the packaging elements did not boost the main effects. In other words and contrasting findings of the main study, both visual and textual ingredient information play a role in creating flavour expectations, with a larger impact of textual ingredient information.

6.2. The effect of (in)congruency amongst visual and textual packaging elements on (mis)match perceptions

A perceived mismatch from (in)congruent information was measured (N=216) between the congruent and incongruent conditions. A cross-tabulation with congruency and mismatch perceptions including chi-square test of equal proportions was conducted to measure mismatch perceptions from packaging information (Table 12) in order to answer the hypothesis. Again, mismatch perceptions did not differ amongst congruent and incongruent conditions in this second study ($X^2(1)=.026$, p=.873).

Table 12. Proportions of perceived mismatch amongst (in)congruent conditions in pre- and post-consumption evaluation

Conditions		Perceived mismatch		Total
		Yes	No	
Congruent	Count (%)	25 (23.1%)	83 (76.9%)	108 (100%)
Incongruent	Count (%)	26 (24.1%)	82 (75.9%)	108 (100%)

Additionally, the answers of the 25 respondents indicating a mismatch in the congruent conditions were further analysed. Out of 25 perceived mismatches in the congruent conditions, 18 were completely unrelated to the ingredient information on the packaging (e.g. “I don’t drink fruit juice because of ‘liquid calories’”, “I wanted to see the back of the packaging to see all nutritional information in detail”, “These type of packaging normally do not contain 100% fruit juice”). The other 7 did indicate a mismatch between ingredient item depiction and the ingredient list, of which two respondents commented on the name of the juice being ‘Apple Mango’ juice, suggesting more apple whilst (in their condition) mango was the main ingredient which was considered mismatching.

6.3. Influence of mismatch perception on perceived deception

Similarly to the main study and in line with expectations, a significant effect was found between mismatch perceptions and perceived deception ($F(1,214)=42.30$, $p<.05$), indicating that people who perceived a mismatch ($M=4.1$, $SD=0.2$) felt more deceived by the packaging of the juice compared to people who did not perceive a mismatch ($M=2.7$, $SD=0.1$).

Additionally, an independent-samples t-test was conducted to compare perceived deception between respondents getting to see the congruent (non-misleading) ingredient information pack and the incongruent (misleading) ingredient information pack. Results indicated a trend in the predicted direction indicating higher ratings of perceived deception for the incongruent condition ($M=3.2$,

SD=1.4) compared to the congruent condition (*M*=2.9, *SD*=1.5), however this result was non-significant *t*(214)=-1.81, *p*=.072.

6.4. Influence of perceived deception on willingness to purchase

Similarly to the main study and in line with expectations, a significant regression equation was found (*F*(1,214)=32.36, *p*<.05), with an R^2 of .127. Participants' predicted willingness to purchase the juice is equal to 4.916 – 0.362 (perceived deception level) when perceived deception is measured on a 7-Point scale. In other words, the more deceived a person feels from the packaging, the lower this person's willingness to purchase the product will be.

Additionally, an independent-samples t-test was conducted to compare willingness to purchase between respondents getting to see the congruent (non-misleading) ingredient information pack and the incongruent (misleading) ingredient information pack. Results indicated no difference for willingness to purchase between the incongruent condition (*M*=3.8, *SD*=1.4) and the congruent condition (*M*=3.9, *SD*=1.4), *t*(214)=-0.586, *p*=.559.

6.5. Processing Style Influence as a moderating factor

Again it was checked whether the main effects of visual and textual stimuli on expected flavour ratio, and mismatch perceptions are influenced (moderated) by the preference for and reliance on a certain cognitive processing style.

6.5.1. The effect of dominant processing style on expected flavour ratio

A Full Factorial ANOVA (*N*=216) was performed with IVs *visual, textual,* and *PSI_category* on the DV *expected flavour ratio.* The three-way interaction was non-significant (*F*(1,208)=0.01, *p*=.980). Indicating that reliance on one over the other packaging element in creating an expected flavour ratio is not affected by dominant thinking style.

6.5.2. The effect of dominant processing style on mismatch perceptions

A chi-square test of equal proportions was conducted in order to check whether mismatch perceptions differed amongst primary E-processors and primary R-processors between the congruent and incongruent condition (Table 13). Being able to perceive a mismatch in the congruent or incongruent conditions was not enhanced by dominant cognitive processing style (X^2(1)=0.157, *p*=.691).

Table 13. Proportions of perceived mismatch amongst (in)congruent conditions in pre-consumption evaluation for primary E-processors and primary R-processors.

	Conditions		Perceived mismatch Yes	Perceived mismatch No	Total
Primary E-processors *N*=93	Congruent	Count	8 (19.0%)	34 (81.0%)	42 (100%)
	Incongruent	Count	11 (22.4%)	38 (77.6%)	49 (100%)
Primary R-processors *N*=121	Congruent	Count	17 (25.8%)	49 (74.2%)	66 (100%)
	Incongruent	Count	15 (25.4%)	44 (74.6%)	59 (100%)

Overall, no moderating effect of dominant processing style on the effect of packaging information on mismatch perceptions was found in the second study either.

Interim discussion

In combination of the two studies, it can be said that regardless of an individual's processing style a less salient positioning of textual information leads to an effect of the ingredient image. In both studies respondents were asked to focus on the packaging before filling in the questionnaire. However, it is evident that in the real-life situation of evaluating food packaging consumers have other things on their mind when grocery shopping (Deck & Jahedi, 2015). In this context, consumers are less likely look at the small letters on the back of packaging such as factual ingredient information (Benn et al., 2015; Hieke & Taylor, 2012; Grunert &Wills, 2007). Another sensory study was performed aiming to create a more realistic design, in which the questions to focus on the pack were removed and instead consumers had to remember an 8-digit number to increase their cognitive load (Miller, 1956).

A new design of the stimuli was created and pre-tested with a more salient positioning of the image and the extra text on the package was deleted, moreover no textual ingredient information was available (see Figure 8) resulting in two conditions. Also, an additional measure of taste (hedonic ratings) was included in the previous survey. The main goal of adding the element of 'tasting' to the research was to investigate differences in perceived flavour ratios and how a mismatch between these and expected flavour ratios would influence levels of perceived deception and willingness to purchase. Liking of the product's taste could make consumers disregard feelings of deception induced by disconfirmation of expectations and was therefore added.

Lastly, the REI-inventory was used to determine a consumer's a dominant processing style. A pitfall of using the REI for this study, is that being either a more rational or more experiential processor is context specific (Novak & Hoffman, 2009). Therefore, these ten items were replaced by items on image and ingredient label use as a possible moderator in expected and perceived flavour ratio from images (Miller & Cassady, 2015). Furthermore, the analysis performed were the same as in the main study.

Figure 8. Manipulations of the packaging as used in Study 3.

Study 3

7. Methods

7.1. Measures

Central Location Test procedure

Data was collected in a computer room at the Wageningen University. Participants were asked to fill in a questionnaire and taste a 100% fruit juice. The sensory test was a replicate from the main study with a few alterations.

Deleted items

The same questionnaire as used for the sensory test (including items on perceived flavour intensities) in the main study was used with a few alterations. Both the items highlighting the focus on the packaging and the REI-questionnaire were taken out to stimulate more spontaneous answering of the questions and to add a more context specific moderator.

Cognitive load

To create a more realistic setting, participants were given a higher cognitive load to gain more spontaneous answers (Miller, 1954), respondents were shown an 8-digit number (53209695) that they were asked to remember by head and needed to recall later in the survey. The researcher did not allow participants to write down the number. After answering the question on perceived flavour intensities, respondents were asked to fill in the 8-digit number.

Image-Ingredient usage as moderator

In order to check for the moderating effect of label usage, participants had to answer the question taken from a research performed by the "Consumentenbond" in the Netherlands in 2017 on information on food packaging '*how often do you look at the following elements*' **never** to **always** on a 5 point scale for the following list: *brand, imagery, ingredient list, country of origin, product name.* To check whether these were indicators for image usage and ingredient list usage, three items from the same questionnaire were adapted and added as well: '*the image on the front of packaging gives an honest impression of the content', 'the ingredient prominently shown on the front of packaging gives the impression that the product contains a lot of it',* and *'the image on the front of packaging is purely decorative'.* Also, two items were taken from the Australian "Consumer Label Survey 2015" and translated to Dutch: '*I usually look at the ingredient list when I buy a product for the first time'* and '*for me personally the information on the ingredient list is important when I buy a product for the first time'*.

Control questions

An extra control question was added to check whether participants liked the juice they tasted which might influence their intention to purchase regardless of a perceived mismatch from packaging.

Moreover, a question on study programme with the options *nutrition and health, food technology* or *other* was added.

7.2. Data preparation and sample description

A total of 114 respondents participated in the sensory test. Respondents finishing within 7 minutes (*N*=5) and respondents familiar with the brand "Cawston" were deleted (*N*=1). The final sample consisted of 108 Dutch students (49 males) (*M*=20.94, *SD*=1.8) that were taken into account for data analysis.

For this third study, internal consistency of the scale items was measured again using SPSS, in computing reliability coefficients for each construct. All scales used to measure the constructs had an adequate internal consistency; willingness to purchase (α=.88), perceived deception (α=.90).

Similar to section 3.4.1. a relative measure of expected and perceived flavour ratios (apple:mango) was created. Whenever a respondent had an expected flavour ratio greater (smaller) than zero, this means the participant expected the apple flavour of the juice to be more (less) intense compared to the mango flavour of the juice. To check whether a perceived mismatch was caused by a discrepancy between expected and perceived flavour intensities, an additional subtraction scale was created between an individual's perceived and expected flavour ratio. Whenever a this deviation is large, a perceived mismatch can be assigned to this disconfirmation of expectations, whilst when close to zero, it is expected that there will not be a perceived mismatch.

To measure the moderating role of image-ingredient use, a new variable was created to classify respondents as either being more *ingredient list, image,* or *equally* focussed by subtracting a person's self-reported image-ingredient usage. A negative (positive) score resulting in more ingredient list (image) focussed and a zero classifying as equal.

A chi-square test of independence was conducted in order to check whether distribution of gender across both conditions (*N*=108) could influence the results. The non-significant result (X^2(1)=1.83, *p*=.246) shows that the way in which gender is distributed amongst the conditions could not have influenced the results.

A randomization check was performed for the control variables *age, consumption frequency of 100% fruit juice in general (general frequency), liking of 100% fruit juice in general (liking 100% FJ), liking of apple/mango juice in general (Liking AM FJ), hedonic score for the juice (Hedonic),* and *study background (Study)* to check whether participants were equally distributed among the different conditions. A One-Way ANOVA was conducted to find out whether these variables could influence results because of the way in which they were distributed across the two conditions. This test showed that 'Age' (*F*(1,107)=0.79, *p*=.376), 'General Frequency' (*F*(1,107)=0.44, *p*=.507), 'Liking of 100% FJ' (*F*(1,107)=0.07, *p*=.800), 'Liking AM FJ' (*F*(1,107)=3.39, *p*=.068), 'Hedonic' (*F*(1,107)=0.63, *p*=.430), and 'Study' (*F*(1,107)=1.72, *p*=.193) were not significantly different on the $p < .05$ level.

8. Results

8.1. The effect of visual packaging elements on expected and perceived flavour ratio

In order to check whether participants assimilated their expected and perceived flavour ratios towards the depicted ingredient item images, an independent-samples t-test was performed to compare expected and perceived flavour ratio between respondents getting to see the image depicting more apple and the image depicting more mango (*N*=108). The image depicting more mango led to assimilation towards expected (M=-43.4, SD=16.5) and perceived (M=-17.5, SD=54.4) mango flavour. Similarly, with the image depicting more apple, assimilation towards expected (M=14.7, SD=35.2) and perceived (M=18.3, SD=41.3) apple flavour occurred. Without textual information available, the image on the front of packaging influences both expected (t(106)=-10.98, p<.001) and perceived flavour ratio (t(106)=-3.85, p=.039).

8.2. The moderating effect of image/ingredient list usage on expected and perceived flavour ratio

To see whether this effect would be stronger for people relying more on the ingredient list, the image or equally on both, people were classified in one of these three categories by subtracting their self-reported scores on image-ingredient list use. A Full Factorial ANOVA (*N*=216) was performed with IVs *image/ingredient usage* and *condition* on the DVs *expected* and *perceived flavour ratio.* No moderating effect was found for expected (F(1,106)=1.23, p=.297) and perceived flavour ratio (F(1,106)=0.64, p=.527). Indicating that reliance on the image in creating an expected and perceived flavour ratio is not affected by the self-reported frequency of looking at the image/ingredient list.

Additionally, scores on the five items for image/label usage between these focus groups were compared (Table 14). As expected, consumers focussing more on the ingredient list show a trend in higher scores on items 4 and 5 considering the ingredient list with their first purchase. Whilst consumers focussing on the image tend to score higher on the trustworthiness of the image as a content indicator.

Table 14. Mean (SD) on a 7 point scale per focus classification group (Image, Ingredient List, and Equal) for each item on image and ingredient list.

Focus classification	N	Image content indicator	Image trustworthy	Image decorative	Ingredient list Important	Ingredient list View
Image	88	6.0 (1.9)	6.1 (1.9)	4.5 (2.6)	5.2 (2.5)	5.1 (2.6)
Ingredient List	15	5.7 (2.2)	5.8 (2.3)	5.0 (2.5)	5.8 (1.9)	6.0 (1.6)
Equal	5	5.8 (2.7)	7.2 (0.4)	7.0 (1.0)	5.2 (1.6)	5.4 (2.1)

8.3. Mismatch perception

A perceived mismatch from expected and perceived flavour intensities was measured (N=108) between the apple and mango conditions. A cross-tabulation with condition and mismatch perceptions including chi-square test of equal proportions was conducted to measure mismatch perceptions between expected and perceived flavour ratio (Table 15). As seen in Table 15, again the same proportion of consumers perceived a mismatch. Regardless of the image shown on the packaging, the proportion of people reporting a perceived mismatch was the same ($X^2(1)=.332$, p=.564).

Table 15. Proportions of perceived mismatch amongst (in)congruent conditions in pre- and post-consumption evaluation.

		Perceived Mismatch		
Conditions (N)		**Yes**	**No**	**Total**
Mango (54)	Count (%)	14 (25.9%)	40 (74.1%)	54 (100%)
Apple (54)	Count (%)	16 (29.6%)	38 (70.4%)	54 (100%)
Total (108)	Count (%)	30 (27.8%)	78 (72.2%)	108 (100%)

To check whether a perceived mismatch was caused by a discrepancy between expected and perceived flavour ratios, the additional subtraction scale between an individual's perceived and expected flavour ratio was looked at. For each person perceived flavour ratio (-100 to 100) minus expected flavour ratio (-100 to 100), showed that a difference of at least 40 points caused a disconfirmation of expectation, reporting a mismatch. Overall, when disconfirmation was less than 40 points, assimilation towards the depicted image occurred and no mismatch was found.

8.4. Influence of perceived mismatch on perceived deception and willingness to purchase

Similarly to the main study and second study, and in line with expectations, a significant effect was found between mismatch perceptions and perceived deception ($F(1,106)=279.64$, $p<.001$), indicating that people who perceived a mismatch ($M=5.1$, $SD=1.4$) felt more deceived by the packaging of the juice compared to people who did not perceive a mismatch ($M=2.1$, $SD=0.6$).

Similarly to the main study and second study, and in line with expectations, a significant regression equation was found ($F(1,106)=141.32$, $p<.001$), with an R^2 of .571. Participants' predicted willingness to purchase the juice is equal to 4.916 – 0.597 (perceived deception level) when perceived deception is measured on a 7-Point scale. In other words, the more deceived a person feels from the packaging, the lower this person's willingness to purchase the product will be.

9. General discussion

9.1. Short summary of study

The aim of this research was to increase understanding of the effect of depicting ingredient items on the front of packaging on pre- and post-consumption product evaluations in order to protect consumers from potentially being misled. It was further proposed that different levels of congruency and cognitive processing style would influence feelings of perceived deception and purchase intention towards the product. A 2x2x2 between-subjects experiment was conducted at a University in the Netherlands to test the propositions made, where respondents evaluated 100% juice packages with different combinations of visual and textual information in terms of presented ratios. A replicate of the main study with more realistically designed stimuli was performed online, to check the findings of this study. To create more spontaneous evaluations, a third study without presenting textual information and adding cognitive load was performed as well. Table 16 provides an overview of accepted and rejected propositions.

Table 16. Overview of rejected and accepted hypotheses.

	Hypothesis	**Finding**
1.	Regardless of the ingredient list shown, expected flavour ratio will be assimilated to the depicted ingredient item images on the front of packaging.	Rejected * **
2.	Regardless of the ingredient list shown and the flavour of the juice, perceived flavour ratio will be assimilated to the depicted ingredient item images on the front of packaging.	Rejected **
3.	In both the pre- and post-consumption evaluation, (in)congruency between the visual and textual packaging elements will lead to (mis)match perceptions.	Rejected
4.	A perceived (mis)match in both the pre- or post-consumption phase will (increase) decrease ratings of perceived deception.	Accepted
5.	Perceived deception will negatively affect an individual's intention to purchase the product.	Accepted
6a	Before tasting the juice, consumers classified as *dominant experiential processors* will rely more on *visual stimuli* of the packaging in their expectation formation compared to *textual stimuli* and therefore assimilate their expected flavour ratio towards the depicted ingredient item images.	Rejected
6b	Before tasting the juice, consumers classified as *dominant rational processors* will rely more on *textual stimuli* of the packaging in their expectation formation compared to *visual stimuli* and therefore base their expected flavour ratio on the shown ingredient item list.	Rejected

7a	After tasting the juice, consumers classified as *dominant experiential processors* will rely more on *visual stimuli* compared to *textual stimuli* and will therefore assimilate their perceived flavour ratio towards the depicted ingredient item images.	Rejected
7b	After tasting the juice, consumers classified as *dominant rational processors* will rely more on *textual stimuli* compared to *visual stimuli* and will therefore assimilate their perceived flavour ratio towards the ingredient item list.	Rejected
8.	In both the pre- and post-consumption phase, consumers classified as dominant rational processors are significantly more likely to consciously perceive a (mis)match between visual ingredient item depiction on the FOP and the textual ingredient item list, compared to dominant experiential processors.	Rejected

* In study 2 a main effect for the image was found, however, as the effect of textual stimuli was found to have a larger F value (and effect size), the hypothesis is still not confirmed. This is elaborated upon in section 9.2.1.

** In study 3, without textual information, a strong assimilation effect towards the image was found. This is elaborated upon in section 9.2.1

9.2. Main findings

9.2.1. Expected and perceived flavour ratios

Three studies investigated the effect of ingredient item depiction on expected and perceived flavour ratios. The factual ingredient information was presented in different ways. In the first study, the textual ingredient information was presented next to the packaging, assuming people would be using this information. In the second study this textual information was placed less conspicuously on the bottom of the front of pack, and in the third study this textual information was not shown at all assuming that most consumers normally do not make the effort to look at it. From the results, it can be concluded that with a very salient positioning of textual ingredient information, people purely base their expected and perceived flavour ratios on this information. In the next study, textual information still strongly influenced assimilation, however the ingredient image also influenced expected and perceived flavour ratios. In the third study, with no textual information present at all, the effect of the image on flavour assimilation was very clear.

In combination of the three studies it can be said that the more realistic the set-up of the experiment and with this the less salient the positioning of the textual information, the more people assimilated their expected and perceived flavour ratio towards the visual stimuli on the front of pack. This is partly in line with findings from previous research advertisement, suggesting that pictures enhance accessibility of packaging information, attracting more attention and being noticed before verbal information (Bolen, 1984). In this sense, the visual information serves as an "advance organiser" as put by Alesandrini (1982), creating expectations for interpretation of verbal information. Also, the

image on the packaging elicits imagery processing (MacInnis & Price, 1987), enhancing spontaneous imagination of the product's taste in representing sensory information from the image in working memory. However, the (non-realistic) salience of the textual information in the stimuli design of the first two studies, might have surpassed the vividness of the imagery. As cue utilisation theory emphasises, cue salience is of major importance in creating product expectations and perceptions (Olson & Jacoby, 1972). Also, the accessibililty-diagnosticity framework as described by Feldman and Lynch (1988) might serve as an explanation. This framework suggests that the likelihood of any bit of information being used as input for judgement or choice depends on the:

- accessibility of the input;
- accessibility of alternative inputs; and
- diagnosticity or perceived relevance of the inputs.

From an attention perspective, the vividness of the visual stimuli might have gone unnoticed because of the accessibility of the salient textual ingredient information presented next to the packaging. Another explanation of the deviating results might be that respondents in this experiment had unlimited time to extensively evaluate the packaging, whilst time-pressure and cognitive load usually are common variables during grocery shopping (for review see Deck & Jahedi, 2015). In a study of Pieters and Warlop (1999), people in the time-pressured condition tended to filter textual information (ingredient information on packaging) more, preferring less cognitively-taxing visual image information.

All in all it can be concluded that the less salient the positioning of the textual information, the stronger the flavour assimilation towards the image was found for both expected and perceived flavour ratios. However, caution must be taken in drawing conclusions on assimilation towards the imagery with present textual information, as the main effect of textual information was stronger compared to that of the visual packaging cue in the first two studies and no comparison with textual information was present in the third study.

Additionally, it is worth mentioning that an interaction effect of visual and textual information was solely found in the post-consumption evaluation of the main study. Despite the juice used for the sensory evaluation of this study was 93% apple juice, it was very opaque and dark yellow, which is not associated with apple juice in the mind of the consumer (Sabbe, 2009). This could be explanatory for the interaction effect found in the main study between visual and textual information in the post-consumption evaluation, solely when the visual depicting more apple was displayed. The discrepancy of apple depiction on the front of packaging and the external attributes of the juice might have led the consumer to process the information less fluently (Reber et al., 2004), compared to the showing the visual dominantly depicting mango. In less fluent processing, more cognitive effort and attention is

going towards evaluation the other packaging elements (Becker, van Rompay, & Schifferstein, 2011), amongst which the ingredient list might have led to assimilation towards this textual packaging cue. With this reasoning it would be expected that in the congruent condition displaying more mango with the mango-looking juice, perceptions of mango would be strongly perceived, however a 50:50 flavour percept was measured. In this sense, textual packaging cues were a stronger predictor of perceived flavour ratio compared to visual packaging information, but mostly when more apples (v.s. more mangoes) were displayed.

9.2.2. Mismatch perceptions

In combination of the first two studies, it can be said that incongruence of ingredient information expressed in FOP-imagery and ingredient list information (deceptive packaging information) does not lead to mismatch perceptions (hypothesis 3) which is contrasting hypothesis. Despite some findings of incongruence between visual and textual packaging elements leading to mismatch perceptions in the main study, this effect was not robust when looking at each level of (in)congruity separately. Only in the deceptive pre-consumption condition depicting more apples on the front of pack accompanied with an ingredient list showing more mangos, a majority of the respondents perceived this incongruent information as a mismatching. In the other pre-consumption deceptive condition, visualising more mango on the front of pack accompanied with an ingredient list indicating a large amount of apple (which often happens in real-life), the mismatch was not clearly perceived. Perhaps, consumers did not see the first discrepancy as mismatching, because they are used to this way of ingredient visualisation and actually want to be able to see the 'special ingredient' as apple juice based juices are more regular compared to the 'special' ingredient mango. It might be interesting to further explore this view of the consumer.

In contrast to perceived mismatches from packaging elements before tasting the product in the main study, no effect of mismatch perception on perceived deception was found in the post-consumption evaluation in the main study. This signals that tasting the product suppressed the effect shown in the pre-consumption evaluation. Moreover, in the second study, no effects were found at all between the deceptive and non-deceptive packaging on perceived mismatches. Perhaps respondents had exclusively seen the imagery as aesthetic elements of the packaging and did not extract information from it to make inferences about the content of the product and therefore did not perceive a mismatch from this type of information.

9.2.3. Perceived deception and willingness to purchase

<u>Perceived deception</u>

In combination of the three studies, it can be said that as predicted a perceived mismatch between the visual and textual packaging elements increased feelings of deception (hypothesis 4). This

is in line with the empirical findings of Ozanne and Underwood (1998), who found that consumers frequently felt betrayed or duped by different packaging elements, such as unrealistic image size on the packaging and exaggerated nutrition-oriented cues compared to the actual nutritional information. This research confirmed that discrepancy between visual and textual information is seen as an intentional form of misleadingness.

Additionally, results showed that a perceived mismatch solely from packaging elements had a smaller effect on perceived deception than a perceived mismatch between expected and perceived flavours. In other words, a consumer feels more betrayed when detecting a mismatch after consuming the product, compared to a mismatch purely from packaging. Perhaps this is because a mismatch from packaging already can be detected before the decision to purchase the product is made, leaving the consumer with the option to opt-out from purchasing, whilst a mismatch in expected and perceived flavours can only arise after the product is being purchased.

Willingness to purchase

As expected, a robust effect was found in all studies of higher feelings of perceived deception negatively influencing willingness to purchase the product (hypothesis 5). Earlier research on advertisements has shown similar effects of deceptive information in a television ad, where deceptive ads were associated with decreased purchase intentions toward the product in the ad (Newell, Goldsmith, & Banzhaf, 2015). This research showed an identical effect for deceptive packaging.

In addition, this study found that the *perception* of deception was enough to decrease purchase intentions toward the product, whether the ingredient information was *objectively* misleading or not. It would be expected that consumers negatively react to deceptive packaging, in turn lowering intentions to purchase (Machiels & Karnal, 2016). However, being exposed to a deceptive packaging compared to a non-deceptive packaging did not significantly differ willingness to purchase (although slightly lower) the packaging. From a positive perspective, this indicates that deceptive ingredient information does not convince or persuade consumers to purchase; however, from a critical perspective, the deceptive packaging was virtually as effective in influencing purchase intentions as the non-deceptive packaging. All in all, deceptive packaging will lead to lower intentions to purchase, but only if consumers perceive this deception. Otherwise the packaging appears to be no more or no less favourable than non-deceptive packaging.

From literature it can be suggested that potentially some consumers willingly give up mental defensiveness against deception. Some consumers might trust certain brands despite its discrepant information displayed. Motivated reasoning is mentioned as the mechanism explaining this behaviour (Agrawal & Maheswaran, 2005; Kunda, 1990; Mello, Macinnis, & Stewart, 2007). Motivated reasoning suggests that consumers focus more on the desired aspects, such as aesthetic appearance and claimed

benefits of a packaging, and less on potential deceptiveness. In other words, regardless of suspiciousness, a strong intention to purchase a product may still arise if the attitude formed from aesthetics and claimed benefits are highly attractive.

9.2.4. Moderating role of cognitive processing style and image-label usage

Contrasting expectations, cognitive processing style was not found to be a moderator between the packaging elements of the product and expected flavour ratios, perceived flavour ratios, and mismatch perceptions, whether the ad was objectively misleading or not (hypotheses 6-9). This may be due to the broad focus of the topics of the REI-questionnaire. The REI-questionnaire measures being a dominant rational or experiential processor in general, whilst this behaviour is very context specific (Novak & Hoffman, 2009). For example, one might be very rational in weighing alternatives in buying a house, whilst more relying on intuition with making everyday purchases such as fruit juice. For example, differences in a consumer's Centrality of Visual Product Aesthetics (CVPA; (Bloch, Brunel, & Arnold, 2003) have already shown to affect interpretation of certain extrinsic cues on product credibility (Becker et al., 2011). A more situation-specific measure of rationality and experientiallity would be useful (Novak & Hoffman, 2009), and could help interpret these results more carefully.

Added nuance to the questionnaire on self-reported image-ingredient list usage (label use) in making food choices was measured in study 3 (Miller & Cassady, 2015). Interesting to see was that about 80% reported themselves as 'image users', whilst in the first two studies we saw that most people relied on textual information. Probably this happened because people were asked explicit questions about the textual information in these studies and again because of the salience of the textual information. Image-label usage also did not moderate the effect of image depiction on flavour assimilation. Eye-tracking could be helpful to classify consumers in a more objective manner.

9.3. Contributions and Managerial implications

This research makes several contributions. First, although it is a common practice for manufacturers to present ingredients on their packaging, earlier research has rarely focussed on the depiction of ingredient items and it corresponding effect on consumer evaluations. More specifically, this study is unique in the marketing domain in the sense that it covered both the pre- and post-consumption evaluation. In other words, both potential misleadingness solely from packaging elements as well as after tasting were investigated, covering *'two moments of truth'* for potential misleadingness.

Also, this study adds to the research topic of investigating the influence of visualising food products (as a whole) on packaging design on consumer response. Added images on food products in existing literature mainly study the depiction of the food product as a whole, as showing the content

on the package allows consumers to increase attention and create inferences about the intrinsic attributes of the product (Piqueras-Fiszman & Spence, 2015; Underwood & Klein, 2002).

Another contribution to literature of this research is the application of an experimental approach to determine whether packaging information is deceptive or not. Until now, most studies have investigated verbal deception in advertisement only (Xie & Boush, 2011). The contribution of this study is to show that deception through graphical elements on packaging is possible as well.

Furthermore, insights in the effect of deceptive visualisation of ingredients on food product packaging towards purchase intention may be useful for researchers and regulators to develop better knowledge about the conditions under which consumers are most likely to be deceived. This study the less salient (absent) factual ingredient information is presented on the packaging, the more consumers rely on ingredient images to create expected and perceived flavours, that the contrast between visualised ingredients on the FOP label and actual ingredients are not consciously perceived, and how this influences their loyalty to a specific product in terms of willingness to purchase the product. This outcome could add as a guidance for improvement of public policies in order to protect consumers better by either presenting the correct ratio of ingredient on the front of packaging or by making the textual information more salient so the imagery on the front of pack acts as an aesthetic element of the packaging.

Lastly, regulations alone cannot sufficiently protect consumers (Machiels & Karnal, 2016). To assist consumers in creating and applying techniques to protect themselves from misleading practices, research needs to inform non-regulatory efforts as well about their findings.

9.4. Limitations and future research

Several potential limitations need mentioning. First, about the design and presentation of the stimuli. Although the way of depicting ingredient items on the front of packaging as done in this research (top of packaging) is employed by several juice brands in the Dutch marketplace, a few brands opt for full surface coverage of ingredient item depiction in their designs (e.g. Healthy People, Jumbo). Also, for this research it was chosen to use drawn illustrations of the depicted ingredients, whilst multiple other brands use photographs which might elicit significantly different sensory profiles for the same product (Deliza et al. 2003) and was preferred over illustrations in early research (Alesandrini & Shiekh, 1983). Also, similar results have been found for either using an image of the end product or the ingredient, with depicting the end product resulting in higher ratings of liking and a more positive evaluation of quality attributes (Rebollar et al., 2017). Moreover, the position of the ingredient item list regularly is on the back of the packaging, whilst in this design it was positioned next to the front of packaging in a single box (main study) or merged on the front of packaging (study 2) or absent at all

(study 3). Creating a tangible 3D package design with a realistic ingredient list on the back of the packaging, with different surface/image coverage ratios to examine the effect of (in)congruity between visual and textual packaging cues was beyond the scope of this research, but may be interesting for future studies to explore in even a more realistic case study.

Second, in this study, self-reported image-label usage was used to check the moderating effect of a dominant packaging focus. Additionally to the 3D packaging, adding an element of monitoring visual attention (i.e. eye tracking) could help in understanding and identifying these groups, as consumers tend the overestimate their label use when self-reporting (Grunert et al., 2010). Also, gaining knowledge in localisation of attention could provide ways in which label design could be modified to improve consumers' ability to locate and effectively utilize factual nutrition information such as the ingredient list (Thomas & Capelli, 2018; Graham, Orquin, and Visschers, 2012).

Third, no pre-test was performed on the noticeability of the incongruence between the visual and textual packaging cues. Moreover, as mentioned before, the role of ingredient depiction on food packaging in the mind of the consumer is not clear from literature yet. Now approximately one third of the participants noticed a mismatch in the stimuli when this actually was the case. This might either indicate that the manipulation was not clear enough, or that participants did not consider this combination of information discrepant. A pre-test to check the manipulation and exploratory research on the role of ingredient depicting in the mind of the consumer would be worthy to perform in the future.

Fourth, it would be interesting to replicate this study for a more complex product. This study examined a 100% fruit juice, in which solely the ratio of fruit could elicit a perceived mismatch and increase perceived deception. However, many other products containing a more extensive ingredient list such as quark, yoghurt and cereal(bars) also often clearly depict their 'special' ingredients (e.g. blueberry) on the front of pack (. Investigating to what extent consumers find this way of presenting a product misleading or not could help in creating guidelines for marketing to prevent perceived deception.

Fifth, it would be interesting to extend this research to the broader context of brand credibility. As each product belongs to a brand, a product could function as a signal since – if and when they do not deliver what is promised– the total brand credibility could erode as a consequence of the halo effect of a products functioning on a brand's image (Erdem & Swait, 1998).

To conclude, visual cues on the packaging are noticed as one of the first elements of the packaging in a supermarket, suggesting a similar effect in the online grocery shopping environment. Even less time is dedicated to making a product choice in the online shopping context compared to

offline contexts (Marimon, Vidgen, Barnes, & Cristóbal, 2010). Therefore, to prevent consumers from being misled, outcomes of the current research could be used already by saliently placing the factual information next to the product (without a need to scroll down). Extending the current research to the online shopping context would help to better understand the perception of product compositions in those contexts.

9.5. Conclusion

The aim of this research was to increase understanding of the effect of depicting ingredient items on the front of packaging on pre- and post-consumption product evaluations in order to create guidelines for visual design elements on packaging to protect consumers from potentially being misled. The findings improve our understanding of how visuals actually used on juice packages in supermarkets affect consumer response. The results showed that consumers did not perceive the incongruity between visual and textual information as mismatching. However, a perceived mismatch from packaging, whether objectively deceptive or not, did increase perceived deception, and lower willingness to purchase. This effect was robust for both mismatches; between packaging elements (pre-consumption) and from expected and perceived flavour ratio (post-consumption), but more substantial for the post-consumption mismatch. Although the moderating effect of cognitive processing style regarding expected and perceived flavours from visual and textual ingredient information was not confirmed, the results indicate that the effect of a salient ingredient list information is substantial, independently of a particular processing style or label usage.

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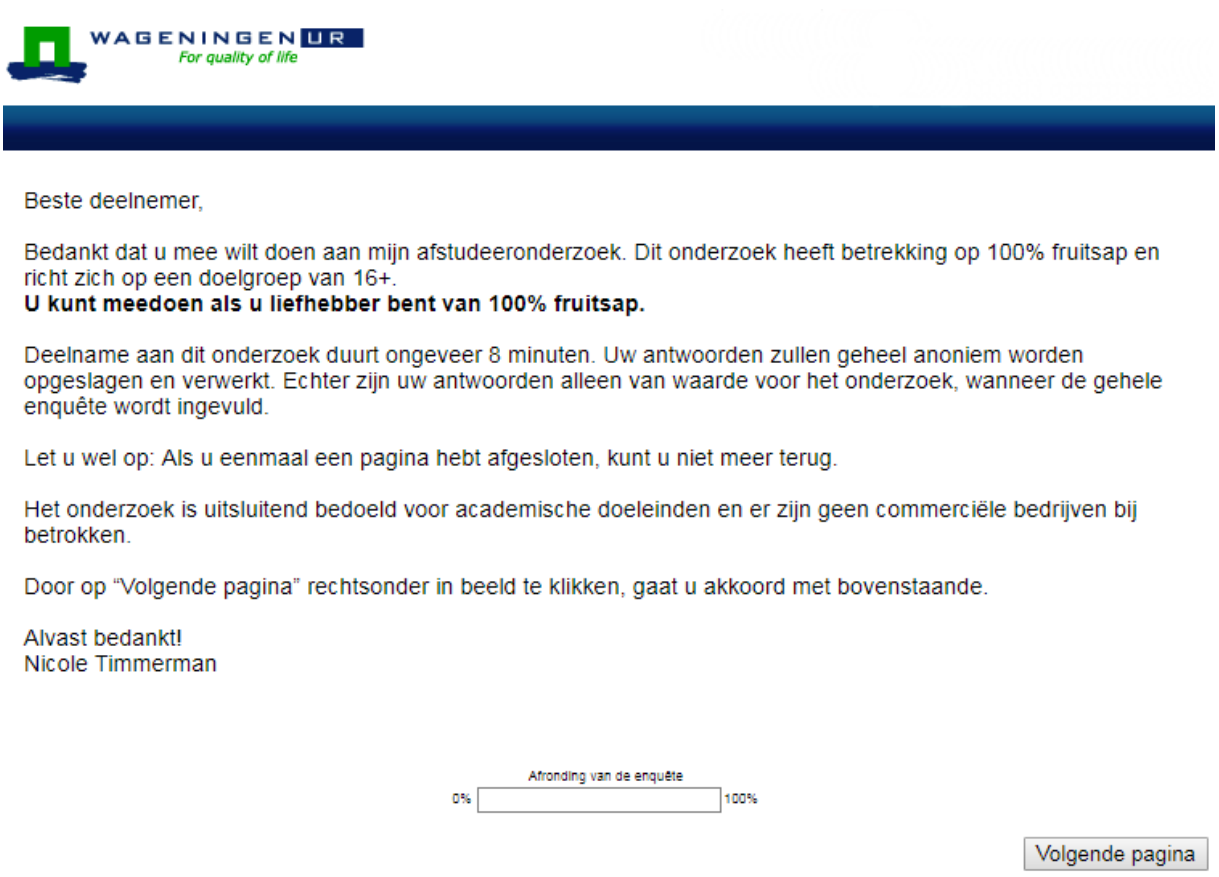
Appendix I - Survey



Beste deelnemer,

Bedankt dat u mee wilt doen aan mijn afstudeeronderzoek. Dit onderzoek heeft betrekking op 100% fruitsap en richt zich op een doelgroep van 16+.
U kunt meedoen als u liefhebber bent van 100% fruitsap.

Deelname aan dit onderzoek duurt ongeveer 8 minuten. Uw antwoorden zullen geheel anoniem worden opgeslagen en verwerkt. Echter zijn uw antwoorden alleen van waarde voor het onderzoek, wanneer de gehele enquête wordt ingevuld.

Let u wel op: Als u eenmaal een pagina hebt afgesloten, kunt u niet meer terug.

Het onderzoek is uitsluitend bedoeld voor academische doeleinden en er zijn geen commerciële bedrijven bij betrokken.

Door op "Volgende pagina" rechtsonder in beeld te klikken, gaat u akkoord met bovenstaande.

Alvast bedankt!
Nicole Timmerman

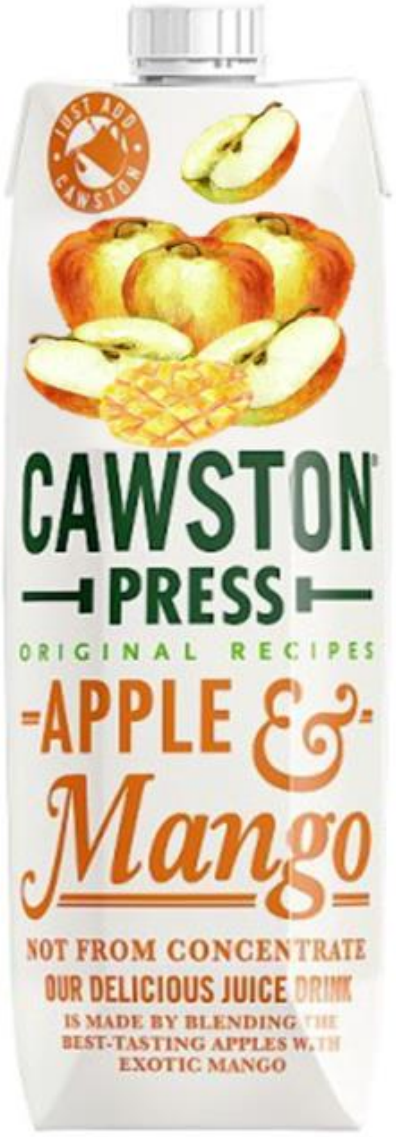
Afronding van de enquête
0% 100%

Volgende pagina

Hereafter, respondents were randomly assigned to one of the four conditions. For each condition, the questions every respondent got to see and had to fill in were kept identical. Only respondents in the post-consumption evaluation also got to taste the sample and, next to their expected flavour intensities, were asked to rate their perceived flavour intensities for the same ingredients as well.

Stelt u zich voor dat u in de supermarkt bent. Wanneer u bij het schap met de 100% fruitsappen komt, biedt een medewerker u een sample aan van onderstaand product.

De volgende vragen zullen gaan over uw mening betreffende onderstaande 100% fruitsap. Bekijk daarom de verpakking en beantwoord daarna onderstaande vragen.



INGREDIENTEN

8 geplette mango's (93.5%)

½ geperste appel (6.5%)

Geef alstublieft aan in welke mate u het eens bent met de volgende stellingen:

	Volledig mee oneens	Grotendeels mee oneens	Een beetje mee oneens	Neutraal	Een beetje mee eens	Grotendeels mee eens	Volledig mee eens
De verpakking van dit product ziet er aantrekkelijk uit	○	○	○	○	○	○	○
Ik vind het design van de verpakking mooi	○	○	○	○	○	○	○
De tekst op de voorkant van de verpakking is gemakkelijk te lezen	○	○	○	○	○	○	○

Wanneer u op "Volgende Pagina" klikt, volgen er meer vragen over deze verpakking.
LET OP: de verpakking is dan niet meer zichtbaar.

Afronding van de enquête
0% 100%

Volgende pagina

WAGENINGEN UR
For quality of life

De volgende vraag gaat over het product dat u zojuist bekeken heeft:

Geef alstublieft uw **verwachte smaakintensiteit** aan van de volgende ingrediënten.

Helemaal niet intens — Heel erg intens

Banaan

Mango

Appel

Sinaasappel

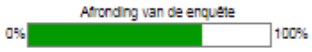
Afronding van de enquête
0% 100%

Volgende pagina

WAGENINGEN UR
For quality of life

Het is nu tijd om de 100% fruitsap te proeven. Steek uw hand op om het sample te ontvangen van de onderzoeker.

Klik op "Volgende pagina" als u het sample **helemaal heeft opgedronken**.

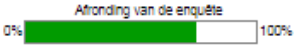


Volgende pagina

WAGENINGEN UR
For quality of life

Geef alstublieft aan in welke mate u het eens bent met de volgende stellingen

	Volledig mee oneens	Grotendeels mee oneens	Een beetje mee oneens	Neutraal	Een beetje mee eens	Grotendeels mee eens	Volledig mee eens
Het is zeer waarschijnlijk dat ik dit product zal overwegen	○	○	○	○	○	○	○
Als ik een 100% fruitsap wil kopen, is de kans groot dat ik voor dit product kies	○	○	○	○	○	○	○
Ik zou absoluut van plan zijn dit product te kopen	○	○	○	○	○	○	○



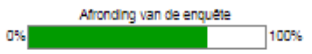
Volgende pagina

WAGENINGEN UR
For quality of life

U heeft zojuist een verpakking van een 100% fruitsap bekeken en bijbehorend sample van het product geproefd. Geef alstublieft aan in hoeverre u het eens bent met de volgende stellingen. Vul het woord in op de puntjes.

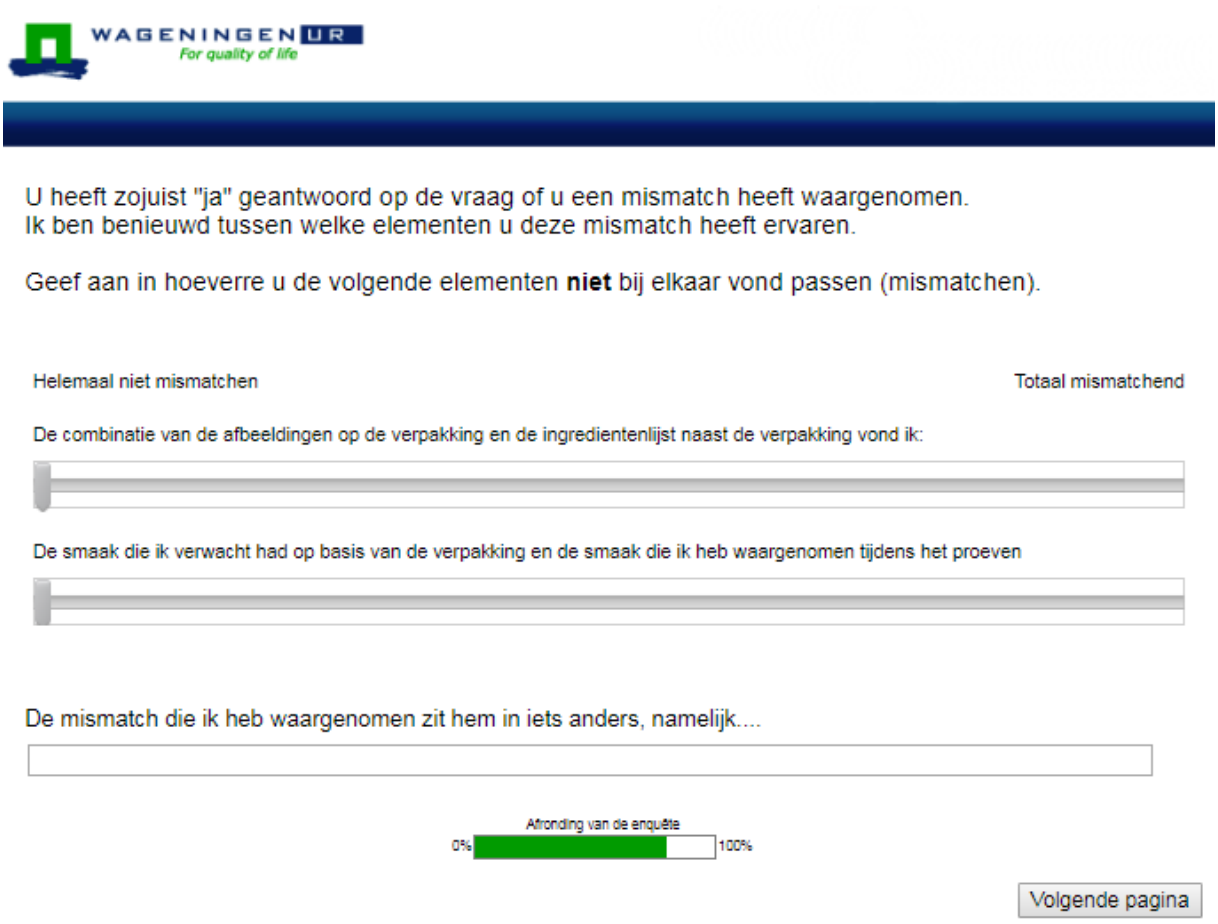
Ik voelde mij zojuist .... door de verpakking van de 100% fruitsap

	Volledig mee oneens	Grotendeels mee oneens	Een beetje mee oneens	Neutraal	Een beetje mee eens	Grotendeels mee eens	Volledig mee eens
enthousiast	○	○	○	○	○	○	○
bedrogen	○	○	○	○	○	○	○
tevreden	○	○	○	○	○	○	○
misleid	○	○	○	○	○	○	○
goed geïnformeerd	○	○	○	○	○	○	○



Volgende pagina


WAGENINGEN UR
For quality of life
Heeft u in het beoordelen van de 100% fruitsap (verpakking, smaak etc.) een "mismatch" ervaren?
Ja
Nee
Afronding van de enquête
0%
100%
Volgende pagina


WAGENINGEN UR
For quality of life
U heeft zojuist "ja" geantwoord op de vraag of u een mismatch heeft waargenomen.
Ik ben benieuwd tussen welke elementen u deze mismatch heeft ervaren.
Geef aan in hoeverre u de volgende elementen niet bij elkaar vond passen (mismatchen).
Helemaal niet mismatchen
Totaal mismatchend
De combinatie van de afbeeldingen op de verpakking en de ingredientenlijst naast de verpakking vond ik:
De smaak die ik verwacht had op basis van de verpakking en de smaak die ik heb waargenomen tijdens het proeven
De mismatch die ik heb waargenomen zit hem in iets anders, namelijk....
Afronding van de enquête
0%
100%
Volgende pagina

U krijgt nog één maal hetzelfde sample te proeven. Steek uw hand op om nogmaals dezelfde 100% fruitsap te ontvangen.

Geef alstublieft uw **waargenomen smaakintensiteit** aan van de volgende ingrediënten.
Hoe verder u de slider naar rechts verplaatst, des te sterker u de smaak van dit ingrediënt ervaart.

Banaan

Mango

Appel

Sinaasappel

Afronding van de enquête
0% 100%

Volgende pagina

WAGENINGEN UR
For quality of life

De volgende vragen gaan over het merk van de 100% fruitap

	Ja	Nee
Ik heb het merknaam "Cawston" opgemerkt op de verpakking	○	○
Ik ken het merk Cawston	○	○
Ik heb eerder een sap van het merk Cawston geconsumeerd	○	○

Hoe vaak drinkt u 100% fruitsappen in het algemeen?

Dagelijks ○ Wekelijks ○ Maandelijks ○ Jaarlijks ○ Nooit ○

Hieronder staan twee stellingen. Klik aan wat op u van toepassing is.

	Volledig mee oneens	Grotendeels mee oneens	Een beetje mee oneens	Neutraal	Een beetje mee eens	Grotendeels mee eens	Volledig mee eens
Ik ben een liefhebbeer van 100% fruitsappen in het algemeen	○	○	○	○	○	○	○
Appel mango sap vind ik/lijkt me lekker	○	○	○	○	○	○	○

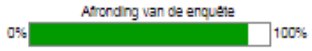
Afronding van de enquête
0% 100%

Volgende pagina

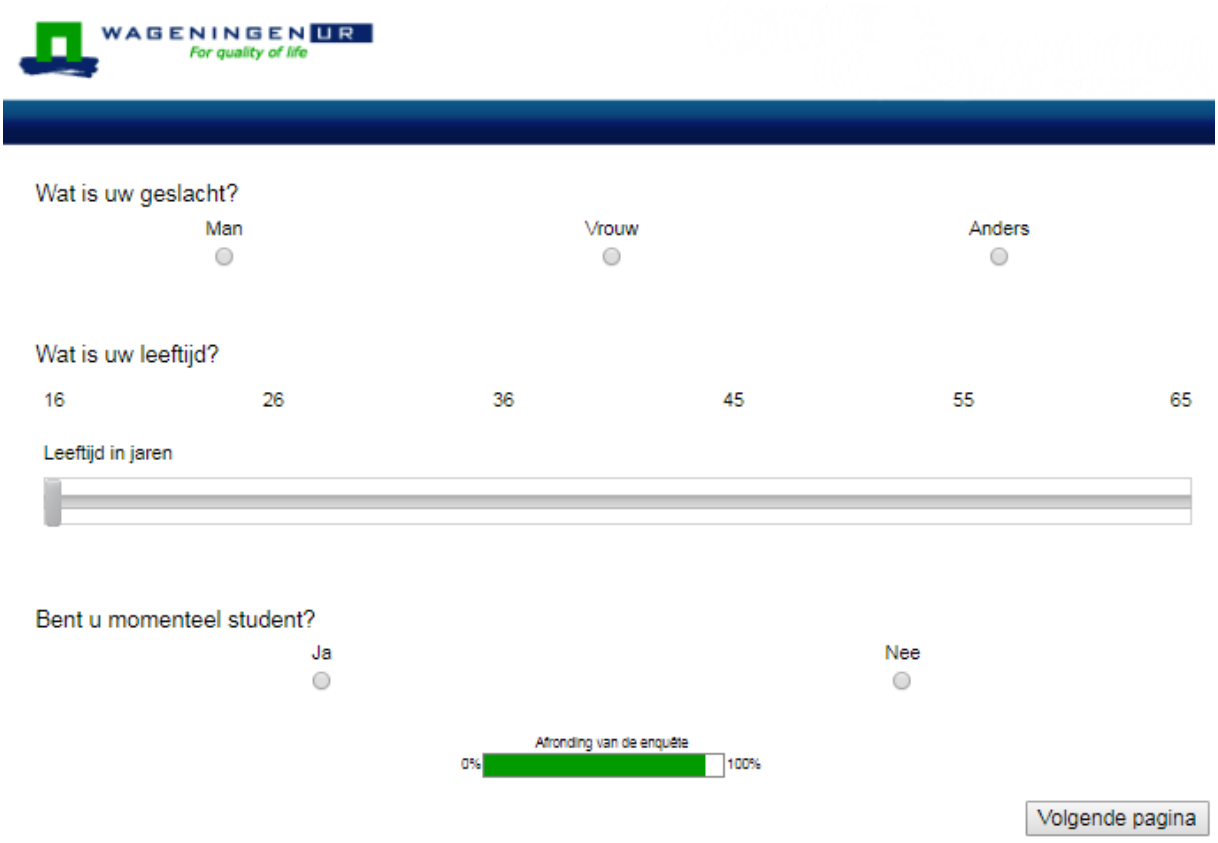
Bijna klaar, dit zijn de laatste stellingen!

Er volgen nog enkele vragen over uw manier van omgang met betrekking tot beslissingssituaties. Geef aan in hoeverre de uitspraken betrekking hebben op de manier waarop u over het algemeen beslissingen neemt. Denk niet te lang na over de stellingen.

	Volledig onjuist		Neutraal		Volledig juist
Ik probeer situaties te vermijden waarbij ik diepgaand over iets moet nadenken	○	○	○	○	○
Ik geniet van intellectuele uitdagingen	○	○	○	○	○
Ik vind het niet leuk om veel na te denken	○	○	○	○	○
Ik geniet van het oplossen van problemen waarbij ik hard moet nadenken	○	○	○	○	○
Denken is niet mijn idee van een plezierige activiteit	○	○	○	○	○
Ik vertrouw graag op mijn intuïtieve indrukken	○	○	○	○	○
Intuïtie kan een zeer nuttige manier zijn om problemen op te lossen	○	○	○	○	○
Ik ga vaak uit van mijn instinct bij het nemen van beslissingen in mijn gedrag	○	○	○	○	○
Ik houd niet van situaties waarin in op mijn intuïtie moet vertrouwen	○	○	○	○	○
Ik denk dat het dwaas is om belangrijke beslissingen te nemen op basis van gevoelens	○	○	○	○	○



Volgende pagina


WAGENINGEN UR
For quality of life
Wat is uw geslacht?
Man
Vrouw
Anders
Wat is uw leeftijd?
16
26
36
45
55
65
Leeftijd in jaren
Bent u momenteel student?
Ja
Nee
Afronding van de enquête
0%
100%
Volgende pagina


WAGENINGEN UR
For quality of life
LET OP: OM UW ANTWOORDEN TE VERSTUREN MOET U NOGMAALS OP "Volgende Pagina" KLIKKEN.
Beste Deelnemer,
Graag wil ik u hartelijk bedanken voor uw deelname aan mijn onderzoek.
Als u geïnteresseerd bent in het doel van dit onderzoek, kunt u een mail te sturen naar nicole.timmerman@wur.nl.
Door het invullen van deze enquête heeft u het mede mogelijk gemaakt dat ik kan afstuderen.
Mogelijke op- of aanmerkingen met betrekking tot de vragenlijst kunt u in onderstaand tekstvak plaatsen.
Nogmaals bedankt en geniet van de Tony Chocolonely!
Met vriendelijke groet,
Nicole Timmerman
Afronding van de enquête
0%
100%
Volgende pagina

Appendix II - Data Analysis

Table 2.1. Effect Coding independent variables

Visual	**Dvi**
V:A<M	-1
V:A>M	1
Textual	**Dte**
THE	-1
T:A>M	1
Tasting	**Dta**
No	-1
Yes	1
PSI-category	**DP**
E-processor	-1
R-processor	1

Table 2.2. Effect coding main + interaction effects

Condition	**Dvi**	**Dte**	**Dta**	**DviDte**	**DviDta**	**DteDta**	**DviDteDta**
1	-1	-1	-1	1	1	1	-1
2	-1	1	-1	-1	1	-1	1
3	1	-1	-1	-1	-1	1	1
4	1	1	-1	1	-1	-1	-1
5	-1	-1	1	1	1	1	1
6	-1	1	1	-1	1	-1	-1
7	1	-1	1	-1	-1	1	-1
8	1	1	1	1	-1	-1	1

$$\hat{\sigma}^2_{\alpha} = \frac{(a-1)(\mathrm{MS_A} - \mathrm{MS_R})}{nab}$$

$$\hat{\sigma}^2_{\beta} = \frac{(b-1)(\mathrm{MS_B} - \mathrm{MS_R})}{nab}$$

$$\hat{\sigma}^2_{\alpha\beta} = \frac{(a-1)(b-1)(\mathrm{MS_{A\times B}} - \mathrm{MS_R})}{nab}$$

$$\omega^2_{\text{effect}} = \frac{\hat{\sigma}^2_{\text{effect}}}{\hat{\sigma}^2_{\text{total}}}$$

Figure 2.1 Calculation omega squared effect size

Table 2.3. Summary of exploratory factor analysis results for the REI-10 questionnaire (*N* = 436)

Pattern Matrix[a]		
	Factor	
	Intuitive	Rational
REI6 (FI)	**.787**	-.029
REI7 (FI)	**.693**	.045
REI9 (FI)	**.693**	.070
REI8 (FI)	**.688**	-.079
REI10 (FI)	**.489**	-.004
REI2 (NFC)	.082	**.685**
REI4 (NFC)	.034	**.551**
REI1 (NFC)	-.017	**.549**
REI5 (NFC)	.034	**.450**
REI3 (NFC)	-.114	**.416**
% of variance	23.15%	14.60%
α	.796	.647

Extraction Method: Maximum Likelihood.
a. Rotation converged in 3 iterations.

Note: Factor loadings over .40 appear in bold.

Table 2.4. Overview of statistical analysis for each hypothesis including *N,* IVs and DV in the model

	Statistical analysis to check hypothesis	**N**	**Independent variables**	**Dependent variable**
H1	Factorial ANOVA	436	Visual Textual Visual * Textual	Expected Flavour Ratio
H2	Factorial ANOVA	222	Visual Textual Visual * Textual	Perceived Flavour Ratio
H3	Test of equal proportions	214 222	Incongruent Congruent	Perceived (mis)match
H4	One-Way ANOVA	436	Perceived mismatch	Perceived Deception
H5	Linear regression	436	Perceived Deception	Willingness to Purchase

H6a **H6b**	Factorial ANOVA	436	Visual Textual PSI_Category Textual * PSI_Category Visual * PSI_Category Visual * Textual Visual * Textual * PSI_Cat	Expected Flavour Ratio
H7a **H7b**	Factorial ANOVA	222	Visual Textual PSI_Category Textual * PSI_Category Visual * PSI_Category Visual * Textual Visual * Textual * PSI_Cat	Perceived Flavour Ratio
H8	Test of equal proportions	214 222	Incongruent Congruent	Perceived (mis)match

Appendix III - Results

Table 3.1. The distribution of respondents amongst the eight conditions (N = 436)

Condition	Non-tasting (N)	Tasting (N)	Total (N)
V:A<M + V:A<M	52 (condition 1)	55 (condition 5)	107
V:A<M + T:A>M	53 (condition 2)	56 (condition 6)	109
V:A>M + T:A<M	55 (condition 3)	55 (condition 7)	110
V:A>M + T:A>M	54 (condition 4)	56 (condition 8)	110
Total (N)	214	222	436

Table 3.2. The distribution of gender amongst the eight conditions (N = 436)

Condition	Male (N)	Female (N)	Total (N)
1	26	26	52
2	28	25	53
3	28	27	55
4	22	32	54
5	23	32	55
6	29	27	56
7	30	25	55
8	26	30	56
Total	212	224	436

Table 3.3. The distribution of PSI-category amongst the eight conditions (N = 436)

Condition	Primary E-Processor (N)	Primary R-processor (N)	Total (N)
1	24	28	52
2	18	35	53
3	25	30	55
4	26	28	54
5	25	30	55
6	24	32	56
7	25	30	55
8	23	33	56
Total	190	246	436