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Consumer Confusion and Front Of Pack (FOP) Nutritional Labels.

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Abstract

This study aimed to identify the type of confusion that occurs when using different FOP label formats for comparing products. Thirty interviews incorporating a think aloud technique were conducted to identify differences in food constituents as represented by FOPs. A FOP format including traffic light colouring, calories and amount in grams, percentage GDA and interpretive text produced the most correct identifications of the healthiest food product. Ambiguity confusion and technical complexity occurred. The Government and other stakeholders need to provide educational material on the use and interpretation of FOP labelling and the constituents of a healthy diet to reduce ambiguity confusion and technical complexity. The paper identifies how effectively consumers use FOP labels and the types and sources of confusion consumers' experience.

Keywords: confusion, ambiguity, overload, similarity, FOP labelling, think aloud interviews

Article Classification: Academic, empirical paper

Introduction

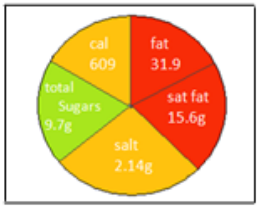
The aim of front of pack (FOP) labelling is to enable consumers to make healthy dietary choices and reduce the levels of obesity (Draper, Adamson, Clegg, Malam, Rigg & Duncan, 2011; Department of Health, 2013). Various health problems are associated with obesity such as Type 2 diabetes and heart disease and cost the NHS £5billion every year (Department of Health, 2013).

Front of Pack (FOP) Labelling in the UK

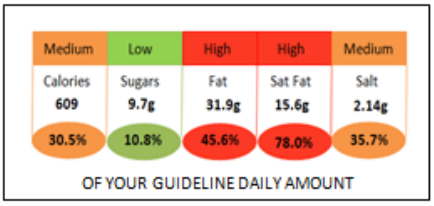
Front of pack (FOP) nutritional labelling "refers to labels positioned on the front of packaged foods, delivering nutritional information to consumers in a variety of formats" (Tymms, 2011, p.10). This encompasses two types of front of pack labelling, descriptive and signpost. Descriptive labelling includes claims such as "low fat". Signpost labelling presents information on five nutrients; calories, fat, saturates, sugar and salt. FOP labels may combine the following elements, amount in grams; percentage Guideline Daily Amounts (% GDAs); interpretive text, high, medium and low and colour coding either the traffic light system or an alternative colour system, in a variety of ways to produce different FOP labels. Four label formats commonly used by retailers can be seen in Figure 1.

Figure 1: Four Different FOP Label Formats Used by Retailers.

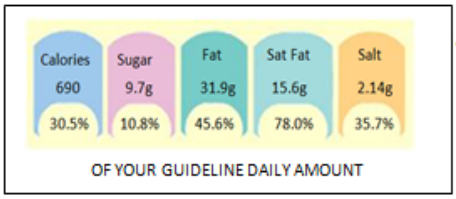
1



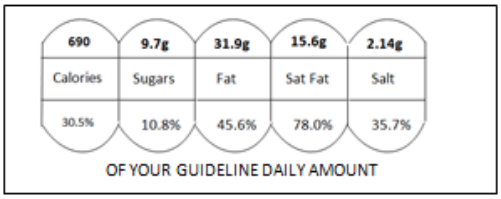
2



3



4



As already stated the objective of FOP labels is to help consumers determine the nutritional features of a product, which will enable them to consume a healthy diet (Feunekes, Gortemaker, Willems, Lion & van den Kommer, 2008). A voluntary FOP labelling system was introduced by the Food Standards Agency (FSA) in 2006 (Malam, Clegg, Kirwan, McGinigal & BMRB Research, 2009), however there has been considerable variation in the formats used by companies. Previous research has not determined which FOP label successfully leads to healthier product choice. Clarity therefore is required on which format is the easiest for consumers to achieve this.

The Concept of Consumer Confusion and FOP Labelling

Although there is no commonly accepted definition of consumer confusion (Mitchell, Walsh & Yamin, 2005), there are a number of definitions which share attributes (Papavassiliou, 1995; Mitchell and Papavassiliou, 1999; Turnbull, Leek & Ying, 2000). Both Turnbull et al. (2000) and Mitchell and Papavassiliou (1999) agree that confusion affects processing and leads to sub-optimal decision making and that it may be a conscious state or not. Consumer

confusion has been found to exist in various food related areas including the labelling of fats (Ippolito and Mathios, 1994), wine (Drummond and Rule, 2005) ecolabelling (Harbaugh, Maxwell & Rousillon, 2011) and food allergen labels (Sakellariou, Sinaniotis, Damianidou, Papadopoulos & Vassilopoulou, 2010). However, consumer confusion has not been directly examined with regard to the consumers' ability to use FOP labels. It is clear that FOP labels may be causing a degree of confusion as although the vast majority of consumers (approximately 80%) are aware of FOP labels and use them in store to evaluate or compare the healthiness of products, comprehension of FOP labels is a little lower (58%-71%) (Food Standards Agency, 2010).

Research has examined various aspects of FOP labelling which are discussed within the following framework of consumer confusion. Mitchell et al. (2005) identified three components of consumer confusion which are: similarity, overload and ambiguity confusion. Similarity confusion is a consumers "propensity to think that different products in a product category are visually and functionally similar" (Walsh, Hennig-Thurau & Mitchell, 2007, p.702). It can be caused by similarity in stimuli such as lettering, colour and style of packaging, name, store environment, advertisements etc. which leads to an incorrect evaluation of a brand and an alteration in the consumer's purchase decision (Foxman, Berger & Cote, 1992; Koli and Thakor, 1997; Mitchell, Walsh & Yamin, 2004; Walsh and Mitchell, 2010).With regard to FOP labels whilst many elements are similar, the aim is to assist the purchase decision for consumers rather than confuse it.

Overload confusion is defined as "a lack of understanding caused by the consumer being confronted with an information rich environment that cannot be processed in the time available" (Mitchell et al., 2005, p.143). Keller and Staelin (1987) found as consumers

increased the amount of information used, their decision effectiveness initially increased but then subsequently decreased. Staelin and Payne (1976) found little to no decrease in choice accuracy when the amount of information was increased. Jacoby, Speller & Kohn (1974) found when consumers were given an increased amount of information with which to make choices regarding healthy food products the number of incorrect answers increased. However, it is also argued that consumers do not overload themselves with information but only attend to a small amount (Jacoby, 1984). Furthermore, Huffman and Kahn (1998) suggest that overload confusion may be attributed to the perceived complexity of the purchase environment rather than the actual complexity of the purchase; therefore a consumer may perceive confusion even if the number of stimuli is small. Also in an information rich environment consumers may not pay attention to a crucial piece of information which may result in confusion (Mitchell et al., 2004).

Ambiguity confusion may be caused by various factors including technological complexity, ambiguous information, dubious product claims or conflicting information (Leek and Kun, 2006). Ambiguous information through unclear presentation and dubious or misleading product claims may be made despite laws being in place. Consumers may also become confused when they encounter conflicting information from different sources or when new information contradicts previous knowledge. Ambiguity confusion may arise in regard to FOP labelling due to the coexistence of different formats on manufacturer and retailer products both within a store and across different stores (Malam et al., 2009; Kelly, Hughes, Chapman, Louie, Dixon, Crawford, King, Daube & Slevin, 2009; Van Camp, Hooker & Souza Monteiro, 2010; Stockley, Jordan & Hunter, 2010; Food Standards Agency, 2010; Draper et al., 2011). When comparing the formats consumers may mistakenly transfer the meaning from one element of a FOP label to the equivalent element of another FOP label

leading to misinterpretation of the information (Draper et al., 2011). Ambiguity confusion may arise from the labels' colouring. Some consumers are unaware of the meaning of the colours used in traffic light FOP labelling (Food Standards Agency, 2010). With the alternative colouring scheme i.e. where pastel colours including blue, pink, green, orange have been used which have no relevance to the food content, consumers assign meaning to the colours possibly due to their previous experience with the traffic light colour system (Draper et al., 2011). With label formats that use one colour, consumers' incorrectly interpreted cool colours such as blue and green as healthier or as low in the specific nutrient (Malam et al., 2009; Food Standards Agency, 2010; Draper et al., 2011).Technological complexity occurs when a consumer is unfamiliar with the technical language used to describe products. The percentage GDA was commonly misinterpreted as the proportion of the nutrient in the product itself rather than the proportion in the serving (Draper et al., 2011).

From the literature above it can be observed that it is unclear as to which of the most common FOP labels are causing confusion when choosing between products and what label elements are contributing to such confusion. This study aims to determine which of the four most common FOP formats is generating the most confusion and what elements of the labels are problematic. From the discussion above it is clear that although confusion has not been directly investigated in the context of FOP labels, previous research highlights that consumers are experiencing elements of confusion, particularly overload and ambiguity including technological complexity. This study aims to identify whether the theoretical framework of consumer confusion is applicable with regard to FOP labels.

Methodology

Face to face, semi-structured interviews were conducted within which three product comparisons were performed utilising a think aloud technique. The product comparison approach was used to determine which FOP label format yielded the most incorrect answers. The number of incorrect answers is equated with the degree of confusion. This approach required identification of a suitable product and various FOP formats. The product used in this study was ready meals. Forty percent of consumers are concerned about the healthiness of ready meals perceiving them to be high in salt, fat and additives therefore people may be more likely to examine their FOP labels (Mintel, 2010). Italian ready meals are the most popular choice amongst consumers (Mintel, 2010) therefore lasagnes were selected. Three regular lasagnes of the same weight but differing in their nutritional ingredients were selected from a major retailer in the UK. A nutritionist determined the relative healthiness of each product and therefore the correct answers for the product comparisons (See Table 1).

Table 1: A Comparison of the Three Ready Meals' Attributes.

	Weight	Calories	Sugar	Fat	Saturated Fat	Salt	Relative Healthiness
Ready Meal 1 RM1	400g	600	9.7g	31.9g	15.6g	2.14g	Least healthiest
Ready Meal 2 RM2	400g	460	4.7g	19.8g	8.7g	2.17g	
Ready Meal 3 RM3	400g	393	12.1g	13.7g	6.8g	2.21g	Most healthiest

The different types of labels used by the four biggest supermarkets in the UK at the time of the study were used in the research (See Figure 1).These four labels contain different combinations of the elements of FOP labels. All four labels present the calories and amount of grams of each nutrient but vary in their incorporation of the other components (See Table 2).

Table 2: The Elements Present on Each FOP Label.

Label Number	Calories and g of each component	% GDA	Traffic Light Colouring	Alternative Colouring	Text
Label 1	Y		Y		
Label 2	Y	Y	Y		Y
Label 3	Y	Y		Y	
Label 4	Y	Y			

The nutritional information for the three lasagnes was prepared in each of the four label formats, therefore a total of 12 labels were created. No information on factors such as brand and price were presented to the respondents in order to examine in isolation the impact of the various label formats on decision making. There were three possible product comparisons (RM1 v RM2; RM1 v RM3; RM2 v RM3) and six possible FOP label format comparisons (L1 vL2; L1v L3; L1 v L4; L2 v L3; L2 v L4; L3 v L4). The three product comparisons were compared under the different label format comparisons creating 18 comparison pairs (See Table 3).

Table 3: The Product and Label Format Comparison Pairs.

Label Format 1 v Label Format 2	Label Format 1 v Label Format 3	Label Format 1 v Label Format 4	Label Format 2 v Label Format 3	Label Format 2 v Label Format 4	Label Format 3 v Label Format 4
RM1 v RM3 (Pair 1)	RM1 v RM3 (Pair 4)	RM1 v RM3 (Pair 7)	RM1 v RM3 (Pair 10)	RM1 v RM3 (Pair 13)	RM1 v RM3 (Pair 16)
RM1 v RM2 (Pair 2)	RM1 v RM2 (Pair 5)	RM1 v RM2 (Pair 8)	RM1 v RM2 (Pair 11)	RM1 v RM2 (Pair 14)	RM1 v RM2 (Pair 17)
RM2 v RM3 (Pair 3)	RM2 v RM3 (Pair 6)	RM2 v RM3 (Pair 9)	RM2 v RM3 (Pair 12)	RM2 v RM3 (Pair 15)	RM2 v RM3 (Pair 18)

It was thought too time consuming and potentially confusing to expose respondents to all 18 comparison pairs, therefore they were divided into six groups, with three comparison pairs in each group. Within each group each product comparison only occurred once to ensure the respondents did not learn the healthiness of the products. The comparison pairs within each group were not rotated.

The respondents' were presented with three pairs of FOP labels, one at a time. A version of the think aloud technique was used (Ericsson and Simon, 1984; Boren and Ramey, 2000) which was first described in Duncker's (1945) experimental psychology research. This technique provides useable information while being relatively easy to employ (Flaherty, 1975). The interviewer asked the respondents to choose the healthiest product from each comparison pair and to talk through what they were thinking about in the process of making their decision. This enabled their inferences and reasons to be identified. The technique has been criticised for putting cognitive strain on users as well as for the interruptive role required by the observer, i.e. to remind the participant to continue verbalising (Branch, 2000). However, the duration of the product comparisons was relatively short and not too cognitively taxing while the observer simply noted the statements made. While in complex thinking aloud procedures an encoding scheme would be developed a priori, ours was relatively easy to interpret given that it was based on identifying which product was perceived as healthiest from each pair but throughout comments were noted, including, what the participant first looked at, the impact of colour, whether they found any aspects of the labels confusing such as the terms, colouring etc.

Convenience sampling was used to obtain 30 respondents both male and female from a range of ages who were each assigned to one of the six groups.

Results

Of the 30 respondents 60% (n=18) were female and 40% (n=12) were male. The average age of the female respondents was 31 (s.d. 15.04) and the male respondents was 32 (s.d.=17.28).

Twenty eight participants (93%) recognised the importance of FOP labels in simplifying information and enabling informed dietary choices. However fewer participants (n=21, 70%) reported checking FOP labels when purchasing food products. Two participants (6.7%) deemed FOP labels to be of no use, believing consumers would eat what they like regardless of the information on the label. Most participants (67%) stated they spent no more than 10 seconds using FOP labels and the remaining participants said they only spent 10-30 seconds examining them.

Consumer Confusion with FOP Labels.

An incorrect answer suggests that some degree of confusion has occurred so from Table 4 it can be seen that overall label 1, the circular traffic light led to the greatest number of incorrect answers, followed by label 4 with no colour, label 3, the alternative coloured bar and finally label 2, the traffic light bar. When labels 1 and 2 are compared the degree of error is far greater (40%) when label 1 is the correct answer. Similarly when labels 3 and 4 are compared the degree of error is far greater (40%) when label 4 is correct.

Table 4: The Number of Incorrect Answers Obtained for Each FOP Label Format.

Label Format Correct	Label Format for Comparison	Number Incorrect against Each Label Format	Total Number Incorrect
Label 1 - Traffic light circular chart	Label 2 - Traffic light bar	2/5 (40%)	6/25 (24%)
	Label 3 – Alternative colour bar	3/10 (30%)	
	Label 4 –No colour	1/10 (10%)	
Label 2 – Traffic light bar	Label 1 – Traffic light circular chart	1/10 (10%)	2/30 (7%)
	Label 3 – Alternative colour bar	1/10 (10%)	
	Label 4 – No colour	0/10 (0%)	
Label 3 – Alternative colour bar	Label 1 – Traffic light circular chart	1/5 (20%)	2/20 (10%)
	Label 2 – Traffic light bar	0/5 (0%)	
	Label 4 –No colour	1/10 (10%)	
Label 4 – No colour	Label 1 – Traffic light circular chart	1/5 (20%)	3/15 (20%)
	Label 2 – Traffic light bar	0/5 (0%)	
	Label 3 – Alternative colour bar	2/5 (40%)	

The comments from the think aloud process during the product comparison revealed that different types of confusion were created by the various elements of FOP labels.

Overload Confusion - As there is a lot of information on an FOP label there is potential for overload confusion to occur. This was recognised by many participants who stated that time constraints mean they do not have time to process all of the information and if they tried they would become confused. The participants therefore focused on individual nutrients when comparing labels, usually calories, fat or saturated fat.

Interestingly, the lack of colour was problematic and seemed to lead to overload confusion. Many participants did not like label 4 as it had no colour and therefore were unable to use it as the basis for their decision. The lack of colour meant the respondents were unable to readily distinguish the different nutrient levels making the information more difficult to understand. A number of participants said they would not consult label 4 whilst those who would appeared overwhelmed and did not know which information to use. In addition participants found the layout of label 4 made the information harder to understand. They felt they had to search for information which increased the difficulty of processing the information and made the participants feel overloaded.

Ambiguity Confusion - There are a number of elements of FOP labels which are creating ambiguity confusion. The alternative colouring was problematic for the majority of participants. Some participants believed the alternative colouring, like traffic light colouring, also represented the amount of nutrient in the product and tried to use colour as a basis for

comparison. Participants quickly became confused as they did not understand what some colours represented.

The layout of the labels was problematic. A number of participants perceived label 1 which is round, to be a pie chart representing the contents proportionately. Similarly some participants perceived the nutrients on labels with the bar format to be ordered (from left to right) in terms of the amount present in the product.

A lack of contextual knowledge leads to ambiguity confusion. The majority of participants examined the amount in grams and calories as this information was common to all the labels. However, they commented that when solely using amount in grams they did not understand what constituted a healthy or unhealthy amount of the nutrient and required a benchmark such as traffic light colour or percentage GDA. Despite this, participants making decisions based upon amount of grams made decisions with ease and obtained the most correct answers as they understood that the product with the higher number was less healthy. Similarly, all participants were comfortable using traffic light colouring and when presented with two labels using this colour system, the comparison was relatively easy. Colour was used both for comparing individual nutrients as well as products. However, some participants compared the relative number of reds, ambers and greens in each product and despite this seeming a logical approach it yielded the most incorrect answers.

Technical complexity – The language used on the labels created technical complexity. The respondents' general understanding of the nutrients, especially fat and saturated fat, was low. Many respondents knew intake of these nutrients should be limited, but believed that the total fat within the product was comprised of both "fat" and "saturated fat" rather than "saturated

fat" being a component of "fat". The percentage GDA also caused some difficulty. A number of participants believed the percentage represented the proportion of the product that was composed of that nutrient despite the text below. Despite the incorrect interpretation of percentage GDA, participants provided a number of correct answers, as they compared the products' numerical values and selected the product with the lower numerical value which tended to be the healthier product.

Discussion

It is clear that FOP labelling could be further improved as none of the FOP labels yielded 100% correct answers for the paired comparisons so consumers are experiencing a degree of confusion with each of the FOP labels. The broad theoretical consumer confusion framework can assist identification of what is specifically confusing about FOP labels. Whilst similarity confusion is not problematic in the context of FOP labelling, overload and ambiguity confusion are both creating comprehension problems, both of which are discussed in more detail below.

Errors in interpreting FOP labels are potentially caused by overload confusion. Consumers spend less than 10 seconds examining a FOP label which is out of necessity as a number of items are purchased on a weekly shop. On each FOP label there are two to four pieces of information for each nutrient which may be processed. Each of these factors individually may lead to overload confusion but the potential problem is exacerbated when they are combined. It is possible as Jacoby (1984) suggests that consumers do not overload themselves with information. In this study consumers spent less than ten seconds on FOP labels, and they only focused on calories, fat and saturated fat.

Huffman and Kahn (1998) proposed that perceived complexity as opposed to actual complexity can create confusion. This may be occurring specifically in regard to label 4, without colour which was perceived as the most difficult to interpret and produced a substantial amount of incorrect answers. Participants presented with label 4, the black and white bar, felt the complexity of the task had increased despite there being only two FOP elements, g per amount and % GDA. Although there was less information on the FOP label the respondents experienced overload confusion. Moreover, consumers stated colour was one of the few pieces of information on the label used to avoid confusion, reinforcing Jacoby's (1984) research that consumers only attend to a small amount of information and do not overload themselves. The fact the consumers are aware they are confused and wish to avoid it contradicts Poiesz and Verhallen (1989) who suggest confusion is "predominantly non-conscious in nature" (p. 233).

It has been stated that ambiguity confusion is caused by ambiguous information, dubious product claims, conflicting information and technical complexity (Leek and Kun, 2006). Certain elements of FOP labels are presented ambiguously and are therefore open to individual interpretation including the traffic light colouring and the interpretive text. Traffic light colouring is easy to understand and enables consumers to make a quick decision. However, when two formats using traffic light colouring were compared the number of errors increased suggesting consumers struggle to correctly compare products. Consumers may be incorrectly interpreting the meaning of the green, orange and red labels i.e. people may think products with red labels should not be consumed at all or that there is not a limit on the consumption of products with green labels. Consumers may have difficulty both deciding whether the balance of colour labels on a product make it healthy and with comparing

products with different balances of green, orange and red labels e.g. whether a product with red saturated fat and green calories is healthier than one in which the nutrients are all orange. Similarly, interpretive text which was perceived quite negatively by consumers may create ambiguity confusion as they may be unsure of the exact meaning of the text. It is not clear for example if products high in a nutrient should be avoided completely or whether nutrients labelled low can be freely consumed etc.

Technical complexity occurred as percentage GDA was wrongly interpreted as proportion of the product by many participants although no incorrect decisions were made on this basis. There was a degree of ambiguity confusion with regard to the fat content of products. Many participants believed the total fat in the product was a combination of the fat and saturated fat values rather than saturated fat being a subcomponent of fat. Percentage GDA was present on most label formats, it does not require additional knowledge to place it in the context of a healthy diet and its presence yielded higher numbers of correct answers. The percentage GDA figures should enable the consumer to easily compare the calorie and fat content which were the main nutrients used. The technical complexity and ambiguity confusion related to percentage GDA potentially explains why it was perceived as little or no use to a substantial number of respondents.

Whilst ambiguous information and technical complexity are evident in the FOP label context there are two additional factors outlined below which are causing ambiguity confusion, a lack of contextual knowledge and a misapplication of knowledge. These factors are new facets of ambiguity confusion. Consumers need to be aware of the amount of each of the nutrients they require per day so they can examine the information and identify products high in fat, sugar etc. Grams of each nutrient was common to all the label formats which consumers

successfully used in comparing products to determine which one was healthier in this research. However, its use may become more problematic if both products are unhealthy. Without the contextual knowledge consumers may not be able to identify both products as unhealthy and make a healthy optimal decision.

Misapplication of prior knowledge may lead to ambiguity confusion. For label 3 with alternative colouring, participants transferred the meaning of traffic light colouring to the alternative colouring. The respondents were incorrectly applying their knowledge and experience of other labels. The format of label 1 is similar to a pie chart which led to respondents assigning unintentional meaning to the information and assuming the segments represented the nutrients proportionately. In this case respondents are incorrectly applying knowledge and experience which is not necessarily related to food labels.

Managerial Implications

The findings highlight factors relating to FOP labels that are causing both overload and ambiguity confusion, some of which manufacturers, retailers and governmental bodies are responsible for and some of which consumers are responsible for.

The Government needs to provide consumers with more information on nutritional guidelines as consumers lack the knowledge to put the information on FOP labels in the context of a healthy diet. A previous Government campaign informing consumers about the recommended daily salt intake and reducing intake succeeded in decreasing UK average daily intake from 9.5g to 8.6g (Food Standards Agency, 2014). Similar campaigns would enable consumers to not only compare products and select the healthier one but also prevent them from making a purchase if both products were unhealthy e.g. if two products being compared

were both high in salt the consumer would know to reject them. Retailers and manufacturers need to work with the Government to provide information on their products and in store to reinforce campaigns. The Government needs to reduce the openness of certain elements of FOP labels to interpretation. Traffic light colouring is useful in identifying healthy products but the meaning of the colours needs clarifying, for example consumers need to know whether a red label means do not consume the product. Interpretation of the balance of colours also needs to be made clear. This information would reduce consumers' ambiguity confusion in the decision making process. In addition it could benefit manufacturers such as Coca Cola, Mondelez, United Biscuits, Unilever, Kellogg and Dairy Crest who have rejected the voluntary FOP label because many of their products would have a red label either against sugar, salt or fat.

Technical complexity was created through the use of terminology such as %GDA on labels. The Government have decided to replace percentage GDA with percentage Reference Intake although the meaning of both terms is the same. Consumers will need to be educated by stakeholders on the meaning of percentage RI and how it should be interpreted on food labels to reduce technical complexity.

The consumers misapplied contextual and non-contextual knowledge and experience when interpreting FOP labels which led to ambiguity confusion. The interpretation of label 1 as a pie chart and the use of traffic light colouring to interpret alternative colouring schemes may not have been anticipated when developing the label formats. Even the bar format created ambiguity confusion as the consumers believed the nutrients were presented from left to right in terms of the amount in the product. Whilst stakeholders may through research attempt to

eliminate the possibility of such interpretations occurring they may not devise a label which is “foolproof”.

The Government’s new standardised FOP label is similar to label 2 in that it has calories and grams of each component, percentage Reference Intake (RI) and traffic light colouring but the new label does not have interpretive text (Department of Health, 2013a; Poulter, 2013).This research has highlighted the elements of the FOP label format such as technical complexity which cause confusion and may still occur with the new Government label. Through educating consumers both on the detail of the meaning of information presented on labels and the nature of a healthy diet, the level of ambiguity confusion that occurs in regard to FOP labelling can be reduced thus enabling consumers to be more effective in determining a healthy diet and reducing the degree of obesity in the UK population.

Limitations and Future Research

A limitation of using semi structured interviews is their inability to establish causality of confusion. This could be addressed in the future by utilising an experimental approach.

With the anticipated implementation of a standardised FOP label there is a need to determine whether consumers can use it to successfully determine healthier products. As traffic light colouring is a key element on FOP labels further research is necessary to determine how consumers evaluate the meaning of the colours and how they balance the number of red, amber and green labels when making product choices. The findings would provide further insight into how to further reduce ambiguity confusion and could be used to refine future Government educational campaigns.

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