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Interpreting the Influence of Heuristic and Systematic Cues on Visual Attention to Food Label Claims

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Interpreting the Influence of Heuristic and Systematic Cues on Visual Attention to Food Label Claims

Abstract

An increase in consumer concern surrounding food ingredients has triggered a rise in label claims as an attempt to communicate salient product attributes to influence a purchase decision. Previous research has established the use of food label claims as heuristic cues, facilitating quick decisions without the need for complicated cognitive processing. Design of a label claim becomes an important concern as research has indicated distinct design elements promote further processing. This study sought to understand the role of visual and textual elements of a label claim toward dual processing routes through the use of eye tracking measures. The results indicated label claims that included both visual and textual elements elicited the highest visual attention allocation from consumers, and suggested that label claims are processed systematically in addition to heuristically as previously specified. Future label claims should include both visual and textual elements to promote further cognitive processing among all consumers. The findings from this study provide an avenue for greater understanding of dual processing modes within the context of food label claims and other agriculturally-relevant concepts.

Keywords

Heuristic-Systematic Processing Model, eye tracking, visual attention, food label claims, food marketing

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Introduction and Literature Review

One of the key purposes of food labels is to cut through the noise of a complex information landscape and communicate clearly to consumers in a simple way and in a standardized format, guiding food choices and behaviors in today's digital age (Jiang et al., 2019; Penzavecchia et al., 2022). These labels can contain nutrition information, allergens, country-of-origin, organic status, sustainability claims, and more. Some labels may even utilize QR codes to link to even more detailed information online. Within agriculture and natural resources, food labeling studies have found consumers do pay attention to label claims related to gluten-free (Cantrell et al., 2020), state of production (e.g., Fresh from Florida; Ruth & Rumble, 2016), how animals were raised (Powers et al., 2020), and nutrition and sustainability (Van Loo et al., 2021), especially when amplified by social media influencers (Pilař et al., 2021). Therefore, clear and concise food labels are more important than ever to empower consumers to make informed decisions in an increasingly complex and influencer-driven food environment.

Food label claims are included on product packaging as a heuristic cue for consumers, providing useful information to evoke a purchase decision without requiring much cognitive processing (Asioli et al., 2017). The design of food labels impacts visual attention to a label, which can influence the route of information processing a consumer engages in (Orquin & Loose, 2013; Sanjari et al., 2017; Silayoi & Speece, 2004). Previous research has suggested visual heuristic cues sway consumers toward heuristic processing, while textual cues are associated with systematic processing (Townsend & Kahn, 2014). Measuring visual attention to a food label allows for a greater understanding of how individual product attributes are processed in order to interpret what components lead to a purchase decision (Van Loo et al., 2018; Van Loo et al., 2021; Wansink et al., 2004). Thus, this study sought to understand how visual and textual elements of a food label claim influenced consumer visual attention and guided them toward one of the dual processing routes, with the ultimate goal of determining how the label claims relate to a purchasing decision. With the application of eye tracking research, this study contributes to the field of agricultural communications by providing valuable insights for designing food labels that optimize processing styles and ultimately influence consumer choices.

Labeling Trends

Consumers are becoming increasingly concerned with the ingredients included in their food, which has provided an opportunity for a multitude of label claims to be featured on virtually every product in the grocery store (Kuchler et al., 2017). Research from NielsenIQ (2018) found 46% of Americans reported the claims on food products directly influence their purchase decisions. This desire to examine the food packaging extends to the ingredient list with consumers wanting to avoid products that contain specific ingredients such as high fructose corn syrup, artificial sweeteners, preservatives, colors, and flavors (International Food Information Council, 2021). One specific trend that has developed out of this widespread desire for ingredient transparency is termed the "clean label." This label claim asserts foods are free from artificial ingredients, and often simultaneously occurs with organic, natural, and non-GMO claims (Aschemann-Witzel et al., 2019). As this trend rapidly gains market share, understanding its influence becomes vital for communicators because it overlaps with many established agricultural issues and has the possibility to shape future conversations.

As consumers search for specific products, it is crucial label claims provide adequate information to supply the necessary information that influences a purchase decision for each individual (Kuchler et al., 2017). Providing sufficient, factual information also equips consumers with the tools to engage in attitude formation regarding an unfamiliar label claim, as well as future claims within the same realm that may be encountered (Lähteenmäki, 2013). Ultimately, label claims represent a crucial information source for communicators to elicit consumer attention. Label claims are extrinsic cues—elements of a food product that do not affect the physical product, which include attributes such as price, branding, and packaging (Szybillo & Jacoby, 1974). The average consumer tends to focus on extrinsic cues when forming their attitudes due to low issue involvement (Walters & Long, 2012). Therefore, the visual and textual design elements of a food label become an important consideration as low involvement consumers tend to rely on these claims for a majority of their information (Sanjari et al., 2017; Silayoi & Speece, 2004). A package design that incorporates visual elements caters to low involvement consumers, while high involvement consumers tend to employ the use of textual elements. Incorporating both of these elements provides an avenue for low and high involvement consumers to process label claim information, further emphasizing the need for label claim design as an essential consideration in the communication process.

Visual Attention Allocation

Eye movements are routinely directed toward areas that capture an individual's attention with a desire for further cognitive processing (Duchowski, 2017; Wedel & Pieters, 2008). Measuring visual attention becomes a powerful signal for understanding how food labels function as communication devices. By studying how consumers visually engage with labels, researchers can gain valuable insights into the effectiveness of agricultural communications strategies. For example, eye tracking methodology has been used to investigate front-of-package nutrition labels (Siegrist et al., 2015), functional food labels (Oliveira et al., 2016), and sustainability claims on labels (Ruppenthal, 2023). This line of research helps inform how agricultural communicators can design labels that capture attention, facilitate information seeking, and ultimately guide consumers toward making informed choices.

In a review of 10 years of nutrition label eye tracking studies, Ma and Zhuang (2021) concluded this approach is "an efficient method to study attention allocation" and these labels function according to principles of selective attention, a core concept in communication theory (p. 8). Measures of visual attention are commonly understood to serve as a proxy for cognitive processing, as longer fixations and a greater overall amount of visual attention demonstrate increased processing (Duchowski, 2017). Visual attention commonly manifests in fixations, when the eyes pause over an area to allow for further scrutiny, and which makes up nearly 90% of an individual's viewing time (Duchowski, 2017). Movements between fixations are referred to as saccades—subconscious movements that shift attention from one area to another. Together, fixations and saccades form a scan path, which describes the complete journey of an eye between areas of interest (AOIs). Areas of interest are researcher-determined elements of a stimuli that represent the construct under scrutiny (Duchowski, 2017). Ultimately, the assessment of eye movements through eye tracking measures provides insight beyond traditional explicit measurement strategies.

In the realm of food label claims, consumers must have a desire to purchase healthy foods, as well as adequate time to direct attention toward health-related label claims (Fenko et

al., 2018; Hoek et al., 2013). As such, the design of a label claim presents an additional factor in eliciting visual attention. Simpler designs prompt consumers to divert their attention toward nutritional information, while designs with an increased amount of front-of-package information require processing before shifting focus to nutritional information (Visschers et al., 2010). Time constraints also have an impact on visual attention as many consumers feel they do not have enough time to fully process label claim information, increasing the need for label claims that are easily processed by all types of consumers (Fenko et al., 2018; Silayoi & Speece, 2004; Tanner et al., 2019). Using eye tracking to understand the label claim design elements that elicit the most visual attention facilitates further messaging development that will aid consumers in making effortless purchase decisions (Van Loo et al., 2018).

Theoretical Framework

The digital age, characterized by the abundance of information and the influence of social media, has undoubtedly impacted how consumers process information (Firth et al., 2019; Shanmugasundaram & Tamilarasu, 2023). This complex environment can lead to increased reliance on heuristics (mental shortcuts), a key concept in the Heuristic-Systematic Model (HSM) (Chaiken, 1980). For instance, consumers might trust health claims shared by online influencers or make quick judgements about a product based on its packaging design. However, unlike the Elaboration Likelihood Model (ELM) (Petty & Cacioppo, 1986), which emphasizes deliberate processing of arguments, the HSM acknowledges the role of these shortcuts in forming attitudes towards food products.

Eye tracking, an innovative method within agricultural communications, offers a valuable tool to understand how these processing styles play out with food labels as communication devices. By measuring visual attention, researchers can go beyond self-reported data and gain insights into which label elements capture attention, how long information is processed, and how the design influences decision-making. This knowledge is crucial for agricultural communicators who can leverage such an approach to develop labels that are clear, informative, and encourage deeper processing of information, ultimately guiding consumers toward informed choices.

As food label claims are generally understood to be used as heuristic cues, the Heuristic-Systematic Processing Model (HSM) served as the framework for this study. HSM states that a persuasive message is processed using information an individual already possesses (i.e. heuristically) or through extensive cognitive measures (i.e. systematically) (Chaiken, 1980, 1987; Zuckerman & Chaiken, 1998). Previous research has indicated nutritional labels are processed systematically, while front-of-package food label claims are more likely to be processed heuristically (Verbeke, 2008). This model assumes individuals have a limited capacity to process information, which suggests the use of heuristic processing as less cognitive effort is required (Gigerenzer & Gaissmaier, 2011; Zuckerman & Chaiken, 1998). Limited capacity for cognition can stem from factors such as a time constraint, scarce knowledge of a subject, or other stimuli that must be simultaneously processed—each of which could arise during any typical grocery shopping trip (Scheibehenne et al., 2007; Zuckerman & Chaiken, 1998).

An individual's attitude is ultimately determined through their route of information processing and is mediated by three factors: issue involvement, message characteristics, and source characteristics. High issue involvement and thorough processing of message characteristics typically results in systematic processing, while heuristic processing tends to occur in low involvement individuals who maintain a distinct focus on the source of a persuasive

message (Chaiken, 1980). High involvement individuals have a greater investment in the outcome of their decision; therefore, they allocate more cognitive resources to determining their attitude concerning a message. Systematic processors rely on the composition of a message, specifically tonality, directionality, and appeal to risk prospect as they heavily scrutinize each aspect to determine their attitude toward a message (Chaiken, 1980). As food is a basic need with a relatively low price point compared to other goods, many consumers retain a low involvement in their food purchasing decision (Verbeke, 2005). These low involvement consumers avoid complicated cognitive processing of a message, rather focusing on the source of a message and evaluating the credibility of said message (Chaiken, 1980). Consumers' evaluation of a label source as trustworthy plays a big role in the use of heuristic processing as they do not need to allocate significant cognitive resources to determine if the label is providing reliable information (Verbeke, 2008).

With food label claims commonly being processed through the heuristic route, measuring visual attention to these package elements allows a greater understanding of how these attributes are used toward processing and purchase decisions (Van Loo et al., 2018). As the grocery store is a distracting environment, consumers are compelled to make quick decisions under time pressure, further encouraging the use of heuristic processing (Hoek et al., 2013).

Visual heuristic cues have been found to be more influential compared to textual cues as visual cues lend themselves toward expedited decisions, although textual cues can be more powerful when a consumer has no predefined product preference (Townsend & Kahn, 2014). Orquin and Loose (2013) found a relationship between a consumer's visual attention and the choice they make during a decision task. Eye movements are directed to heuristic cues when an individual must reduce their cognitive strain, positing that heuristic elements of a package influence visual attention of an individual and, thus, shape their purchase decisions (Orquin & Loose, 2013).

Purpose and Hypothesis/Research Question

Persuasive food label claims are highly salient for a consumer's purchase decision and inform their route of cognitive processing. Specifically, design features of a label claim influence consumers' visual attention toward a stimuli, which can impact the amount and type of cognitive processing. Creating label claims that draw the consumer's visual attention and easily guide cognitive efforts can provide a strategy for communicators developing new label claims with the purpose of eliciting a purchase decision. To understand the impact of label claim design, the purpose of this study was to determine how consumers' visual attention to food labels was influenced by a combination of visual and textual elements. As such, the following hypothesis and research question were used to guide this study:

H_1: Visual attention allocation will differ significantly based on label design.

RQ_1: How much visual attention is directed at the clean label when viewing different food products?

Methodology

This study used a 2 (visual: yes vs. no) x 2 (textual: yes vs. no) x 2 (product type: chips vs. granola bar) within- and between-subjects factorial design with a control to determine the influence of visual and textual elements of a label on visual attention. A factorial design was chosen as it allowed a comparison of the visual and textual elements through multiple label designs (Duchowski, 2017). Visual and textual elements served as the between-subjects variable, while product type was the within-subjects variable. As consumers are becoming increasingly consumed with ingredient transparency of their food and the clean eating trend has made its way into the diet of many Americans, a "clean label" was developed to measure the influence of visual and textual label elements within the context of this widespread trend. The label contained the term "clean label" and statements that emphasized several commonly associated attributes of the trend. Four label conditions were developed to test both the visual and textual elements, as well as the interaction between the two. The four label conditions were: 1) visual only - designed clean label without statements, 2) visual and textual - designed clean label with statements, 3) textual only - statements only, and 4) a control with no label claim information. Eye tracking was used to measure visual attention allocation to the label claim as visual attention signals elements that require processing, which can determine the power of a persuasive message (Wedel & Pieters, 2008).

Independent Variables

Visual Elements

The visual element of a label claim was selected as an independent variable because previous research has indicated the design of a label claim is highly influential the toward information processing route, as well as purchase decisions (Townsend & Kahn, 2014; Wansink et al., 2004). Visual elements are more likely to be processed heuristically as they require less cognitive effort to fully understand and provide a route for a quick decision (Silayoi & Speece, 2004). To understand the influence of visual elements, a circular, green label claim was designed, which included a plant to emphasize the natural attribute of clean label products. This label claim was prominently displayed on each of the experimental package designs (see Figures 1 and 2).

Figure 1

Granola Bar Experimental Product Designs

Condition 1: Clean Label without Statements

Condition 2: Clean Label with Statements

Condition 3: Statements Only

Condition 4: Control

Textual Elements

Much like visual elements, textual elements contribute to the route of information processing an individual completes (Wansink et al., 2004). Textual elements of a package are typically processed systematically as they require comprehensive attention to read (Silayoi & Speece, 2004). The included statements were derived from previous research surrounding clean label products: free from artificial preservatives and colors, all natural, organic, and non-GMO. These textual statements (see Figures 1 and 2) were incorporated into the visual logo to understand the influence of both elements, as well as tested as their own element to determine if they were persuasive by themselves.

Figure 2

Potato Chips Experimental Product Designs

Condition 1: Clean Label without Statements

Condition 2: Clean Label with Statements

Condition 3: Statements Only

Condition 4: Control

Product Type

Product type was selected as an independent variable because messaging effectiveness has been found to vary between product types (Jeong & Lundy, 2015). Potato chips and a granola bar were selected as two contrasting products to test the effects of the label claim elements. Specifically, these products were selected due to possessing a higher level of processing and the consumer expectation that they would not normally be associated with clean eating. The label claim was prominently featured on each package, on the upper right corner for the potato chips and in the middle of the granola bar. The product package designs included only minimal information compared with typical products in order to elicit more attention to the label claim being evaluated (see Figures 1 and 2).

Dependent Variable

Visual attention allocation served as the dependent variable for this study, which was operationalized through total fixation duration (seconds) to an AOI containing the label. Attention is a necessary component of information processing, as an individual must direct visual attention toward a message in order to fully understand its contents and purpose (LaBerge, 1995). As visual attention serves as a proxy for cognitive processing, measuring the amount of time an individual spent viewing the label claim allowed a greater understanding of resources allocated to forming an attitude regarding the claim and its messaging (Duchowski, 2017).

Individual Difference Variables

Age, gender, ingredient concern, and pre-existing packaging attitudes served as individual difference variables to determine if they were influential in affecting visual attention. These four factors were assessed through a pre-test questionnaire, with one Likert-type question determining each individual difference variable.

Validity and Reliability

As it has become more accessible, eye tracking has become a common method to incorporate into studies focusing on attention (Orquin & Holmqvist, 2017). Lab experiments allow for increased control over each variable, thus increasing internal validity (Duchowski, 2017). To account for any differences between sessions, participants were randomly assigned to each label claim which resulted in a large enough sample to explain effects that may occur from external factors such as amount of light (Orquin & Holmqvist, 2017). By controlling the independent variables of the experiment, the researcher maintained the ability to produce valid results. The reliability of eye tracking is highly dependent on maintaining consistent measurement among participants. Each participant completed a calibration procedure to ensure the eye tracking hardware was properly following their point of gaze (Duchowski, 2017).

Participants

The population for this study was Millennial and Generation Z consumers who were between the ages of 18-38. This population was selected due to an increase desire for food

ingredient transparency seen within these two generations (Rosenbloom, 2018). Millennials have established their desire for increased information when making food purchase decisions, and they instinctively associate healthy products with attributes such as natural, organic, locally sourced, and sustainable (Hoffman, 2012; Rosenbloom, 2018). Generation Z consumers have only recently reached a point where they are making their own food purchase decisions and have emerged with a focus on clean eating, which aligns with their definition of health (The NPD Group, 2018). As such, consumers within both of these generations are at a pivotal time in their attitude formation of food products and rely heavily on heuristic cues.

A sample of 117 Millennial and Generation Z consumers from a southwestern university were recruited through a university-wide announcement system. Data collection occurred in 2019. Participants were awarded a $20 cash incentive for their participation. A total of 30 participants were randomly exposed to each label condition with data collected from a total of 120 participants. After data reduction, 29 participants were exposed to the visual only label condition, 30 were exposed to the visual and textual, 30 were exposed to the textual only, and 28 were exposed to the control, resulting in the final sample of 117. No participants were removed from the sample due to their eye tracking data as all participants were above the 70% threshold for weighted gaze sample.

The majority of participants were female (70.1%, n = 82) between the ages of 18-22 (52.1%, n = 61). Most of the participants indicated they purchase their food from a grocery store (84.6%, n = 99) and were the primary grocery shopper in their household (86.3%, n = 101), which established these participants as highly involved in making their own food purchase decisions. Even so, these consumers had varying levels of concern over ingredients, with participants indicating they were either very concerned (10.3%, n = 12), fairly concerned (58.1%, n = 68), or not very concerned (31.6%, n = 37), which established the majority of participants as low involvement consumers when considering food ingredients.

Procedure

Those who expressed an interest in participating were sent a screening questionnaire to assess their eligibility for the study. Those who met the age requirement were provided a time slot for their individual session, which was conducted in an eye tracking laboratory. Although a laboratory setting decreases the ecological validity associated with such an experiment, it allows for increased control in an eye tracking study, thus strengthening internal validity (Duchowski, 2017). Once participants arrived at the laboratory, they were instructed to sit approximately 24 inches in front of computer screen, which was outfitted with a Tobii X2-60 Eye-tracker unit. The Tobii eye-tracker and its accompanying software recorded gaze data at 60Hz. This hardware allowed for the collection of eye movement data to provide information such as fixation duration, fixation count, and scanpath as participants looked through the product stimulus.

Participants completed a pre-test questionnaire to assess their pre-existing attitudes associated with food consumption, as well as their demographic information. Following completion of the pre-test questionnaire, participants performed a calibration procedure where they were asked to follow a moving dot with their eyes, which traveled to five fixed points on a screen. During the calibration procedure and while viewing the product stimuli, participants were asked to refrain from moving their head and the rest of their body so the eye-tracker could accurately capture gaze data. Following successful calibration, participants were directed to look through 10 images at their own pace, although they were instructed to take their time and not

rush through the images. The set of 10 images contained the two product packages with the participant's respective label claim condition. An additional eight distractor images were used that contained no reference to clean labels. These images ensured the participant was not looking directly at the label claim when clicking through the images and was not cognizant of the area being measured. As this study was part of a larger study, a post-test questionnaire was utilized which assessed participants' perceptions and attitudes toward the products they viewed. Specific questions about the clean labels were asked in the post-test questionnaire to minimize any priming effects. The intent of the overarching study was to understand how the visual elements on these products influences consumers' decision-making process.

Data Collection and Analysis

Data from the pre- and post-test questionnaires were captured through Qualtrics and exported to SPSS v.25 for analysis. Descriptive statistics were used to analyze the demographic information. Eye tracking data were collected through the Tobii Studio software system and exported into SPSS for analysis. AOIs were added to each product package where the label was placed, or would have been placed in the case of the control package. Inferential statistics were used to analyze eye tracking data in order to gain insight into the effect of the independent variables on the dependent variable (Duchowski, 2017). Specifically, a paired samples *t*-test was used to determine if any statistically significant differences existed between visual attention to the two products. One-way ANOVAs and ANCOVAs were used to determine statistically significant differences between the visual and textual elements of the label claim, while taking into consideration demographic information that may influence visual attention. As part of the ANOVA and ANCOVA processes, group means and standard deviations were calculated.

Results

Through an eye tracking experiment, visual attention allocation to the visual and textual elements of a label claim design was measured. The alpha level was set *a priori* at .05 for all statistical tests. H_1 predicted that visual attention would differ significantly based on label design. A one-way ANOVA showed a large significant difference in visual attention between the four label conditions ($F_{3,113} = 23.70$, $p < .001$, $\eta^2 = .386$); therefore H_1 was accepted. A Bonferroni comparison revealed significance existed between the label with both visual and textual elements and the textual elements listed by themselves. Participants who viewed both the visual and textual elements spent the most time fixated on the label with an average of 3.22 seconds (*SD* = 1.93), while those who viewed the textual elements only spent an average of 2.62 seconds (*SD* = 1.43) fixated on the label (Table 1). Figures 3 and 4 display the differences in visual attention between the products and four label conditions.

Table 1

Group Means of Total Fixation Duration Between Label Conditions

Label Condition	*N*	*M*	*SD*
Visual Only	29	1.66	1.82
Visual and Textual	30	3.22	1.93
Textual Only	30	2.62	1.43
No Label	28	0.06	0.08

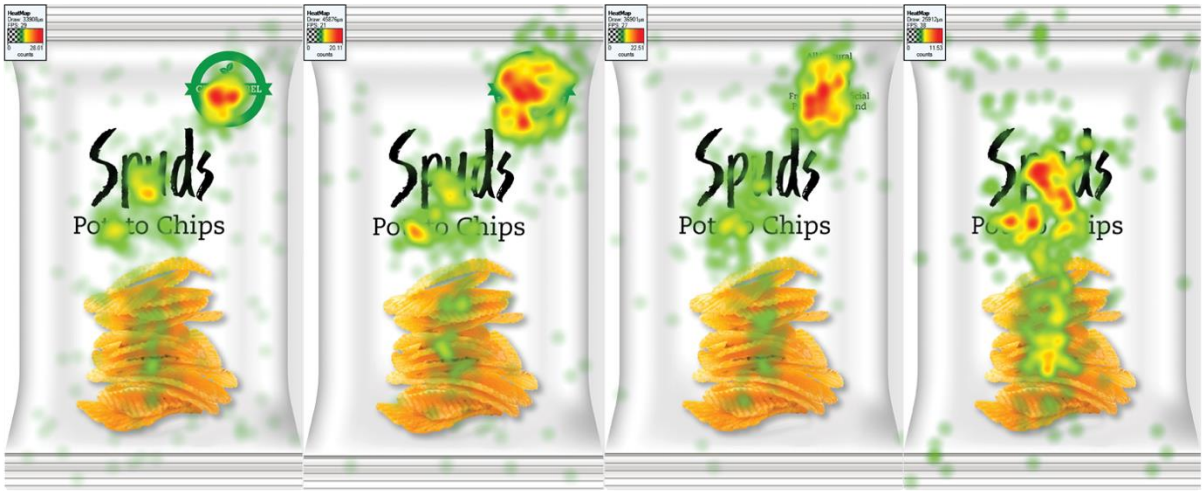
Note: Fixation duration is reported in seconds

Figure 3

Heat Map of Visual Attention Allocation to the Granola Bar Between Label Conditions (L to R, visuals only, visual and textual, textual only, control)

Figure 4

Heat Map of Visual Attention Allocation to the Potato Chips Between Label Conditions (L to R, visuals only, visual and textual, textual only, control)



RQ_1 sought to understand differences in visual attention allocation between the two product types; a paired samples *t*-test showed no significant differences in visual attention allocation between the two ($t_{116} = 1.10$, $p = .272$). Participants who viewed the visual and textual elements spent the highest average time fixated on the label, specifically 3.30 seconds (*SD* = 2.39) for the potato chips and 3.14 seconds (*SD* = 1.97) for the granola bar (Table 2).

Table 2

Group Means of Visual Attention Allocation Between Product Type

	Potato Chips			Granola Bar		
Label Condition	*N*	*M*	*SD*	*N*	*M*	*SD*
Visual Only	29	1.68	1.72	29	1.64	2.21
Visual and Textual	30	3.30	2.39	30	3.14	1.97
Textual Only	30	2.86	1.69	30	2.37	1.49
No Label	28	0.01	.062	28	0.11	.166

Note: Fixation duration is reported in seconds

Two one-way ANCOVAs were conducted to determine if any differences in visual attention allocation existed between the visual and textual elements for each product. The one-way ANCOVA for the potato chips revealed a statistically significant difference in visual attention allocation between the who viewed the visual elements ($F_{1, 109} = 10.52$, $p = .002$, $\eta^2 = .088$) and the textual elements ($F_{1, 109} = 46.99$, $p < .001$, $\eta^2 = .301$) (Table 3). The four covariates

of age, gender, ingredient concern, and pre-existing packaging attitudes were not statistically significant in influencing visual attention to the label claim on the potato chips packaging.

Table 3

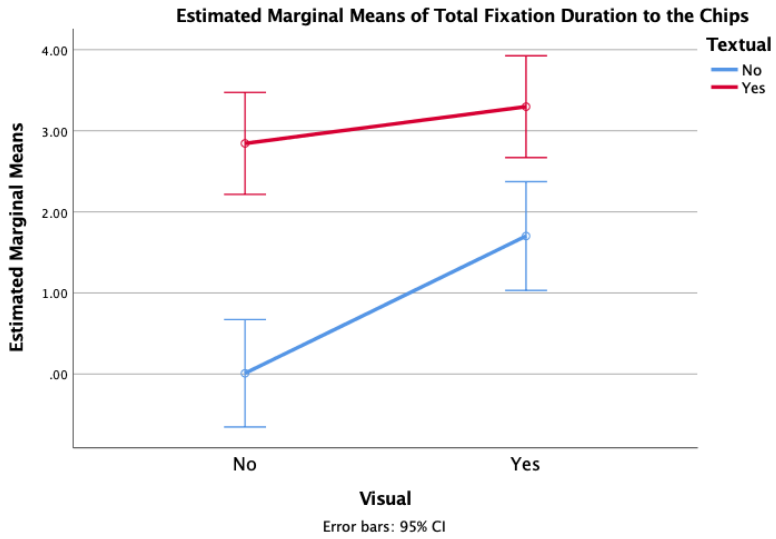
*Analysis of Covariance of Visual Attention to the Potato Chips with Individual Difference Variables as the Covariates (*N *= 117)*

Item	*df*	*F*	*p*	η^2
Visual	1	10.52	.002*	.088
Textual	1	46.99	.000*	.301
Age	1	0.02	.880	.000
Gender	1	0.49	.491	.004
Ingredient Concern	1	0.85	.359	.008
Pre-existing Packaging Attitudes	1	0.08	.778	.001

Figure 5 displays the interaction between the visual and textual elements, emphasizing the effect of the textual statements toward visual attention, as visual attention to the labels that included textual statements was significantly higher compared to the labels that did not contain these statements. In addition, visual attention increased when a visual element was added, with the label containing both the visual and textual elements accumulating the most visual attention allocation for the potato chips.

Figure 5

Means of fixation duration to the chips between visual and textual elements



The one-way ANCOVA for the granola bar revealed similar results regarding visual attention to the visual and textual elements of the packaging. A statistically significant difference was found between visual attention to the visual ($F_{1, 109}$ = 11.14, p = .001, η^2 = .093) and textual ($F_{1, 109}$ = 36.55, p < .001, η^2 = .251) elements of the package (Table 4). Again, the four covariates were not statistically significant in influencing visual attention allocation.

Table 4

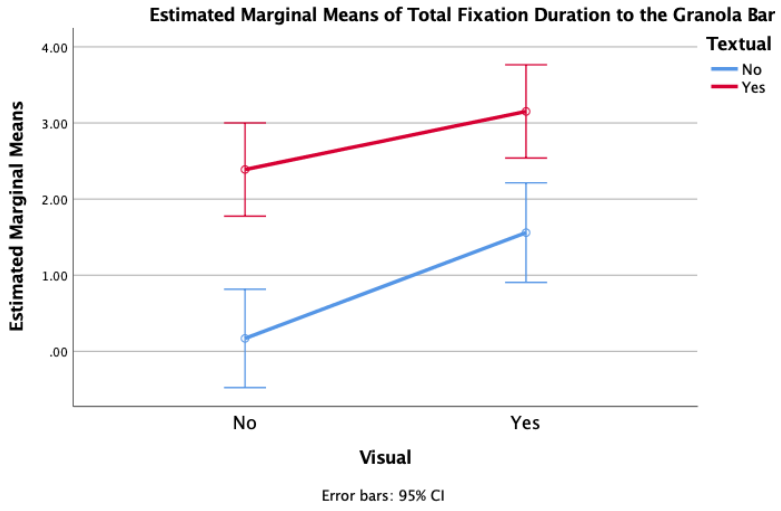
*Analysis of Covariance of Visual Attention to the Granola Bar with Individual Difference Variables as the Covariates (*N *= 117)*

Item	*df*	*F*	*p*	η^2
Visual	1	11.14	.001*	.093
Textual	1	36.55	.000*	.251
Age	1	0.44	.510	.004
Gender	1	0.34	.559	.003
Ingredient Concern	1	0.45	.503	.004
Pre-existing Packaging Attitudes	1	0.01	.964	.000

Figure 5 displays the interaction between the visual and textual elements for the granola bar. These results were similar to the potato chips, where visual attention to the textual elements of the package was significantly higher overall. In addition, further support exists for combining the visual and textual elements as it resulted in the most visual attention.

Figure 5

Means of fixation duration to the granola bar between visual and textual elements



Conclusions, Implications, and Recommendations

As consumers push for increased ingredient transparency in their food choices and label claims become more prolific across the grocery store (IFIC, 2021; NielsenIQ, 2018), further understanding of the impact of these label claims is needed. This study sought to understand how visual and textual heuristic cues of a label claim influenced consumers' visual attention allocation. Using visual attention allocation as the dependent variable in this study allowed the researchers to explore total fixation duration, which serves as a proxy for measuring cognitive processing. An individual's visual attention indicates areas where they perceived a need for further cognitive processing (Wedel & Pieters, 2008). By understanding the influence of message formats that elicit the most visual attention, guidelines for future label claim development can be formed (Van Loo et al., 2018). Subsequent messages that utilize these tactics would facilitate further processing for both low and high involvement consumers, as they process information through different means. The results of this study provided support for literature indicating label claims were processed heuristically, while it also yielded support for systematic processing, as participants spent significantly more time viewing the textual elements.

As longer fixation durations were associated with the label claims that included a textual element, it is clear that participants were reading the statements and engaging in further processing of the information. Including a textual element, in the form of descriptive statements, provided an opportunity for participants to process the information systematically, in addition to heuristically as anticipated (Silayoi & Speece, 2004). The findings were consistent among products, indicating longer fixation durations for the textual elements, which demonstrated that the product type had no influence on visual attention allocation to the label claim. An additional analysis between visual and textual elements of a label claim revealed a statistically significant difference in visual attention, although the four covariates of age, gender, ingredient concern, and pre-existing packaging attitudes had no influence. These findings indicate the textual elements of a label claim continue to have a significant influence on visual attention among all demographics. Previous literature suggested consumers without a predefined product preference rely on textual information, even when visuals are available that would facilitate an expedited decision (Townsend & Kahn, 2014). By including these textual elements on the label claim, consumers are able to make an initial judgement for unfamiliar claims and use their retained knowledge heuristically when the claim is known.

The findings of this study provide a contribution to literature associated with processing modes and food label claims. As the HSM states, how a message is processed depends on several individual and contextual factors such as motivation, knowledge, and involvement (Chaiken, 1980), which also influence how effective the label is in capturing attention and subsequent information processing (Sanjari et al., 2017). Label claims are inherently used as heuristic cues, although including textual elements provides a method for systematic processing. Appealing to both facets of processing allows alternate routes toward a purchase decision, as consumers are able to participate in the processing mode best suited to their involvement level. This finding could have implications beyond label claims, as visual and textual elements are incorporated throughout various messaging strategies, including online and social media channels, which could provide alternate routes for dual processing in countless situations. As prior research found, consumers do notice and attend to a variety of claims on food labels (Cantrell et al., 2020; Pilař et al., 2021; Powers et al., 2020; Ruth & Rumble, 2016, Van Loo et al., 2021) so those

working within agricultural communications and food marketing should utilize a variety of approaches to reach their audience members.

This study does have several limitations. The first of these is the use of a convenience sample Millennials and Generation Z participants who may have different purchasing preferences and behaviors than those in different generations, which limits the ability to extend these results more broadly. Another limitation is the ecological validity of the study because data were collected in a laboratory setting rather than a field setting where additional distractions and time restrictions influence how people attend to food packaging and label claims. Finally, this research did not measure the potential relationship between visual attention allocation and behavioral change such as purchase motivation.

Despite these limitations, this study provided notable findings regarding consumers' cognitive processing modes and provides an opportunity to further investigate dual processing modes in the context of food label claims and beyond. Much of the research associated with food label claims indicates they are processed heuristically, while little research expands on initial attitude formation of a label claim and how it has the potential to be processed systematically. Further research associated with dual processing modes would allow for a better understanding of consumers' entire cognitive process toward selecting food for consumption, including how design differences lend themselves to distinct processing routes.

Eye tracking provided insight into differences in visual attention allocation among label elements, and, ultimately, the amount of cognitive processing harnessed to completely understand the label claim information and form a pertinent attitude. Conducting a similar study in a field-based setting using eye tracking glasses would provide a better idea of how a label claims draw consumers' attention when situated among other products with similar attributes. Additionally, measuring visual attention to other aspects of a package such as price or nutrition claims would reveal some insight into how much visual attention and processing is associated with label claims when compared to other salient elements of a food product. This would also allow for opportunities in multidisciplinary research with those in the economic or nutrition disciplines.

One of the distinct goals of marketing a food product is to influence a purchase decision, with an understanding of how all package elements are processed. The development of a cohesive package design leads to increased use of label claim information, which ultimately impacts purchase decisions. Determining variations in visual attention to each area of a package would aid in creating food packaging with an appropriate ratio of elements that engage consumers. This type of experiment would also improve ecological validity, as a lab-based setting increases participants' awareness that they are participating in a research study.

The increased use and reliance on mobile and digital technologies has also influenced how food products are marketed. With specific focus on food packaging, manufacturers can incorporate QR codes, which allow consumers to access additional information about the product (Albăstroiu & Felea, 2015). QR codes support mobile marketing efforts as more consumers use their smartphones to obtain additional information (Brockgreitens & Abbas, 2016). Rotsios et al. (2022) found including QR codes that lead to a web page with additional product information led to increased consumer awareness and product knowledge. While we did not evaluate the use of QR codes in this study, this does present an additional area for future research.

The design of a label claim has proven to be influential toward the type of processing an individual undertakes, as a combination of visual and textual elements elicit more visual attention from consumers. For those working in food marketing, providing label claims with the

opportunity for different processing routes allows all facets of consumers to comprehend prominent information and use it toward a purchase decision.

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