
# Consumer satisfaction with food labels during the pre-purchase in-store evaluation: a study in Gauteng

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**OPSOMMING**

Voedseletikette speel ‘n integrale rol in die verbruikersbesluitnemingsproses van verpakte voedselprodukte omdat belangrike produkinligting soos vervaldatums en inligting oor voedingswaarde en allergene deur middel van etikette aan die eindverbruiker oorgedra word. Verbruikers maak veral tydens die eerste aankoop van ‘n produk baie staat op etiketinligting om hul produkkeuse te vergemaklik. In Suid-Afrika, met sy heterogene bevolkingsamestelling, het nie alle verbruikers dieselfde behoeftes nie en daarom kan die afleiding gemaak word dat verbruikersbehoeftes in terme van produkinligting op etikette verskil. Alhoewel voedseletikettering in Suid-Afrika gereguleer word, is dit steeds noodsaaklik dat verbruikers tevrede is daarmee omdat voedseletikette en die inligting daarop so ‘n belangrike rol speel. Daar is egter weinig vorige navorsing oor verbruikerstevredenheid met voedseletikette in Suid-Afrika gedoen. Daarom het dié studie ten doel gehad om verbruikerstevredenheid met voedseletikette tydens ‘n tipiese aankoopsituasie te ondersoek en beskryf.

Die konformasie/diskonformasie teorie het as basis vir die studie gedien en die beoordeling van voedseletikette is binne die konformasie/diskonformasie paradigma vergelyk. Die studie het verder gepoog om die invloed van etikette op verbruikers se keuse van voedselprodukte, asook die invloed van demografiese eienskappe op verbruikers se verwagtinge en beoordeling van voedseletikette te bepaal. Die studie leen hom dan ook daartoe om aanbevelings aan reguleerders en vervaardigers te maak om bestaande voedseletikette te verbeter wat moontlik verbruikerstevredenheid sal verhoog.

Op grond van die literatuur kan inligting op die etiket soos ‘n bestanddelelys, vervaldatum en nutriëntinligting asook eienskappe van die etiket soos leesbaarheid, verstaanbaarheid en geldigheid verbruikers se tevredenheid daarmee beïnvloed. Deur middel van eksploratiewe faktoranalise is etiketinligting in hierdie studie in twee kategorieë verdeel, naamlik primêre inligting (bestanddelelys, vervaldatum, nutriëntinligting, inligting oor allergene en ‘n kwaliteitswaarborg) asook sekondêre inligting (naam van vervaardiger, land van oorsprong/geografiese gebied, bekende logos/simbole, gebruiksaanwysings en aantal porsies).

‘n Kwantitatiewe navorsingsmetode is gevolg met behulp van ‘n opname oor ‘n tydperk van drie weke. Vierhonderd self-geadministreerde vraelyste is deur middel van ‘n nie-waarskynlikheidsteekproefmetode gedurende September 2010 by besighede en kantore in stedelike gebeide van Gauteng versprei. ‘n Totaal van 279 bruikbare vraelyste is verkry en data-analise is deur Statistiese Konsultasiedienste van die Noordwes Universiteit met behulp van SPSS (Statistical Package for Social Sciences) uitgevoer. Die resultate dui daarop dat verbruikers slegs gedeeltelik tevrede met voedseletikette is aangesien hul ontevrede was met eienskappe van die etiket asook met die primêre inligting. Hulle was wel tevrede met sekondêre inligting. Verbruikers het in terme van belangrikheid aangedui dat hulle hoër verwagtinge van primêre inligting as sekondêre inligting het; asook dat primêre inligting meer waarskynlik hul aankoopbesluit sal beïnvloed as sekondêre inligting. In hierdie studie het demografiese eienskappe van verbruikers min invloed op hul verwagtinge en prestasie beoordeling van voedseletikette gehad.

Op grond van die resultate in hierdie studie kan aanbevelings aan reguleerders en vervaardigers gemaak word om verbruikerstevredenheid met etiketinligting te verbeter. Sodanige aanbevelings sluit die verbetering van algehele leesbaarheid, verstaanbaarheid, betroubaarheid en toereikendheid van voedseletikette in. Veral primêre inlgiting en hoe dit aan verbruikers oorgedra word, behoort verbeter te word om verbruikerstevredenheid met bestaande voedseletikette te verhoog.

**SUMMARY**

Food labels are imperative in consumers' decision-making process of packaged food products as they communicate important information such as expiry dates, nutrition information and information about allergies to the consumer. Especially during a first-time purchase, consumers rely on food labels to assist them in making their product choice easier. In the heterogeneous context of South Africa, consumers' product needs vary and one may assume that consumer needs in terms of food label information differ. Although food labelling is regulated in South Africa, it is still important that consumers are satisfied with labels due to their significant communicative function. However, to the knowledge of the author, little previous research exists on South African consumers' satisfaction with food labels. Therefore, this study aimed to explore and describe consumers' satisfaction with food labels based on a typical in-store encounter.

The confirmation/disconfirmation paradigm had been used as theoretical foundation in this study and consumers' expectations and performance judgement of food labels were therefore explored and compared within the confirmation/disconfirmation paradigm. This study furthermore aimed to explore the influence of food labels on consumers' product choice as well as to determine the influence of demographic characteristics on consumers' expectations and performance judgement of food labels. Lastly, this study aimed to make recommendations to food regulators and manufacturers on how existing food labels could be improved in order to enhance consumer satisfaction.

Based on the literature, satisfaction with food labels might be influenced by the information on food labels such as ingredient lists, expiry dates and nutrition information as well as attributes of food labels such as the readability, understandability, credibility and adequacy. Exploratory factor analysis used in the present study indicated that the information on food labels can be classified as either primary (ingredient list, expiry date, health and nutrition information, information about allergies and quality guarantee) or secondary (name of manufacturer, well-known logos or symbols, country of origin or geographical region, usage instructions and number of servings).

A quantitative research method by means of a survey approach was used in this study over a period of three weeks. A total of 400 self-administered questionnaires were distributed at office buildings and business premises in the urban Gauteng Province in September 2010 by means of a non-probability sampling method. A total of 279 useful questionnaires were retrieved and data analysis was performed by Statistical Consultations Services of the North-West University using SPSS (Statistical Package for Social Sciences). Results show that respondents were only partially satisfied with food labels as they were satisfied with secondary information, but dissatisfied with primary information as well as with label attributes. The results furthermore show that primary information tended to be more likely to influence respondents' product choice than secondary information. In addition, results show that demographics had little influence on respondents' expectations and performance judgement of food labels.

Based on the findings of this study, recommendations can be made to regulators and manufacturers on how consumer satisfaction with existing food labels can be improved. Recommendations include the improvement of the overall readability, understandability, credibility as well as adequacy of food labels. Especially primary information and the way it gets portrayed should be considered for improvement to increase consumer satisfaction.

**KEY WORDS**

Confirmation of expectations

Consumer satisfaction

Decision-making

Food labels

In-store product evaluation

Label attributes

Label information

South African consumers

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# *Chapter 1*

# *Introduction*

## 1.1 BACKGROUND AND MOTIVATION

### 1.1.1 Food labels in the consumer decision-making process

Food labels serve as an external stimulus that consumers could use during the in-store decision-making process of packaged food products to aid them in making the most suitable choice amongst alternatives from a product category (Badham, 2004:17; Silayoi & Speece, 2004:619; Dimara & Skuras, 2005:92). Although food products are usually seen as routine purchasing that require little involvement (Jooste, 2002:7), some consumers nowadays regard packaged food products as a higher involvement decision (Silayoi & Speece, 2004:619), especially during a first time purchase. Consumers that are more involved in food purchasing decisions seek increased food product information due to technological advances, such as genetically modified foods which they often find difficult to assess (Silayoi & Speece, 2004:607; Teisl *et al.*, 2008:447). In addition, some consumers are becoming increasingly concerned about their health and food safety and that of their families (Klein, 2005:78), as well as the impact of their food consumption on the environment (De Magistris & Gracia, 2008:942). As a result, they are motivated to carefully consider the food products that they purchase, which is typical of rational decision-making where consumers use information to evaluate and intentionally select the product that best meets certain criteria (Schiffman & Kanuk, 2010:110).

Some consumers would inevitably thus be more involved in their purchasing decisions of packaged food products, which confirm the importance of labels and the information that labels provide. Although food labelling is regulated in South Africa, it is crucial that consumers are satisfied with food labels, in terms of the various components that labels consist of, due to the important communicative function thereof (Hoffman *et al*., 2005:300; Klopper, 2002:35). Previous researchers have investigated South African consumers' perceptions of food labels (Kempen *et al*., 2011), their beliefs and practices related to label reading (Badham, 2004) as well as their use and understanding of food label information (Jacobs *et al*., 2010). Yet, to the knowledge of the author, little or no research on consumers' satisfaction with food labels has previously been conducted in the South African

context. South Africa is an emerging economy where retail has to address the needs of a very diverse consumer population. Eleven official languages are acknowledged in the country (Martins, 2007:168) and for obvious reasons it is seldom possible to use more than one language on a food label. Whether vulnerable consumer groups understand the food labels and perceive food labels as a useful tool is not clear (Macanda, 2005). Therefore, this study aimed to explore and describe consumers' satisfaction with food labels based on a typical in-store encounter.

### 1.1.2 Consumer satisfaction

The confirmation/disconfirmation paradigm is widely recognised and generally used as a framework to investigate consumer satisfaction. The confirmation/disconfirmation paradigm suggests that consumers have certain expectations about food labels based on prior experience, needs and wants. Upon or after consumption, consumers compare these expectations against the product's actual performance, which results in confirmation or disconfirmation of their expectations which leads to a feeling of satisfaction or dissatisfaction. Satisfaction results when expectations are confirmed or positively disconfirmed, whereas dissatisfaction results when expectations are negatively disconfirmed (Engel *et al.,* 1995:275; Blackwell *et al.,* 2001:176; Mowen & Minor, 2001:203; Arnould *et al.,* 2004:769). Likewise, in the present study, the confirmation/disconfirmation paradigm was adopted for consumer satisfaction or dissatisfaction with food labels.

#### 1.1.2.1 Pre-purchase satisfaction with food labels

Although the bulk of research on consumer satisfaction is related to post-purchase behaviour, satisfaction with food labels would typically be pre-purchase satisfaction as some consumers use food labels to judge the performance of the product as a whole prior to purchase (Silayoi & Speece, 2004:624). Consumers need to experience some pre-purchase satisfaction before engaging in a decision to purchase a product (Simintiras *et al*., 1997:858; Chen-Yu & Hong, 2002:118). Pre-purchase satisfaction occurs at the pre-purchase stage of the consumer decision-making process when alternatives are evaluated and it is achieved by the presence of certain product attributes that consumers regard as important and consequently expect to encounter (Chae *et al*., 2006:29). Therefore, it can be assumed that when consumers' expectations of food labels are met or exceeded, it might lead them to prefer one product over another. Consequently, this study aimed to explore the influence of food labels on consumers' product choice.

#### 1.1.2.2 Consumers' expectations and perceived performance of food labels

According to Spreng *et al*. (1996:17), satisfaction is a result of satisfaction with product attributes and satisfaction with product information. Thus, consumers' satisfaction with food labels would depend on their satisfaction with information on food labels, such as ingredient lists, nutrition information and expiry dates, as well as attributes of food labels such as legibility, credibility, understandability and adequacy of the information. It can therefore be inferred that consumers have certain expectations about the attributes and information on food labels during their in-store decision-making process, which they later use to judge the actual product performance. Previous studies reveal contradicting results about consumers' views of food labels as some consumers find the information on food labels to be adequate or even excessive (Silayoi & Speece, 2004:612) while others find it inadequate (Klopper, 2002:35; McEachern & Warnaby, 2008:418; Teisl *et al*., 2008:452). Some consumers, especially the elderly, experience difficulty in reading the information on labels because fonts are too small and writing styles are too dense (Silayoi & Speece, 2004:612; Doyle *et al.*, 2005:783). Others do not trust the information (Worsley & Lea, 2008:1110); find the information on food labels confusing; difficult to understand (Miller *et al*., 1997:277; Doyle *et al*., 2005:782; McEachern & Warnaby, 2008:418), while others find the contrary (Klein, 2005:72). Clearly, more research is needed on consumers' expectations and judgement of the attributes and information on food labels. Therefore, this study aimed to explore and describe consumers' expectations and judgement of current food labels to enable an investigation of consumers' satisfaction with food labels within the confirmation/disconfirmation paradigm. Consumers' expectations differ due to various factors, including demographic characteristics (Mowen & Minor, 2001:203; Arnould *et al*., 2004:770) and therefore consumers would judge food labels' performance differently.

#### 1.1.2.3 Consumer satisfaction with food labels in the South African context

Demographics influence consumer behaviour (Mullins *et al*., 2005:123) and designing an optimal label for South African consumers might be a challenging task as not all consumers in South Africa are literate and educated (Lamb *et al*., 2004:54). In addition, one consumer that is health conscious due to education and awareness of the link between food and health will probably regard nutrition information on the food label as highly important. Another consumer who prefers to purchase organic food due to an environmental concern will most likely regard the organic logo as very important. Especially in a heterogeneous country such as South Africa with a diverse consumer market (Martins, 2007:168), it can be assumed that different consumers have different expectations and consequently judge the performance of food labels differently. Therefore, the current study aimed to determine the influence of

certain demographic characteristics on consumers' expectations and judgement of food labels.

### 1.1.3 Conclusion

Exploring consumers' expectations, judgement and consequent satisfaction with attributes and information on food labels can lead to a better understanding of how the best possible food label should be designed for the South African consumer. Such a food label would be useful and contribute to informed, responsible purchasing decisions. Consequently, this study aimed to make recommendations to food regulators and manufacturers on how to improve current food labels. Effective labelling might ease consumers' decision-making and lead to increased levels of satisfaction, not only with food labels, but also with packaged food products in general.

## 1.2 PROBLEM STATEMENT

Although researchers have investigated South African consumers' perceptions of food labels as well as their beliefs and practices related to label reading, no research exists on South African consumers' satisfaction with food labels. All consumers are affected by various influences when purchasing food products and therefore they value and expect different attributes and information on the food label as important. Consumers' expectations of food labels therefore differ. Likewise, the performance of food labels vary according to individual consumers' preconceived expectations. Consequently, controversy exists on what information should be portrayed and how it should be presented on food labels to meet consumers' expectations in order to satisfy consumers' needs. Food labelling that meets consumers' expectations is important because consumers do not necessarily have the knowledge, experience or time to judge an array of products on the shelves in stores. Consumers would therefore benefit from labels that are useful and that meet their expectations in terms of type, content and format. Accepting that consumers' choice of products might eventually be based on the performance of attributes and the information on food labels, products that are labelled in accordance with consumers' expectations would therefore have a better chance of being selected.

## 1.3 AIM AND OBJECTIVES

### 1.3.1 Aim

The aim of this study was to explore and describe consumers' satisfaction with product labels during the pre-purchase in-store evaluation of packaged food products.

### 1.3.2 Objectives

In order to achieve the aim of this study, the following objectives were identified:

1. To explore and describe consumers' expectations of food labels.
2. To explore and describe consumers' judgement of the performance of food labels.
3. To explore and describe consumers' satisfaction with food labels.
4. To explore and describe the influence of food labels on consumers' product choices.
5. To determine whether consumers'
    - expectations of food labels and
    - judgements of food labels are influenced by
        - age
        - language
        - gender
        - level of education.
6. To make recommendations to industry on how food labels could be improved to enhance consumers' use of and satisfaction with food labels.

## 1.4 STRUCTURE OF MINI-DISSERTATION

This mini-dissertation is presented in an article format consisting of four chapters. In chapter one, which is the introductory chapter, the background and motivation, problem statement, aim as well as objectives are presented. Chapter 2 consists of an in-depth literature review while Chapter 3 holds the research article according to the authors' guidelines of *Public health nutrition*, consisting of an abstract, keywords, brief background and motivation as well as literature review, concise methodology, results and discussion, a conclusion and acknowledgements. In Chapter 4, concluding remarks, the limitations of the study as well as future recommendation are presented. Addenda are included as supporting information to the chapters. Addendum A is the letter of respondents' consent to participate; Addendum B provides the full-length questionnaire; Addendum C presents additional results of this study

and Addendum D provides *Public health nutrition's* guidelines for the research article as supplied to the authors.

## 1.5 CONTRIBUTIONS

The aims and objectives of the reported study were achieved by the collaboration of a team of researchers. Each researcher had a pertinent role throughout the duration of the study. Table 1.1 provides a summary of each researcher's contribution.

Table 1.1: Summary of authors' contributions to the study

| **Name** | **Contribution** |
|---|---|
| Miss. N. Prinsloo | First author, responsible for literature research, questionnaire design, data capturing, statistical analysis and interpretation of data as well as the preparation of this mini-dissertation. |
| Prof. M van der Merwe | Supervisor and co-author of research article. Generated the idea for the research. Supervised the activities of the first author and provided direction and advice for the duration of the study. Also obtained funds and ethical clearance to enable the study. |
| Prof. M.J.C. Bosman | Co-supervisor and co-author of research article. Co-supervised activities of the first author for the duration of the study. |
| Prof. A.C. Erasmus | Co-supervisor and co-author of research article. Co-supervised the activities of the first author for the duration of the study. |
| Dr. S.M. Ellis | Co-author of the research article. Assisted with the data analysis. Supervised the writing of the research results and provided statistical consultation. |

The following statement is from the co-authors, confirming their individual roles in the study and providing their permission for the articles to form part of this mini-dissertation.

*I declare that I have approved the above-mentioned article, and that my role in the study, as stated above, is representative of my actual contribution and that I hereby give my consent that it may be published as part of the Masters mini-dissertation of Miss N. Prinsloo.*

| | |
|---|---|
| Miss. N. Prinsloo<br>Researcher | Prof. M. van der Merwe<br>Supervisor |
| Prof. M.J.C. Bosman<br>Co-supervisor | Prof. A.C. Erasmus<br>Co-supervisor |
| Dr. S.M. Ellis<br>Co-author of research article | |

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# *Chapter 2*

# *Literature review*

## 2.1 INTRODUCTION

Point-of-sale communications seem to be an effective instrument to inform consumers in terms of information producers wish to bring across to potential buyers (McEachern & Warnaby, 2008:422). With the move to self-service retail formats, a product's packaging has in fact substituted the salesperson at the point-of-sale (Silayoi & Speece, 2004:607) and the food label serves as a very important packaging feature that may influence consumer decision-making (Peters-Texeira & Badrie, 2005:510). Consumers' decisions concerning a food product do not exclusively depend on taste: instead, consumers' purchase decisions are driven by various factors such as consumers' expectations and product related cues such as price, branding and packaging (Kole *et al.,* 2009:187). Food product labels serve an important communicative function by assisting consumers during the pre-purchase decision-making process, where consumers who are unfamiliar with a product have to rely on information portrayed on food labels to make their final purchase decisions in-store (Badham, 2004:17; Silayoi & Speece, 2004:619; Dimara & Skuras, 2005:92).

Food products are usually seen as routine purchasing items requiring little involvement and limited external search for information (Jooste, 2002:7), which suggests that not all consumers will utilise the information on food labels. Yet more recent reports indicate that consumers have become more involved in the purchase decision of packaged food products and that they tend to evaluate packaged food products more carefully and read product label information more often (Silayoi & Speece, 2004:619). There are also indications of a rising need to provide consumers with more information on food labels as some consumers demand additional information such as a quality guarantee and country of origin on the products they consume (Dimara & Skuras, 2005:92). If used, appropriately presented information on packaged food products has a significant impact on consumers' purchase decision as this information reduces uncertainty and increases product credibility (Silayoi & Speece, 2004:624). The importance of label information during consumers' in-store decision-making process can therefore not be ignored.

Considering the important role of labels on packaged food products during consumers' pre-purchase decision-making and their potential influence on whether consumers will eventually purchase the product or not (Silayoi & Speece, 2004:620), it is essential that consumers are satisfied with food labels, specifically in terms of what they portray and how information is portrayed. Hoffman *et al.* (2005:329) define consumer satisfaction as an instant, transaction-specific measure of whether consumer perceptions of a product's performance meet or exceed consumer expectations so that a confirmation of expectations or positive disconfirmation arises. If performance does not meet expectations, negative disconfirmation occurs, which results in consumers' dissatisfaction (Engel *et al.,* 1995:275; Blackwell *et al.,* 2001:176; Mowen & Minor, 2001:203; Arnould *et al.,* 2004:769). Based on prior experience with food purchases and food labels, one may assume that consumers have pertinent expectations of food labels, specifically concerning the type of information communicated as well as the attributes of the labels.

Due to previous experiences with food products and multiple other environmental and marketing influences, not all consumers would have the same expectations of food labels (Mowen & Minor, 2001:203; Arnould *et al.,* 2004:770). For example, some consumers are more health conscious due to external influences such as that of their reference groups, who they identify with and assess themselves against, or internal influences such as gaining more information about food and health issues (Du Plessis & Rousseau, 2003:84). One can therefore deduce that health conscious consumers would expect nutrition information to be pertinent on food labels while another consumer who is influenced by a food allergic family member might expect allergen information to be included on food labels (Lin & Yen, 2008:444). Failure to provide the information that consumers expect to find on food labels might therefore influence consumers to opt for an alternative that does provide the information they want.

Consumers furthermore have expectations concerning the way information is portrayed on labels of food products which can be referred to as attributes of the food label and include its legibility, understandability, credibility and adequacy. Upon reading the food label, some consumers find the information confusing (Silayoi & Speece, 2004:612; Peters-Texeira & Badrie, 2005:511), difficult to understand (Doyle *et al.,* 2005:782; McEachern & Warnaby, 2008:418) and they may even doubt the scientific truth thereof (Silayoi & Speece, 2004:612; Klein, 2005:79; Teisl *et al.,* 2008:451). Other consumers experience difficulty in reading the

information on food labels due to the small fonts and dense writing styles that are used because of the limited space on food labels (Silayoi & Speece, 2004:612; Doyle *et al.,* 2005:783) which might result in a dissatisfied consumer who rejects a product as a whole. Therefore, providing consumers with effective labels in terms of information and the way it gets portrayed on packaged food products, is an important responsibility of food manufacturers. Subsequently, this chapter presents relevant literature on food labels and its communicative function, the consumer decision-making process, consumers' use of food labels in the decision-making process, influences on the consumer decision-making process as well as consumer satisfaction with food labels. To conclude this chapter, a theoretical framework is provided to collectively integrate the concepts and theory.

## 2.2 **THE FOOD LABEL AS COMMUNICATIVE PRODUCT PACKAGING FEATURE**

### 2.2.1 **Defining concepts of packaged products**

A package may become a product's competitive advantage, or at least a significant part of it because packaging plays a vital role in communicating product information at the point-of-sale (Silayoi & Speece, 2004:607) and by doing so, packaging assists consumers in the in-store decision-making process (Badham, 2004:17; Silayoi & Speece, 2004:607; Dimara & Skuras, 2005:92). Previously, packaging was primarily meant to protect food products, but in recent times the marketing significance of labels is acknowledged (Klopper, 2002:34), as consumers make their purchasing decisions predominantly in-store (Miller *et al.,* 1997) where the label distinguishes one product from another. Not surprisingly then, internationally, companies are spending more money on packaging than on advertising as part of their marketing strategies (Hoffman *et al.,* 2005:299).

The four main packaging elements that potentially influence consumer decision-making, can be divided into two broad categories, namely visual and informational elements (Silayoi & Speece, 2004:610). The visual elements refer to the graphics, colours, size and shape of the product's packaging whereas the informational elements relate to information portrayed and technologies used in the package. As an informational element of a product's packaging, the food label is considered by some as the most important packaging feature that influences consumer decision-making (Peters-Texeira & Badrie, 2005:510).

### 2.2.2 The communicative function of the food label

The label is the printed material that appears on a product's package, which represents the outermost layer of the product and carries information about the product and the manufacturer (Klopper, 2002:35). A label might be a straightforward tag attached to the product or an elaborately designed graphic that is part of the package. Consumer-orientated food labels have a strong practical dimension (Hoffman *et al.,* 2005:300; Klopper, 2002:35) and serve the following communicative functions:

- Identify the name and address of the manufacturer; country of origin of the product as well as the ingredients or materials used in the product by means of an ingredient list (Klopper, 2002:35; Bennion & Scheule, 2004:39; Hoffman *et al.,* 2005:300; Whitney & Rolfes, 2005:56).
- Report the expiry date and the contents' grading based on a prescribed government criterion (Hoffman *et al.,* 2005:300).
- Explain to consumers how to utilise the product in terms of a serving suggestion (Klopper, 2002:35; Hoffman *et al.,* 2005:300).
- Warn consumers about possible ingredient or product misuse (Klopper, 2002:35; Hoffman *et al.,* 2005:300) as well as allergens that are or might be present in the product.
- Serve as an important communication link among users, eventual buyers and the company (Hoffman *et al.,* 2005:300).
- State the net contents of the product in weight or volume (Klopper, 2002:35; Bennion & Scheule, 2004:39; Whitney & Rolfes, 2005:56).
- Carry a barcode and portray information on the product's environmental friendliness (Klopper, 2002:35).
- Portray nutritional information and approved health and nutrition claims (Klopper, 2002:35; Whitney & Rolfes, 2005:56).

The communicative function of food labels is, however, not limited to the abovementioned elements. In recent times some consumers seek additional information on the food products they consume (Silayoi & Speece, 2004:607; Teisl *et al.,* 2008:447). Some even retrieve large amounts of product information from labels (Dimara & Skuras, 2005:96), which exerts pressure on food manufacturers to include sufficient product information on food labels. Subsequently, consumers' demand for increased product information and how it relates to food labels will be discussed in the following section.

### 2.2.3 Food labels and consumers' demands for increased product information

One of the leading sectors that is dependent on innovative technologies, is the food and beverage industry, which represents approximately 18% of all South African manufacturing sales. In recent years, the food and beverage sector has come under increased pressure as a result of changing market demands and its need for innovative, novel and effective technologies (Lues & Lategan, 2006:62). Some consumers experience difficulties in evaluating these new technologies. The emerging of genetically modified (GM) foods is a classic example: some consumers find GM foods acceptable and safe to consume while others do not (Teisl *et al.,* 2008:447) and food labels have to be much more informative to guide consumers in the difficult to task to accept or reject such products. Consistent with the rest of the world, new technologies produce a set of possible benefits and potential threats to South African consumers and their health (Batrinou *et al.,* 2008:257; Teisl *et al.,* 2008:447).

As a result of the possible benefits and threats of new technologies, consumers continually seek more information on the food and beverage products that they consume (Silayoi & Speece, 2004:607; Teisl *et al.,* 2008:447). Consumers, in their search for food products, seek information that goes beyond what is generally asked about conventional products. Besides information concerning health, safety, nutritional value and responsibility toward the environment, consumers for example now also seek information relating to the product's association with a geographic region, its traceability, quality guarantee, its possible use and particular methods of production (Dimara & Skuras, 2005:92).

When searching for food products, the food label is a valuable source to provide consumers with all the information that they seek on product characteristics (Dimara & Skuras, 2005:92). The amount of information that consumers seek on product characteristics seems to be influenced by consumers' demographic characteristics as it is evident that consumers in households with higher incomes seek more information on food labels than consumers in lower income households (Dimara & Skuras, 2005:90; Lin & Yen, 2008:444). Du Plessis and Rousseau (2003:84) have revealed that South African consumers from high income households are not only informed and knowledgeable, but are also health conscious due to higher levels of education. The former is supported by Badham (2004:12) who has found that South African consumers from higher income groups have a stronger belief in the link between food and health which contributes to the demand for increased product information on food labels. Of the adult South African consumers in metropolitan areas, 42% look for

health information on the packaging and labels of food products (Badham, 2004:15) and results from a previous study indicate that some South African consumers commonly read the ingredient list and nutritional information on food labels because of health and safety concerns and to verify the content and quality of the product (Klein, 2005:78).

Another health and safety concern for consumers is allergens such as nuts in processed food products that might have fatal consequences to food allergic consumers when ingested, which emphasises the importance of product information on food labels for consumer health, safety and wellbeing (Miles *et al.,* 2006:797; Voordouw *et al.,* 2009:101). Consumers' increased concerns about the health and safety of ingredients and characteristics of food products, required manufacturers to implement more control over the contents of the products and subsequently the information portrayed on food labels (Newman & Cullen, 2002:65). In general, consumers are protected by effective food labels (Miles *et al.,* 2006:797). Similar to the rest of the world, ensuring food safety and integrity is a key concern in the South African food industry (Lues & Lategan, 2006:62) as specific regulations relating to the labelling and advertising of foodstuffs are set.

### 2.2.4 Regulations relating to the labelling and advertising of foodstuffs

Consumers' perception of food safety is apparently associated with the extent of their trust and confidence in the food industry as well as the capability of the government to protect them through regulations (Fotopoulos & Krystallis, 2003:1351). In the past, some South African manufacturers communicated confusing information on food labels as part of their marketing strategies which often mislead and deceived consumers (Klopper, 2002:35; Steenkamp, 2007), for example, the phrase "95% fat free" printed on food labels often deceived consumers in thinking that the products were low in fat while products with a fat content of 5% is in fact not regarded as low fat (Macanda, 2005). In order to communicate truthful and honest information about food products, South Africa has labelling regulations aimed at protecting consumers. The third draft of the South African regulations (R146) relating to the labelling and advertising of foodstuffs (Act 54 of 1972) was promulgated on 1 March 2010 (SA, 2010) and will come into effect soon.

The revised draft regulations were proposed to protect the consumer because misinformation, especially on health claims, frequently used as a marketing tool, misleads

and confuses uninformed consumers and will be controlled under the new regulation (Klopper, 2002:35; Macanda, 2005; Steenkamp, 2007). Amendments were made to provide clear definitions of food ingredients as well as nutritional information. Certain statements such as “nutritious”, which previously caused consumer deception, are now prohibited by the new proposed regulations (Booysen, 2007:55; Steenkamp, 2007). The following new additions to the regulations were proposed: mandatory date markings on most foods, indication of the country of origin; strict conditions and criteria to deal with responsible manufacturing and labelling practices as well as batch identification. Furthermore, the list of common food allergens was extended from two to nine different allergen groups (Booysen, 2007:55; Steenkamp, 2007; SA, 2010).

Food manufacturers and producers should at all times adhere to the regulations relating to the labelling and advertising of foodstuffs (Steenkamp, 2007). The key objective of the new amended draft regulations is to create an equal policy for all products stating only facts so as not to confuse the consumer and to use the label as platform to educate consumers (Steenkamp, 2007). The South African Department of Health uses label information as part of a strategy to educate consumers in order to prevent obesity and to provide the consumer with truthful, accurate and consistent information in order to choose healthier alternatives when purchasing food products (Booysen, 2007:55). Food label information could thus contribute to the decision-making process (Drichoutis *et al.,* 2006:1) when purchasing food.

## 2.3 **FOOD LABELS AS EXTERNAL STIMULI IN THE CONSUMER DECISION-MAKING PROCESS**

### 2.3.1 **Consumer decision-making of packaged food products**

Consumer decision-making is seen as a problem-solving activity (Du Plessis & Rousseau, 2003:110) that involves a process rather than a single activity (Mowen & Minor, 2001:171). Consumers eventually make purchase decisions to achieve their goals (Mowen & Minor, 2001:171), for example choosing food that does not contain substances that they are allergic to, which would be the best alternative amongst all available options for them. Engel *et al.* (1995:154) identify stages that consumers go through in the decision-making process which are presented in an adapted consumer decision-making model (Figure 1).

More commonly, consumers rather take on a simplistic form of decision-making where little effort and involvement are needed to make a purchase (Engel *et al.,* 1995:154). A substantial number of food products are seen as commodities to which consumers pay little attention and involvement during the decision-making process (Silayoi & Speece, 2004:616). Consumers often purchase food products merely routinely or on a habitual basis (Engel *et al.,* 1995:155; Jooste, 2002:7) and one can assume that little attention gets paid to food labels and the information it portrays. Although South African consumers across a broad socio-economic spectrum spend considerable amounts of their monthly income on food and food products (Lamb *et al.,* 2004:54), some consumers are illiterate and uneducated about food and health issues (Macanda, 2005). Illiteracy and consumers being uneducated further contribute to food labels not being used (Macanda, 2005) in the decision-making process of packaged food products.

With so many new product alternatives on the market nowadays, consumers may approach certain packaged food products as high involvement purchases that require more intensive evaluation (Silayoi & Speece, 2004:619) especially when they purchase a product for the first time (Peters-Texeira & Badrie, 2005:511). These consumers who are more involved in the decision-making process of packaged food products do not base their decisions on sensory stimuli such as taste, but rather on packaging cues (Kole *et al.,* 2009:187) such as information on food labels to ensure that they choose the best option amongst alternatives. Consumers who evaluate products carefully probably follow a rational decision-making process, as product choices are made objectively by means of attributes that would best satisfy their needs (Schiffman & Kanuk, 2010:110). Thus, on-package information and labels of food products are valued as highly important by consumers who follow a rational decision-making process. In addition, the literacy rate of the South African population is increasing, which might lead to an increase in the number of consumers who read label information. This potential increase in the number of South African consumers who read label information, stresses the importance of food labels and the role they can play in assisting consumers in their decision-making process (Booysen, 2007:55). The adapted consumer decision-making model (Figure 1) of Engel *et al.* (1995:154) is therefore relevant to literate consumers that regard the purchase of packaged food products as a higher involvement decision and consequently follow a rational decision-making process. This model has been adapted from the original by amending the internal and external influences to relate to South African consumers' decision-making as explained by Du Plessis and Rousseau (2003). The adapted consumer decision-making model (Figure 1) will

subsequently be discussed to explicate how consumers make use of food labels as an external stimulus during the decision-making process.

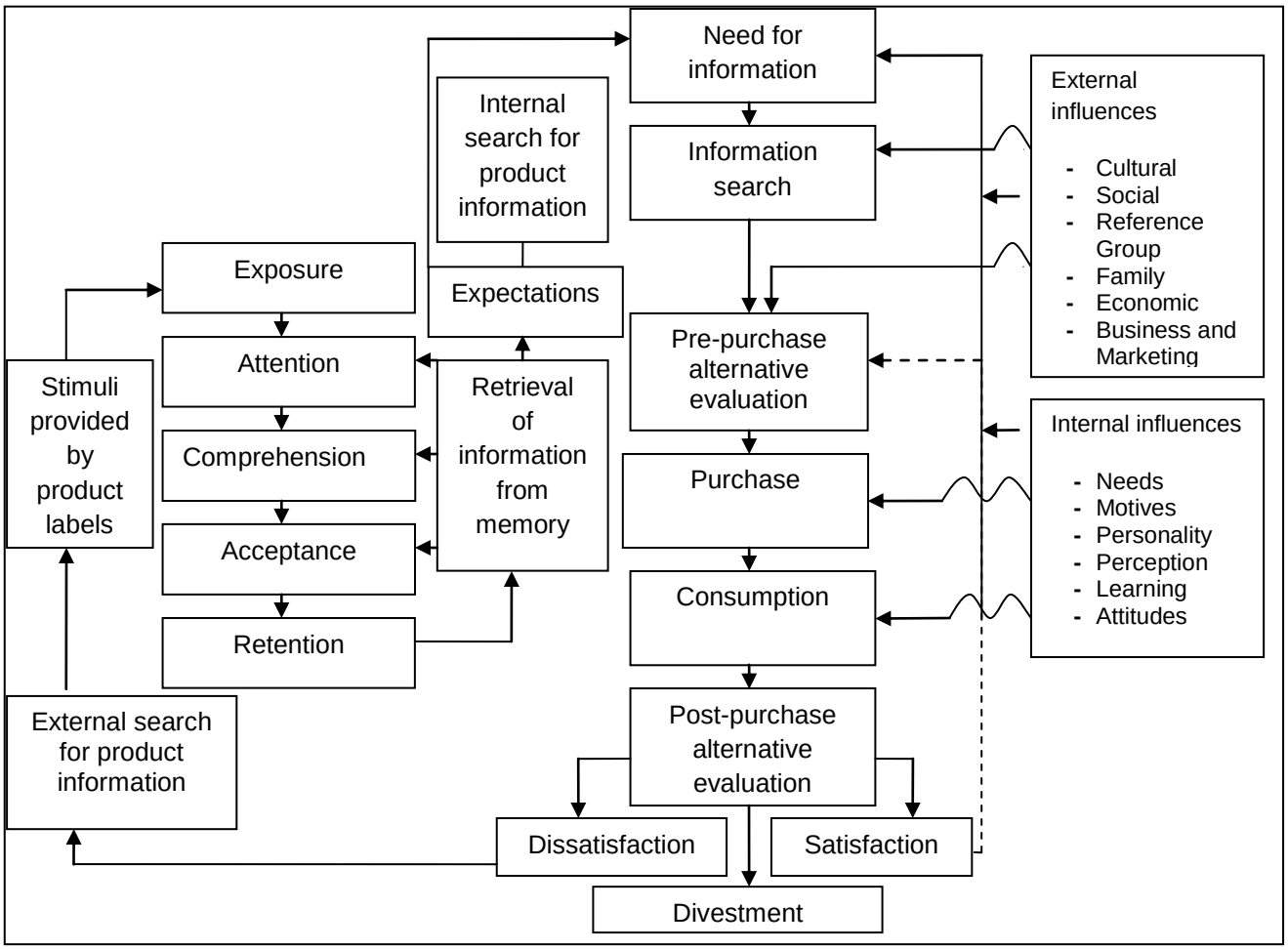


Figure 1: The consumer decision-making model relevant to South African consumers' decision-making of labelled food products (Adapted from Engel *et al.*, 1995:154).

### 2.3.2 The consumer decision-making model relevant to food labels

#### 2.3.2.1 Food labels in the need recognition stage

The first stage in the consumer decision-making process is need recognition (Figure 1). Need recognition occurs when consumers perceive a difference between their current situation and the situation they would like to be in (Engel *et al.,* 1995:146). Consumers often become aware of this difference in-store by external stimuli such as a product's logo, brand, name and colours portrayed on the package and label (Arnould *et al.,* 2004:301; Silayoi & Speece, 2004:607; Wright, 2006:431) and consequently, a need arises for the specific product. Packaging provides strong promotional support at the point of purchase (Mullins *et*

*al.*, 2005:251) and food labels are therefore regarded as very important packaging features (Peters-Texeira & Badrie, 2005:510) that play a significant role in a consumer's need recognition.

#### 2.3.2.2 Food labels in the information search stage

Internal search into memory follows the need recognition to determine whether sufficient information is already known about available alternatives to allow a choice to be made without an additional search for information (Engel *et al.,* 1995:148). An external search will be required when little is known about the available alternatives (Engel *et al.,* 1995:148) as in the case of a first time purchase from a specific product category. Dimara and Skuras (2005:92) consider food labels to be a powerful quality signal and direct aid to consumers in making purchase decisions as it communicates important product information during their external information search.

Consumers' food purchasing decisions are influenced by product information presented on labels such as origin and nutritional value (Kimura *et al.,* 2008) and informational elements are becoming more important (Silayoi & Speece, 2004:624) as the modern consumer seeks additional information on the food products that they consume (Dimara & Skuras, 2005:92). Package information is consequently being used more extensively (Silayoi & Speece, 2004:607) and therefore does appropriately delivered information on the packaging and labels of food products, generate a strong impact on consumers' purchase decisions (Silayoi & Speece, 2004:624). A precondition, though, is that the information on labels should be relevant and understandable. When consumers are exposed to information on food labels as a point-of-sale-stimulus, information processing occurs, involving the following five steps (Figure 1):

- After **exposure** to food labels, product information reaches consumers and their senses are activated (Mowen & Minor, 2001:38) for initial information processing to begin (Engel *et al.,* 1995:148).
- The **attention** of consumers is most likely to be attracted when the information on food labels is considered as relevant to their specific purchasing need (Engel *et al.,* 1995:148). For example, health conscious consumers will pay attention to the nutrition information on food labels (Klein, 2005:78).

- **Comprehension** occurs when the newly gathered information that consumers have paid attention to, is analysed against related information stored in their memory (Engel *et al.,* 1995:148).
- **Acceptance** of the information takes place when the information has not been rejected by the consumers after comprehending it, with the goal to change consumers' beliefs and attitudes about a product (Engel *et al.,* 1995:148).
- **Retention** arises when newly comprehended information about a product is stored in the consumers' memory to be accessible for future use (Engel *et al.,* 1995:148). Consumers would, for example, memorise information on food labels and once exposed again, previous experiences with food labels are recalled from the memory and consumers' **expectations** are consequently formed (Mowen & Minor, 2001:203) (Figure 1).

After information processing has occurred, consumers examine a product in terms of product attributes offered at the pre-purchase alternative evaluation stage, as compared to predetermined standards formed by internal and external influences (Engel *et al.,* 1995:151). Prior to continuing the discussion with the pre-purchase alternative evaluation stage (Figure 1), the various internal and external influences (Figure 1) on consumers during their decision-making process will be discussed as these influences determine the criteria that consumers use to evaluate alternative products (Arnould *et al.,* 2004:678; Mullins *et al.,* 2005:114). In the following sections, internal and external influences on consumer decision-making (Figure 1) are defined and examples pertinent to food labels as external stimuli and food purchasing are incorporated.

#### 2.3.2.3 Internal influences on consumer decision-making

Each individual consumer's cognition is controlled by various internal influences such as needs, motives, personality, perception and attitudes (Figure 1). At specific times, different consumers are affected by one or more of these internal influences which is why consumers differ in terms of their behaviour and the decisions they make (Engel *et al.,* 1995:291; Du Plessis & Rousseau, 2003:111). Some internal influences and how they relate to packaged food products will now be discussed.

- Consumers' product **needs** include physical and physiological needs such as hunger which can be fulfilled by purchasing and eating food, or psychological and emotional needs (Du Plessis & Rousseau, 2003:229) such as to attract friends by serving certain food and drink items (Du Plessis & Rousseau, 2003:230). A significant number of these needs are evoked in-store through product displays or packaging of a food product (Silayoi & Speece, 2004:607) and regularly result in unplanned purchases (Blackwell *et al.,* 2001:128).

- **Motives** often cause consumers to realise their need for a specific product and direct, inspire and strengthen consumer behaviour towards the purchase of the product (Du Plessis & Rousseau, 2003:111). For example, consumers concerned with environmental welfare are motivated to buy organic food products and express a need for these products (De Magistris & Gracia, 2008:942). Manufacturers often try to motivate consumers into buying a product by linking the product to important needs (Blackwell *et al.,* 2001:250), such as the placement of an organic logo on labels of organic food products.

- **Personality** is a combination of distinctive, individual characteristics which reveal constant and continuing patterns of behaviour and causes a consumer to act in a definite way in the buying situation (Du Plessis & Rousseau, 2003:111; Arnould *et al.,* 2004:389). For example, consumers tend to associate personality factors with specific colours and some consumers associate the colour black with sophistication. For this reason, manufacturers desiring to create a sophisticated persona or a premium image for a food or drink product, use labels that are predominantly black (Schiffman & Kanuk, 2010:161).

- **Perception** is the process by which consumers select, organise and interpret sensory stimuli into a meaningful and rational image (Newman & Cullen, 2002:133; Du Plessis & Rousseau, 2003:111; Arnould *et al.,* 2004:299; Hoffman *et al.,* 2005:184; Mullins *et al.,* 2005:119; Schiffman & Kanuk, 2010:175). Examples of stimuli include packages, labels, brand names, advertisements and commercials (Schiffman & Kanuk, 2010:175) which often determine how consumers perceive a product as a whole. For example, some food products such as chocolate, wrapped in expensive-looking foil products are perceived as good quality and consumers will pay a higher price for those products while wine bottles with shiny labels are

perceived as less expensive, but those with dull labels are perceived as expensive (Lamb *et al.,* 2004:83).

- The amount of **learning** that takes place is determined by the value systems and needs of the consumer and it depends on what the consumer already knows (Du Plessis & Rousseau, 2003:111; Arnould *et al.,* 2004:342). Through learning, consumers assess new information in terms of existing beliefs and past experiences (Arnould *et al.,* 2004:342) which leads to changes in knowledge, attitudes and behaviour (Engel *et al.,* 1995:514). During the in-store shopping situation, the food label is a valuable instrument in providing consumers with new information and consumers learn more about food products and food product attributes by using the label (Badham, 2004:17; Silayoi & Speece, 2004:619; Dimara & Skuras, 2005:92) which might change consumers' attitudes and behaviour towards a specific product. On the other hand, labels are only valuable in teaching if consumers know how to use food labels and consumers who understand how to read labels will be best able to apply the information in order to learn about product attributes (Whitney & Rolfes, 2005:61). In South Africa, not all consumers are educated and some are even illiterate (Lamb *et al.,* 2004:54), making it a difficult task to teach these consumers about product attributes through food labels.

- Consumers' behavioural intentions depend on their **attitudes** as attitudes are long-lasting systems of positive or negative evaluations or emotions and result in consumers showing a like or dislike for a particular product (Du Plessis & Rousseau, 2003:111; Schiffman & Kanuk, 2010:246). Attitudes are learned tendencies to react to a product in a consistently favourable or unfavourable manner and are formed through consumers' beliefs and/or feelings (Engel *et al.,* 1995:364). Labels of food products are often used to create certain beliefs and/or feelings about a product. For example, by stating on a label that a particular food product is "fat free" and "guilt free" makes the consumer believe that the product is healthy while at the same time it eliminates the consumers' feelings of guilt that might be experienced when eating a similar product that is not fat free and it therefore creates an overall favourable attitude towards the product (Engel *et al.,* 1995:366). In another example, for consumers who show a dislike in genetically modified (GM) foods due to their beliefs, the term "GM" on the label of a food product evokes an extremely negative attitude towards the product during the decision-making process (Batrinou *et al.,* 2008:257).

#### 2.3.2.4 External influences on consumer decision-making

Apart from internal influences, consumers are shaped by their external environment as they live and operate in it and various influences within this external environment in part determine consumers' behaviour (Engel *et al.,* 1995:607). External influences such as economic demand factors, reference groups and cultural influences have an effect on consumers' decision-making process (Figure 1). Various external influences and how they relate to packaged food products and food labels will now be discussed.

- **Cultural influences** refer to inherent beliefs, norms, values, and customs, which underlie and direct behaviour within a society. These beliefs, norms, values, and customs are learnt and lead to universal patterns of behaviour (Du Plessis & Rousseau, 2003:112; Mullins *et al.,* 2005:126). In order to communicate effectively with consumers of a specific culture, manufacturers can use appropriate symbols to convey pertinent product attributes (Schiffman & Kanuk, 2010:442). For example, food lawful to be consumed by Muslim (Islam religion) consumers is known as "halaal" (Bennion & Scheule, 2004:4) and manufacturers make use of a symbol on the food label to convey the product as "halaal". South Africa's population represents a heterogeneous and multi-cultural society (Lamb *et al.,* 2004:92) with eleven national spoken languages. Despite the fact that English is recognised as the language of commerce and science, it was spoken by only 8.2% of South Africans in 2001 (Statistics South Africa, 2003). Many African languages spoken in South Africa have limited vocabularies and it is often impossible to translate expressions from one language to another (Du Plessis & Rousseau, 2003:35). As only one official language is required on food labels (Steenkamp, 2007), which is usually English, it can be assumed that many South African consumers experience difficulty in understanding or relating to the information on food labels.

- **Social class** is defined as the way in which elements of income, education, occupation, and residential location combine to form a specific social hierarchy and consumers as members of each class have relatively the same status (Arnould *et al.,* 2004:480; Schiffman & Kanuk, 2010:338). Social classes are commonly referred to as lower, middle or upper class and the kind and quality of products that consumers purchase are closely related to their social class as determined by the abovementioned elements (Engel *et al.,* 1995:701). Income and education, as elements of consumers' social class, influence consumers' food purchasing, as previous studies have indicated that both higher educational attainment (Lin & Yen,

2008:444) and higher income (Badham, 2004:12) contribute to consumers' in-store use of food labels.

- A **reference group** is any group with which a consumer identifies in such a way that he or she tends to use the group as a benchmark for self-evaluation and as a basis of personal values and goals (Du Plessis & Rousseau, 2003:112; Arnould *et al.,* 2004:609; Wright, 2006:369; Schiffman & Kanuk, 2010:281). The group serves as a reference point for the individual in the creation of beliefs, attitudes and behaviour and reflects which choices are acceptable and which are not. Reference groups influence consumer decision-making as consumers often learn about product choices and services by observing or seeking information from members of a reference group to enable themselves to relate with the specific group (Engel *et al.,* 1995:719). Therefore, some consumers purchase food products of a certain brand only when serving it to guests (Sjitsema *et al.,* 2002:567) as they strive for social acceptance from the specific reference group that their guests belong to.

- Members of a **family** constantly influence each other in making product decisions as individual members often purchase products for the use of the whole family (Engel *et al.,* 1995:742). Different members of families play different roles in purchase decisions as a child might be a user of breakfast cereal but the parent acts as the buyer, although influenced by the child (Du Plessis & Rousseau, 2003:112; Arnould *et al.,* 2004:521; Mullins *et al.,* 2005:127). Family also influence label reading practices of consumers. For example, when a family member is on a special diet or is allergic to some ingredients, the consumer who is making the actual purchase is more likely to use food labels in the grocery shopping situation in order to gain product information relating to the diet of that family-member (Lin & Yen, 2008:444).

- **Economic demand factors** refer to the purchasing power of consumers, based on their household income and accessibility of monetary funds or restrictions placed on the consumer as a result of lack of money or credit-worthiness (Du Plessis & Rousseau, 2003:112). The well-known Laws of Consumption of Ernest Engel propose relationships between household income and the proportion spent on categories such as food and education (Engel *et al.,* 1995:295). In South Africa, consumers from higher income groups spend more money in rand value on food items per month than consumers from lower income groups, while in proportion, the lower income groups spend a higher proportion of their monthly income on food than

consumers from high income groups (Du Plessis & Rousseau, 2003:93). Consumers from higher income groups have greater exposure to new products due to an increased awareness of advertising and innovation (Anon, 2005:29) as well as increased product demands due to affordability and higher education levels (Lamb *et al.,* 2004:54). Greater exposure to new products, affordability and high education levels might all contribute to the use of food labels by consumers from higher income groups when they purchase packaged food products (Dimara & Skuras, 2005:95; Lin & Yen, 2008:444). During a time of economic recession as recently experienced in South Africa and internationally, consumers have less money to spend due to a decrease in income, productivity and employment. Therefore, consumers seek quality guarantees, value for money, satisfaction and the capacity to save time and money before purchasing products (Lamb *et al.,* 2004:57). Thus, in a period of economic decline, consumers might search more often for information on labels of food products that they intend to purchase to ensure that they spend their money wisely.

- **Business and marketing influences** originate from the direct contact that consumers have with companies or products through marketing elements such as personal selling, sales promotion, and advertising (Du Plessis & Rousseau, 2003:112). These business and marketing influences can not only influence consumer decision-making (Kole *et al*., 2009:187), but can also become the driving force of consumer loyalty (Wright, 2006:431). At the point-of-sale in a retail store, the information and graphics portrayed on a food label such as the product's name, brand, logo and colours influence the success of marketing stimuli (Arnould *et al.,* 2004:301; Wright, 2006:431) as it communicates the image, quality and other attributes of the product to consumers. Marketers often create a demand for a product by creating a demand for the packaging of the product which is known as kaleidoscopic packaging. Kaleidoscopic packaging entails that elements of the package of a product are changed continually and by doing that, a demand is created for the packaging. Children are often the target market of kaleidoscopic packaging. For example, breakfast cereal manufacturers print different animals or well-known television characters on the labels or packaging and achieve success by doing so as children demand the products with the characters (Lamb *et al.,* 2004:424).

#### 2.3.2.5 Food labels in the pre-purchase alternative evaluation stage

After information on products has been gathered through stimuli such as food labels, consumers compare the options identified, as determined by various internal and external influences, in the pre-purchase alternative evaluation stage (Mowen & Minor, 2001:180; Figure 1) and these options are evaluated to establish which product best satisfies the consumer's need (Hill, 1996:42). During this process of alternative evaluation, consumers gain a more comprehensive understanding of the product or brand required (Fernie *et al.,* 2003:254) by making use of an evoked set and specific criteria (Schiffman & Kanuk, 2010:488). An evoked set refers to the small number of products or brands, usually between three and seven, within a specific product category that the consumer is familiar with, remembers and prefers (Blackwell *et al.,* 2001:111; Schiffman & Kanuk, 2010:488).

The criteria consumers use to evaluate the products or brands in the evoked set are expressed in terms of important product attributes (Mullins *et al.,* 2005:114; Schiffman & Kanuk, 2010:489). For each product or brand in the evoked set, consumers learn, compare and evaluate the various product attributes, dimensions and benefits, such as price, size and nutritional value. These product attributes, dimensions and benefits are measured according to importance and satisfactory performances (Fernie *et al.,* 2003:254; Mullins *et al.,* 2005:114). However, each consumer uses different criteria to evaluate products as different consumers regard different product attributes as important due to the effect of various internal and external influences (Mullins *et al.,* 2005:114; Wright, 2006:28) which have previously been discussed.

In the context of food product decision-making, a food item has definite attributes that fit in the criteria, food pattern or diet of a consumer (De Magistris & Gracia, 2008:932) and consumers take different food product attributes into consideration when evaluating, choosing, or consuming food products (Sjitsema *et al.,* 2002:572). Consumers also use different criteria to decide what products to purchase and they rate product attribute importance differently. Whereas price will be the most important product attribute for one consumer, trustworthiness of the manufacturer might be the most important for another (Wright, 2006:28). Previous research reveals that some consumers use the food label to evaluate and compare food products in-store (Higginson *et al.,* 2002:151).

When using the food label to compare products, different consumers regard different attributes of food products as important. For example, health conscious consumers commonly compare the nutrition information (Higginson *et al.,* 2002:149) such as the fat and sugar content (Klein, 2005:78) of different versions of the same food product in order to choose the healthiest option. For consumers preferring organic food, an organic logo on the food label is of utmost importance as the organic product is identified through and differentiated from other conventional food products by the organic logo (De Magistris & Gracia, 2008:932). Furthermore, new products in a familiar product category can lead consumers into reading food labels as they compare the attributes of the product that they regularly purchase with the attributes of the new product (Klein, 2005:67).

When consumers with food allergies evaluate alternative products, they regard allergen information on food labels as highly important and agree that simple terminology on food allergens should be presented on food labels (Miles *et al.,* 2006:799). In addition, some consumers regard the expiry date as significant and they actively search for the food product on the shelf with the longest remaining shelf-life, as it is considered to be an indication of freshness (Peters-Texeira & Badrie, 2005:512). To make the best choice according to the purity of different products, a number of consumers read and compare the ingredient lists of food products as presented on food labels (Klein, 2005:57).

From the aforementioned theory and results, it is evident that food labels play a vital role when consumers evaluate alternative food products in-store. Mowen and Minor (2001:180) state that it is through the alternative evaluation stage in the decision-making process that consumers gain the information needed in order to make a final purchasing decision. After evaluating alternative products, the product with the most favourable attributes will be purchased (Engel *et al.,* 1995:151).

#### 2.3.2.6 Food labels in the purchase, consumption and post-purchase evaluation stages

Decisions to purchase food products are made within the store, either impulsively on the basis of brand familiarity, or as a result of comparisons of the products on the shelf (Mullins *et al.,* 2005:116). If consumers purchase a product impulsively or on the basis of brand familiarity, the label is often used to identify the product as the brand name is printed on the

food label (Klopper, 2002:35) and, as mentioned above, consumers use the label to compare products (Higginson *et al.,* 2002:151) which will lead to the purchase (Figure 1). When consumers purchase a product for the first time on a trial basis and the product is found to be more satisfactory than other products upon consuming it, consumers are likely to repeat the purchase (Schiffman & Kanuk, 2010:497).

As consumers use a product, especially during a first-time trial purchase, they compare the product's performance to their expectations as part of their post-purchase behaviour (Schiffman & Kanuk, 2010:498). Consumers' post-purchase behaviour involves the assessment of the products' performance on the key attributes identified by consumers once the product is bought (Du Plessis & Rousseau, 2003:120; Mowen & Minor, 2001:200). This assessment of products' performances after consumption is known as post-purchase alternative evaluation (Figure 1) and has two possible outcomes, namely consumer satisfaction or dissatisfaction (CS/D) (Engel *et al.,* 1995:273). Although consumer satisfaction is an outcome of the consumer decision-making process (Figure 1), it is also an important element of this review and will therefore be discussed comprehensively in a separate section.

## 2.4 CONSUMERS' SATISFACTION WITH FOOD LABELS

### 2.4.1 Consumer satisfaction defined through the expectancy disconfirmation model

Hoffman *et al.* (2005:329) define consumer satisfaction as an instant, transaction-specific measure of whether consumer perceptions of a product's performance meet or exceed consumer expectations. A model essential for understanding consumer satisfaction/dissatisfaction (CS/D) is the expectancy disconfirmation model (Mowen & Minor, 2001:203) which illustrates that consumers compare the actual performance of a product with the foregoing expectations concerning the product's performance and that leads to satisfaction (or not) (Laufer, 2002:312). Some consumers evaluate the performance of a food product based on the food label (Silayoi & Speece, 2004:624) and anticipate how it would satisfy their needs.

Expectations are consumers' anticipation or prediction of how a product will perform, based on previous experiences with a similar product, advertisements or promotions. Consumers

expect that when they purchase a product, it will fulfil their needs upon consumption (Mowen & Minor, 2001:203; Arnould *et al.,* 2004:770). Thus, it can be believed that consumers expect that when they make use of a food label, it will fulfil their needs upon reading it.

Once consumers consume the product that they have purchased, they compare the expectations that they had to the actual performance of the product, which is a significant determinant of consumer satisfaction (Blackwell *et al.,* 2001:175). Performance is measured in terms of the absolute level of overall product performance based on specific product attributes; the number of attributes offered by the product in line with what the consumer has identified as important and the extent to which the product has achieved, compared with the consumer's expectations (Mowen & Minor, 2001:200). Thus, food label performance might be measured in terms of the attributes that it offers to consumers, consistent with their expectations. When comparing expectations to performance of the product, there are three possible outcomes (Engel *et al.,* 1995:275; Blackwell *et al.,* 2001:176; Mowen & Minor, 2001:203; Arnould *et al.,* 2004:769):

- Positive disconfirmation (when performance exceed expectations) which leads to increased levels of satisfaction;
- Confirmation (when performance equals expectations) that also leads to satisfaction;
- Negative disconfirmation (when performance falls below expectations) which leads to increased levels of dissatisfaction.

Based on the comparison of expected performance to actual performance of a product, consumers experience positive, negative, or neutral emotions, depending on whether expectations were confirmed (Mowen & Minor, 2001:199). Spreng *et al.* (1996:17) elaborate on the expectancy disconfirmation model with their model of the satisfaction formation process (Figure 2). The model proposes that feelings of satisfaction arise when consumers compare their perceptions of the performance of a product to both their desires and expectations (Spreng *et al.,* 1996:15).

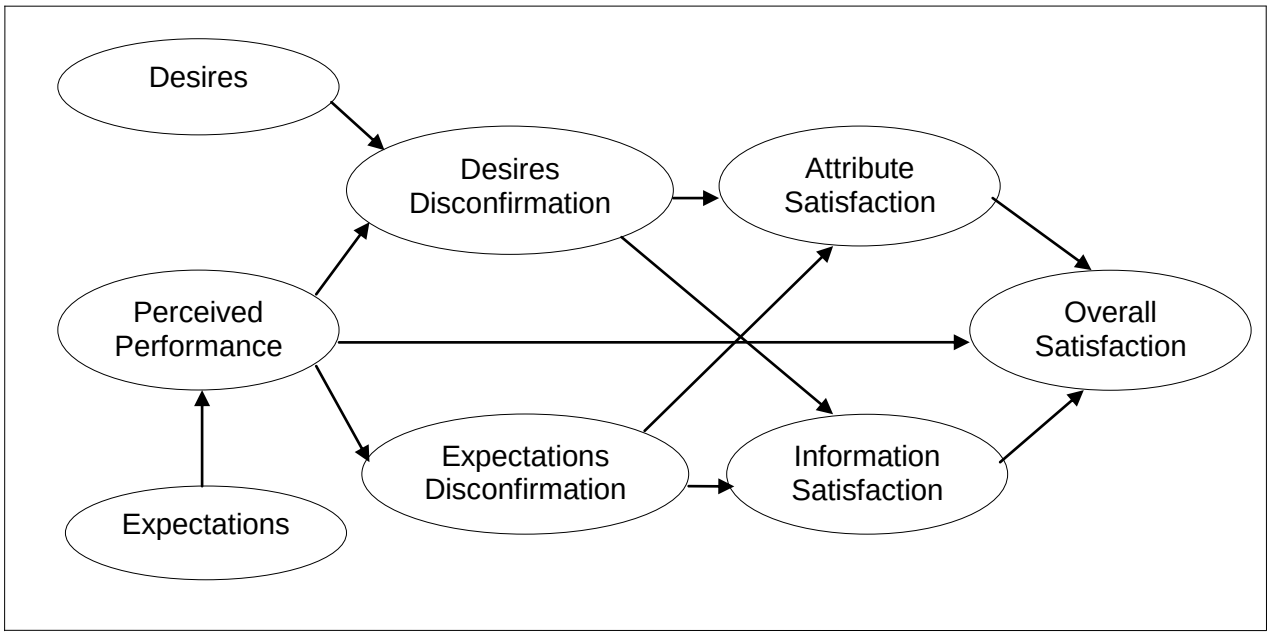


Figure 2: Conceptual model of the satisfaction formation process (Spreng *et al.*, 1997:17)

Spreng *et al.* (1996:17) explain that overall satisfaction, as an emotional reaction to a product, is influenced by a consumer's satisfaction with the product itself (attribute satisfaction, such as the taste of a food product) and with the information used in choosing the product (information satisfaction, such as the information on a food product's packaging). Attribute satisfaction and information satisfaction are formed by consumers' judgments of the degree to which a product's performance is perceived to have met or exceeded his or her desires (desires disconfirmation) and expectations (expectations disconfirmation). Desires for specific ways of satisfying a need are reflected by consumers' wants which are formed by internal and external influences (Figure 1) and different consumers may have different wants to satisfy the same need (Mullins *et al.,* 2005:8). Desires change over time, which explains the reason why consumers' satisfaction with a product might change, although the extent to which the product meets their expectations remains relatively constant. For example, consumers' increased knowledge about nutrition and health leads to a desire for less cholesterol in food (Spreng *et al.,* 1996:27).

Spreng *et al.* (1996:28) furthermore explain that low information satisfaction may be more likely to stimulate negative word-of-mouth communications than low attribute satisfaction, because the consumer may feel cheated by untruths. Negative word-of-mouth, complaint behaviour, the divestment of products when consumers are dissatisfied, together with repeat

purchase intentions and the formation of brand loyalty when consumers are satisfied, are the respective outcomes of CS/D after consumption (Engel *et al.,* 1995:166; Mowen & Minor, 2001:196). One can assume that the information on food labels and how it is conveyed might influence consumers' satisfaction or dissatisfaction with a product as a whole. When consumers are satisfied with the information they will repeatedly purchase the product, but when they are dissatisfied, they will possibly reject the product. Although the majority of CS/D literature is based on the belief that CS/D is a post-purchase outcome, some researchers investigated CS/D at the pre-purchase alternative evaluation stage of the consumer decision-making process (Simintiras *et al.,* 1997:858; Chen-Yu & Hong, 2002:118). The latter will be further explained in the following section.

### 2.4.2 Pre-purchase satisfaction and preference of labelled food products

Pre-purchase satisfaction occurs at the pre-purchase stage of the decision-making process when product alternatives are evaluated (Figure 1) and is achieved when certain product attributes that the consumer regards as important, are present (Chae *et al.*, 2006:29). Chen-Yu and Hong (2002:122) have found that the higher the satisfaction with a product prior to purchase, the higher the preference for one product over another. The latter is supported by Siminitras *et al.* (1997:867) who report that pre-purchase satisfaction is a predictor of the purchase behaviour of especially first-time buyers. Food labels are often used to evaluate products in-store, especially during a first time purchase (Peters-Texeira & Badrie, 2005:511), as they portray information on product attributes such as an ingredient list (Klein, 2005:57). As some consumers judge the overall performance of a food product by reading the label (Silayoi & Speece, 2004:624), one can conclude that the information on food labels and how it gets portrayed is related to consumers' pre-purchase satisfaction and preference of a food product. Preferences signify consumers' attitudes toward products based on the belief of supremacy of one product over another (Blackwell *et al.*, 2001:289). Thus, consumers might prefer one product over another, based on their pre-purchase satisfaction with attributes and information on the food label. Expectations are an important determinant of satisfaction (Ha, 2006:138) and as previously mentioned, consumers have certain expectations of food labels which will be discussed in the following section.

### 2.4.3 Consumers' expectations based on prior experiences and product knowledge of food labels

Consumers expect that the information on food labels should be easy legible while evaluating products, but consumers with vision impairment often experience difficulty in reading labels and as a result, concerns about colour differentiation and font size are increasingly raised (Doyle *et al.,* 2005:783). Some consumers, especially the elderly, are not satisfied with the small fonts as that leads to poor legibility and confusion (Silayoi & Speece, 2004:612). Consumers want to be assured about the food and drink they consume – guaranteed that it is not going to affect their health negatively (Dimara & Skuras, 2005:99) and expect that information on food labels is simple and accurate in order to simplify the decision-making process (Silayoi & Speece, 2004:621). However, some consumers are sceptical about the credibility and scientific truth of health related claims on food labels (Klein, 2005:79; Worsley & Lea, 2008:1110) while others find the nutrition information confusing (Silayoi & Speece, 2004:620).

Previous research indicates that some consumers find the food label too time-consuming and difficult to follow upon purchasing packaged food products (Silayoi & Speece, 2004:612; Peters-Texeira & Badrie, 2005:511). The format of food labels is, in some cases inadequate, as some consumers experience difficulty in understanding the basis of the information presented, which leads to complications in assessing or comparing products (Miller *et al.,* 1997:277; Doyle *et al.,* 2005:782; McEachern & Warnaby, 2008:418). Thus, for some consumers, the performance of labels in terms of how the information gets portrayed falls below their expectations, which might lead to their dissatisfaction with food labels.

From an informational point of view, consumers regularly read and therefore expect an ingredient list on labels of food products to know what the product contains and to make the best choice according to the purity of products (Klein, 2005:57). Some consumers regard expiry dates as very important and therefore expect it to be portrayed on labels of food products (Peters-Texeira & Badrie, 2005:512). However, some consumers are frustrated as they cannot always find an expiry date on food labels (Klein, 2005:74). Health conscious consumers expect nutritional information on food labels, such as fat, sugar, vitamin, mineral, protein and fibre contents as well as information relating to the product's glycemic index (GI), recommended daily allowance (RDA) and monosodium glutamate (MSG) (Klein, 2005:78). In addition, consumers with food allergies regard allergen information on food labels as

highly important and expect simple terminology or symbols of food allergens on food labels (Klein, 2005:78; Miles *et al.,* 2006:799), while organic food consumers expect an organic logo on the food label in order to identify and differentiate the organic product from the conventional product (De Magistris & Gracia, 2008:932).

As previously mentioned, nowadays some consumers expect information on food labels that goes beyond what was expected from conventional products, since these consumers seek information relating to the product's association with a geographic region, its traceability, quality guarantee, its possible use and its particular methods of production (Dimara & Skuras, 2005:92). On the one hand, there is a rising need to present consumers with more product information, as consumers that seek increased product information regard the amount of information on food labels as insufficient (Klopper, 2002:35; McEachern & Warnaby, 2008:418; Teisl *et al.,* 2008:452). On the other hand, too much information enhances the risk of information overload (Silayoi & Speece, 2004:612; Kimura *et al.,* 2008:629). Previous research indicates that excessive information on food labels is not necessarily better for all consumers, because less knowledgeable consumers often experience difficulty understanding the information (Feunekes *et al*., 2008:64). Thus, there is controversy on how much product information should be presented on food labels as not all consumers have the same expectations.

The effectiveness of food labels is greatly reduced if consumers are unable to evaluate the product information (Badham, 2004:16). When consumers are unable to evaluate the information for whichever reason, it might lead them to ignore the information or even reject the product in favour of another product where information is more effectively communicated (Silayoi & Speece, 2004:620). Therefore, it is essential that product attributes and information are communicated effectively as dissatisfaction with the food label could result in a lower preference of the product. As Spreng *et al's.*(1996) model (Figure 2) suggests, overall satisfaction is a result of information satisfaction as well as attribute satisfaction.

### 2.4.4 Label information versus label attributes

Rossiter and Percy (2001:188) define an attribute as what the product has, in other words the physical features of a product. For the purpose of this literature review, attributes are the physical features of the label of the food product and although the label is inherent to the

food product and its packaging (Klopper, 2002:35), their attributes differ. Thus, attributes of the label, for example, include its adequacy while attributes of the product itself are displayed as informational elements on the food label, such as expiry dates. Consistent with the Spreng *et al.* model of the satisfaction formation process (Figure 2), informational elements as well as attributes of the food label that influence consumer decision-making, have been identified throughout the literature which is presented in a summarised format. Information of product attributes presented on food labels include expiry dates, ingredient lists, nutrition and health information, country of origin/geographical region, allergen information, well-known logos/symbols, name and address of manufacturers, quality guarantees, usage instructions and number of servings. Physical or intangible attributes of food labels include the credibility, understandability, adequacy and legibility in terms of font size and writing styles.

## 2.5 THEORETICAL FRAMEWORK OF CONSUMER SATISFACTION WITH FOOD LABELS DURING THE PRE-PURCHASE IN-STORE EVALUATION

From the literature, a theoretical framework (Figure 3) has been constructed with the aim to understand consumers' satisfaction with labels at the in-store evaluation and consequent preference of food products. This framework integrates a consumer decision-making model (Engel *et al.,* 1995:153) and a model of the consumer's satisfaction formation process (Spreng *et al.,* 1996:17). Based on supportive theory from the literature, some elements have been added in order to present a comprehensive and flowing theoretical framework suitable for this review.

Some consumers, affected by internal and external influences, make use of the food label as an external stimulus during their in-store search for product information (Peters-Texeira & Badrie, 2005:510), especially during a first-time purchase (Figure 3). After consumers have recognised a need (internal influence) for a specific product, the information on labels of food products reaches consumers and the initial processing of the information begins (Figure 3). Once exposed, consumers are attracted to information that is relevant to their specific purchasing need. For example, health conscious consumers read the nutrition information on food labels. The information gathered from food labels is then analysed against related information stored in the memory whereafter consumers comprehend and accept the information (Engel *et al.,* 1995:149). For information to be accessible for future use, consumers store the newly comprehended information in their memory (Figure 3).

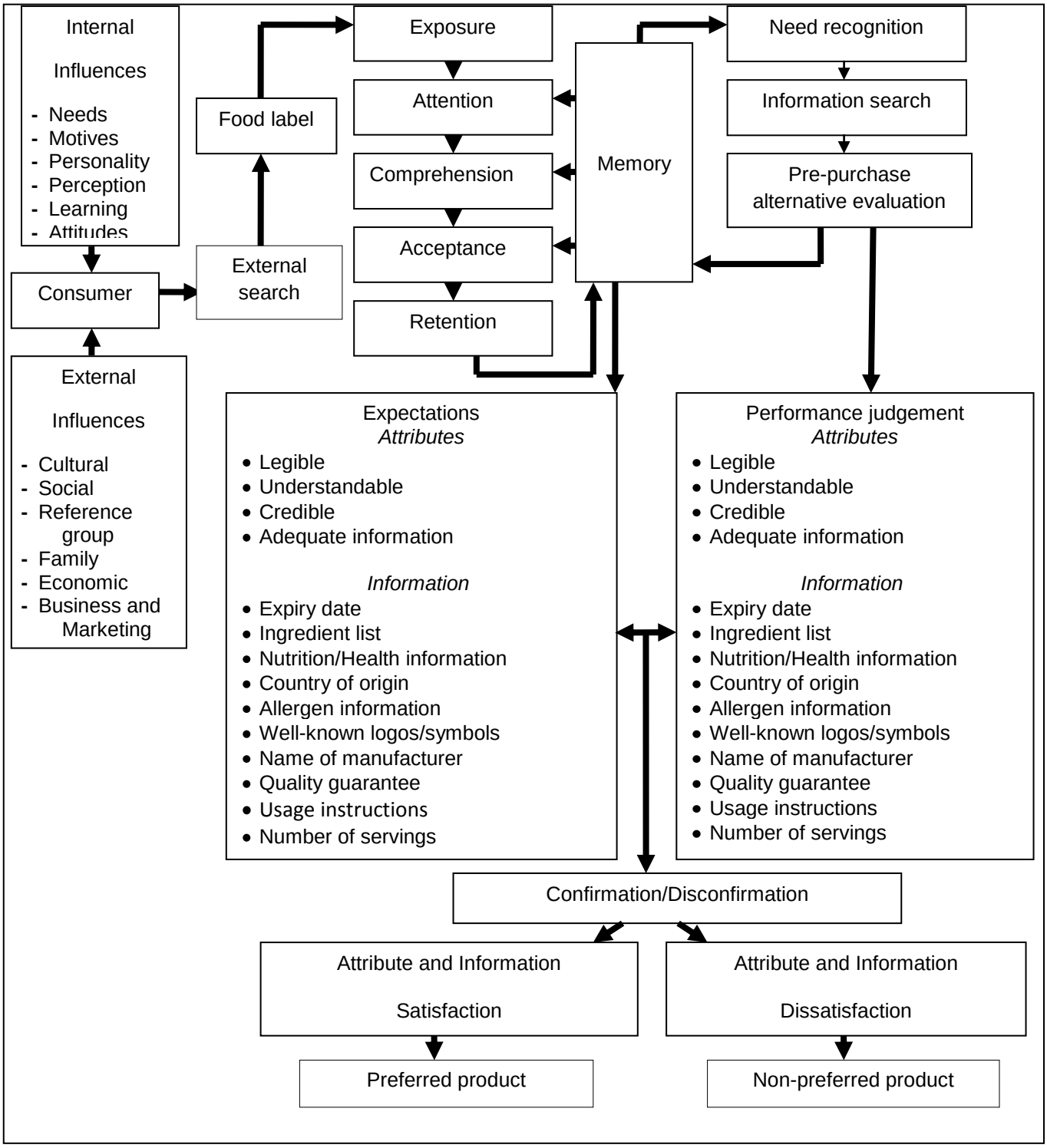


Figure 3: Theoretical framework of consumers' satisfaction with food labels during the pre-purchase in-store evaluation

After need recognition, consumers search for information and use the food label to evaluate alternative products on criteria that consist of important product attributes. This would be typical of rational decision-making, i.e. where consumers use information to intentionally select the product that best meets certain criteria (Schiffman & Kanuk, 2010:110). The importance of product attributes such as nutrition information, as displayed on food labels, is determined by various internal and external influences and differs for each consumer (Figure 3). Thus, internal influences such as consumers' specific needs, perception, personality, attitude, level of education and literacy as well as external influences such as social class, economic situation, family members and culture can, amongst other influences, determine how consumers make use of food labels while evaluating alternative products.

After evaluating alternatives, the product with the most sought-after attributes will be purchased and specific product attributes are essential in achieving pre-purchase satisfaction (Chae *et al.,* 2006:29). The information on product attributes and how it gets portrayed on food labels are therefore significant in the pre-purchase alternative evaluation stage of the consumer decision-making process (Figure 3). For the purpose of this literature review, attributes of the food label refer to how information gets portrayed and include the labels' adequacy, understandability, credibility and legibility.

Due to previous experiences, consumers have certain expectations of the attributes and information of food labels which inevitably influence their perception of the potential performance of food products and therefore labels will influence their actual purchasing decisions. Literature indicates that consumers expect labels to be understandable (McEachern & Warnaby, 2008:418), legible (Doyle *et al*., 2005:783), credible (Silayoi & Speece, 2004:621) and adequate (Teisl *et al*., 2008:452). Consumers thus expect information on food products that they consider important to be present and presented clearly on labels to enable an informed purchasing decision. The theoretical model (Figure 3) suggests that when the performance of food labels, in terms of attributes and information, equals or exceeds consumers' expectations, satisfaction with the label might encourage the purchasing of the product. On the other hand, when the performance of attributes and information on food labels falls below consumers' expectations, dissatisfaction with the label might lead to rejection of the product. Thus, the food

label could significantly influence consumers' in-store, pre-purchase satisfaction with packaged food products.

## 2.6 CONLUSION

Labels are significant in consumers' decision-making of food products and serve an important function as part of a products' packaging (Peters-Texeira & Badrie, 2005:510). At the point-of-sale, the label of food products serves a number of communicative functions, providing consumers with information on products to make an informed product choice (Hoffman *et al.,* 2005:300; Klopper, 2002:35). As some consumers demand more and more information on the food products they consume due to influences such as technological advances in the food industry and increased health consciousness (Silayoi & Speece, 2004:607; Teisl *et al.,* 2008:447), the more important food labels and the information they portray become in the consumer decision-making process.

During rational decision-making, consumers make use of food labels as external stimuli to assist them in the information search and alternative evaluation stages (Higginson *et al.,* 2002:151) of the decision-making process. By making use of food labels, consumers gain product information in order to choose the best option (Silayoi & Speece, 2004:619), especially when they purchase a product for the first time. During the decision-making process, consumers are affected by various internal and external influences (Arnould *et al.,* 2004:678; Mullins *et al.,* 2005:114) that determine if and how they make use of food labels, which differ for each consumer. Internal influences such as consumers' specific needs, personality, attitude, level of education, literacy skills and income as well as external influences such as social class, economic situation, family members and culture can, amongst other influences, determine if and how consumers make use of food labels during the decision-making process.

Many consumers in South Africa cannot use food labels during the decision-making process because they are uneducated about health and nutrition issues or because they are illiterate (Macanda, 2005). Functionally illiterate consumers make decisions differently from literate consumers, as they often purchase a product based on a single piece of information without

considering other attributes, such as treating all words and numbers as pictorial elements (Schiffman & Kanuk, 2010:493), indicating that they would neither read nor understand the information on food labels. Furthermore, the purchasing of food products is said to be routine, requiring little involvement of consumers (Jooste, 2002:7), indicating that consumers, even though some are educated and literate, do not always make use of food labels. Yet, there are indications that the literacy rate of South Africans is rising and consumers' increased reference to issues such as nutrition and health (Lamb *et al.,* 2004:81) indicates the importance of food labels and the information they portray on packaged food products.

When consumers purchase packaged food products, they do not purchase these products on sensory characteristics such as taste and smell (Kole *et al.,* 2009:187), but rather on cues such as information on labels, especially when it is a first-time purchase (Peters-Texeira & Badrie, 2005:511), which might indicate that they purchase the product because they are satisfied with the label of the product and the way information is portrayed on the label. For consumers to be satisfied, according to the confirmation/disconfirmation paradigm, their expectations about a product must be met or exceeded by the product's performance, which is usually associated with post-purchase alternative evaluation (Hoffman *et al.,* 2005:329). However, for consumers to actually purchase a product, they need to experience pre-purchase satisfaction (Chen-Yu & Hong, 2002:122) which occurs at the pre-purchase alternative evaluation stage of the consumer decision-making process (Chae *et al.,* 2006:29). From the literature, one can conclude that consumers might purchase a packaged food product if they are satisfied with the label at the pre-purchase alternative evaluation stage, thus, when performance of the label equals or exceeds consumers' expectations. Based on previous experiences and product knowledge, consumers have certain expectations of food labels when they make use of the food label as external stimuli during the in-store alternative evaluation.

Consumers have expectations regarding the information on food labels and how it gets portrayed as consumers expect the information to be legible, understandable, credible and adequate. Consumers furthermore expect certain information such as an expiry date, allergen information and quality guarantee to be portrayed on labels of food products to make an informed product decision. Consistent with the Spreng *et al.* (1996) model (Figure 2), it can be concluded that consumers' satisfaction with label information and their satisfaction with label

attributes (legibility, credibility, understandability and adequacy) lead to their overall satisfaction with the food label. As illustrated in the theoretical framework (Figure 3) of this review, the concepts of the decision-making process, the confirmation/disconfirmation paradigm and the attribute and information satisfaction formation process are collectively joined. The framework suggests that when consumers' expectations about the information and attributes of food labels are confirmed or positively disconfirmed at the pre-purchase alternative evaluation stage, satisfaction is the result which might lead consumers to accept the product and purchase it on a habitual basis. On the other hand, when expectations about the information and attributes of food labels are negatively disconfirmed at the pre-purchase alternative evaluation stage, dissatisfaction is the result which might lead to rejection of the product as a whole.

Research is therefore needed to determine if consumers purchase packaged food products for the first time because they are satisfied with the information and attributes of the labels, irrespective of the performance of the product itself. Investigating consumers' expectations and satisfaction with attributes and information of food labels can lead to a better understanding of especially first-time buyers' and brand switchers' in-store consumer decision-making. However, different consumers have different expectations of the information and attributes of food labels as some find the information adequate or even excessive (Silayoi & Speece, 2004:612) while others find it inadequate (Klopper, 2002:35; McEachern & Warnaby, 2008:418; Teisl *et al.,* 2008:452) and therefore, designing a label that satisfies all consumers is a difficult assignment.

Designing a suitable label is especially a challenge for food manufacturers in South Africa with its unique demographic composition (Lamb *et al.,* 2004:54), consisting of the very wealthy to the very poor, educated to uneducated and literate to illiterate. The South African Department of Health uses the food label as part of a strategy to prevent obesity and to aid consumers in making healthier food choices (Booysen, 2007:55). Yet, less than half of urban consumers make use of food labels to find nutrition information (Badham, 2004:15). Therefore, more research on South African consumers' expectations of food labels as well as the performance of current food labels are essential in order to design a label that satisfies consumers over a broad socio-economic spectrum. In addition, educating South African consumers on health and nutrition issues (Macanda, 2005) and how to use the food label in the in-store consumer decision-making process might also increase consumers' satisfaction with food labels.

According to Donoghue and De Klerk (2006:52), it is essential that retailers and manufacturers understand how consumers make decisions and how they explain unexpected negative outcomes such as product failure. As a negative outcome, consumers might reject or never purchase a food product because they are dissatisfied with its label. Research on the topic of South African consumers' satisfaction with food labels is limited and should therefore be investigated and explored. The suggested theoretical framework (Figure 3) can be applied in both quantitative and qualitative research aimed at gaining a better understanding of consumers' expectations and satisfaction with food labels and consequent preference. Such research on consumers' expectations and satisfaction with food labels should not only be seen as an academic assignment, but also as a connection between the food manufacturer or marketer and the consumer. Recommendations might be made to food regulators and manufacturers on how to improve or rectify their labels to the benefit of both the consumer and the manufacturer. Based on the suggestions of Donoghue and De Klerk (2006:52), questions that could emerge from such a theoretical framework (Figure 3) that would be of value in the South African research environment include:

- What are South African consumers' expectations regarding food labels?
- How do South African consumers judge the performance of current food labels?
- What are the pertinent shortcomings of existing food labels and how could that be addressed realistically considering the limitations that industry has to take into consideration in terms of limited space and financial implications?
- What is the relationship between specific consumer-related variables (i.e. demographics, personality, attitude, values, culture, knowledge and experience) and consumers' dis/satisfaction with food labels?
- What is the relationship between consumers' dis/satisfaction with food labels and their rejection or preference of a product?
- What is the relationship between consumers' satisfaction with food labels and product loyalty?

It would probably not be easy to change food labels to a format and including information that will satisfy consumers across the broad South-African socio-economic spectrum. However, if there is clarity about what consumers expect and what they regard as of utmost importance, effort could be made to revise food labels. Revision of current food

labels could possibly lead to its optimal utilisation during the in-store evaluation process of packaged food products.

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# *Chapter 3*

# *Research article*

**Title: Consumers' in-store satisfaction with food labels: a study in Gauteng, South Africa.**

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**ABSTRACT**

*Objective*: To explore and describe consumers' retrospective satisfaction with food labels by a comparison of their expectations and performance judgement within the expectancy disconfirmation paradigm. The influence of food labels on consumers' choice of packaged food products as well as the influence of demographic characteristics on consumers' expectations and judgement of food labels were also explored. Lastly, this study aimed to provide recommendations on how existing food labels can be improved.

*Design*: An exploratory survey approach was followed and data were collected by means of structured questionnaires.

*Setting*: Potential respondents were recruited in selected office buildings and business premises in three regions within the urban Gauteng Province, South Africa.

*Subjects*: A total of 279 self-administered questionnaires were retrieved from consumers 18 years or older over a three week period in 2010 using a non-probability sampling method.

*Results*: On average, respondents were dissatisfied with label attributes (believability, readability, understandability and adequacy) and primary information (ingredient lists, expiry dates, nutrition information, information about allergens and quality guarantees), but satisfied with secondary information (name of manufacturer, country of origin, well-known logos/symbols, usage instructions and number of servings). Based on the findings of the present study, recommendations were made to food regulators and manufacturers on how to improve on existing food labels to consequently increase consumer satisfaction.

*Conclusion*: When amendments to food labels are considered, primary information (ingredient lists, expiry dates, nutrition information, information about allergens and quality guarantees) which is essential in consumer decision-making should be improved to increase consumers' satisfaction with food labels and to enable them to make more informed product decisions.

**KEY WORDS**

Food labels

In-store product evaluation

Satisfaction

South African consumers

## 1. INTRODUCTION

Due to technological advances within the food industry in recent years[1,2], consumers' increased environmental awareness[3] and health consciousness[4], many consumers nowadays approach packaged food products as a higher involvement purchase decision during which food labels are useful to product judgements[1]. In fact, such a rational decision-making process[5] is often pursued with the food label as the most important packaging feature[6]. Considering the important role of labels on packaged food products during consumers' pre-purchase decision-making, it is essential that consumers are satisfied with food labels, specifically in terms of what and how they portray information. Food labelling is regulated in South Africa and the new draft of the South African regulations (R146) relating to the labelling and advertising of foodstuffs (Act 54 of 1972) will come into effect shortly[7]. Although labelling is regulated, which gives the impression that consumers' best interest is taken at heart, consumers' satisfaction with food labels is still relatively unexplored in South Africa.

Previous researchers investigated South African consumers' perceptions[8] of food labels, their beliefs and practices[9] related to label reading as well as their understanding and use of food label information[10]. Yet, to the knowledge of the authors, little or no research on consumers' satisfaction with food labels has previously been conducted in the South African context. Considering the unique consumer profile of South Africa[11], which is characterised by features of first- as well as third-world countries, this type of research is probably long overdue. From the relevant literature, this study proposes a conceptual framework (Figure 1) of consumers' pre-purchase satisfaction with food labels wherefrom the aims and objectives were derived.

This study aimed to explore and describe consumers' retrospective satisfaction with food labels based on a typical in-store encounter within the expectancy disconfirmation paradigm[12] as theoretical background. Therefore, consumers' expectations and performance judgement of current food labels were explored and compared whereupon consumers' satisfaction with food

labels was derived. This study furthermore aimed to explore the influence of food labels on consumers' product choice, as well as the influence of consumers' demographic characteristics on their expectations and performance judgements of food labels. Lastly, this study aimed to recommend amendments to regulators and manufacturers on how to improve on existing food labels which could enhance consumer satisfaction.

## 2. CONSUMERS' SATISFACTION WITH FOOD LABELS

### 2.1 Relevance of the expectancy disconfirmation paradigm

According to the expectancy disconfirmation paradigm, consumers have specific expectations of the performance of a product. Upon or after consumption, consumers measure these expectations against products' performance whereafter consumer satisfaction or dissatisfaction (CS/D) manifests. When products' performance meet (confirm) or exceed consumers' expectations (positively disconfirm), satisfaction is the result. When the performance of a product, however, fails consumers' expectations (negatively disconfirm), dissatisfaction is the result[13,14,15,16] (Figure 1). Likewise, in the present study, the expectancy disconfirmation paradigm was adopted to investigate CS/D with food labels (Figure 1). Although the majority of CS/D literature is based on the belief that CS/D is a post-purchase outcome, the present study followed the approach of Siminitras *et al.*[17] and Chen-Yu and Hong[18] who investigated CS/D at the pre-purchase evaluation stage of the consumer decision-making process.

### 2.2 Consumers' pre-purchase satisfaction

Consumers' in-store satisfaction with food labels would typically reflect pre-purchase satisfaction as consumers often use food labels to judge the overall performance of a product prior to purchase[1]. The higher the satisfaction with a product prior to purchase, the higher the preference for one product over another[18], especially in the case of a first-time purchase[17]. Thus, consumers' preference or rejection of products might be the respective outcomes of consumers' pre-purchase satisfaction with food labels (Figure 1). Based on the satisfaction

formation theory of Spreng *et al.*[19], two main elements of food labels might specifically influence consumers' satisfaction with food labels, namely physical or intangible label attributes such as believability, readability, understandability and adequacy, which are more difficult to judge than tangible label information such as ingredient lists, nutrition information, expiry dates and allergen information. Due to prior experience, consumers have specific expectations relating to the attributes and information on food labels (Figure 1).

### 2.3 Consumers' expectations regarding the performance judgement of food labels

Expectations are consumers' anticipation or prediction of how a product will perform, based on their previous experiences with the same or a similar product. Consumers expect that when they purchase a product, it will fulfil their needs upon consumption[15,16]. Likewise, it can be said that during consumers' in-store decision-making process of packaged food products, they expect the labels on products which are primarily meant to inform consumers about the properties of the product, to fulfil their needs in terms of label attributes and product information (Figure 1). However, as demographics generally influence consumer behaviour[20] in a heterogeneous country such as South Africa[21], consumers' expectations and the importance of food labels probably differ across different market segments (Figure 1). On the one extreme millions of consumers in South Africa unfortunately have low education- and literacy levels[22] which unavoidably influence their income earning potential, product experience and experiences with food labels which they cannot comprehend to minimise risk perception. Consumers in higher socio-economic groups, on the other hand, who have higher income- and education levels tend to be more informed and health conscious [23], which suggest that they have pertinent expectations of food labels. South Africa acknowledges eleven official national languages[21], yet the market environment, in which food labels are implemented, uses predominantly English[24] which may influence South African consumers' expectations and eventual use of food labels. Figure 1 indicates that consumers' expectations about products (e.g. packaged food products) determine their product judgements (even during the pre-purchase evaluation stage) but that consumers' expectations are shaped over time due to prior experience in accordance with various individual/personal characteristics such as gender, age, level of education and language, which are socio-cultural specific.

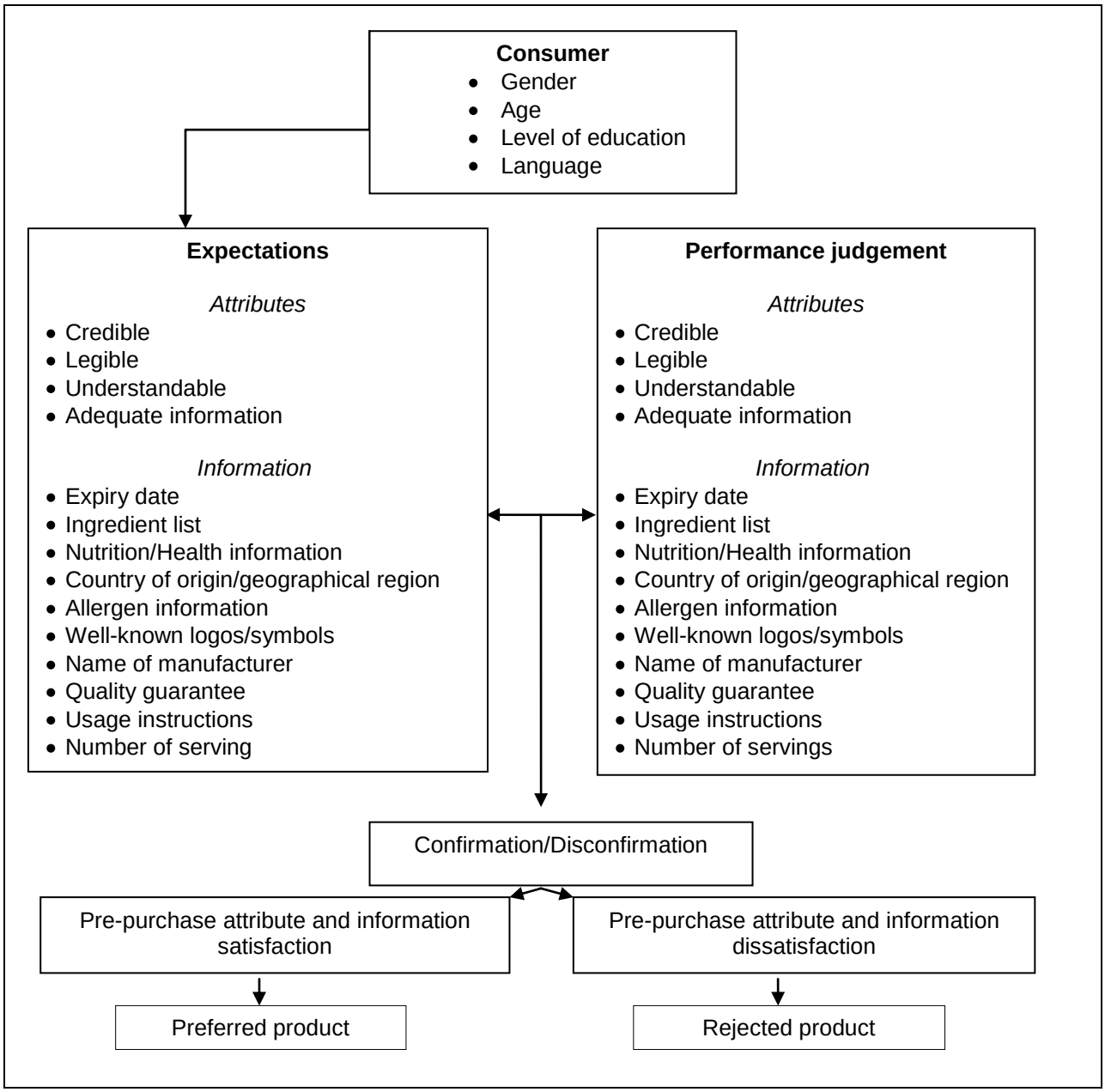


Figure 1: Conceptual framework of consumers' pre-purchase in-store satisfaction with food labels (Adapted from Engel *et al.*[13] and Spreng *et al.*[19] )

Product performance is measured in terms of the absolute level of overall product performance based on specific product attributes that are consistent with what the consumer expected to be important[15], which would inevitably be within a consumers' personal frame of reference. Based on the comparison of expected performance to actual performance of a product, consumers

therefore have positive, negative, or neutral reactions depending on whether expectations were confirmed[15]. As satisfaction with food labels infers pre-purchase satisfaction, the proposed conceptual framework (Figure 1) of this study suggests that when the performance of food labels, in terms of attributes and information, equals or exceed consumers' expectations, satisfaction with the label might indicate a preference for that product (positive reaction). On the other hand, when the performance of attributes and information on food labels fails consumers' expectations, dissatisfaction with the label might lead to rejection of the product (negative reaction).

## 3. METHODOLOGY

### 3.1 Research strategy

An exploratory research design was used in this study to gain insight into an under researched problem [25]. According to Babbie and Mouton[26], the survey approach that was chosen for this research is appropriate for exploratory research. A survey approach generates quantifiable data that can be analysed statistically to generate accurate and precise results[27] about a topic such as consumers' satisfaction with food labels.

### 3.2 Sample

As Gauteng Province reflects the heterogeneity of South Africa as a whole[23], consumers from this province was targeted to include an element of representativeness in this study. A non-probability, convenience sampling method was employed with age as the only inclusion criterion: respondents therefore had to be the lawful age of 18 years or older to participate. The Statistical Consultation Services of the North-West University recommended a sample size of 400.

### 3.3 Data collection

The questionnaire contained six sections, namely A: general food shopping and label reading practices; B: expectations of food labels (1=unimportant; 5=very important) C and D: performance judgement of food labels (1=strongly disagree; 5=strongly agree), (1=unacceptable; 5=excellent) E: the influence of food labels on consumers' product choice (1=very unlikely; 5=very likely) and F: demographic information. Section E included an open ended question for respondents to make recommendations on how current food labels can be improved to increase consumer satisfaction. Five-point Likert scales were mainly used to ease completion of the questionnaire. The questionnaire was only available in English as the researchers believed that this was the most appropriate language to use because food label information is predominantly in English and respondents would be familiar with the terms used in the questionnaire. The questionnaire was pre-tested prior to data collection on ten respondents. The study was approved by the Ethics Committee of the North-West University, Potchefstroom Campus, no. NWU-00024 – 09 – A1.

The self-administered questionnaires were distributed by the researcher in office buildings and businesses in three randomly selected regions in the Gauteng Province, using a drop-down-collect-later method during September 2010. Office buildings and business premises were randomly selected on the researchers' judgement with safety and accessibility being two major determinants[28]. For consistency and to prevent fieldworker bias, the researcher did not make use of fieldworkers to collect data. The researcher collected the questionnaires after two to four days after recurring reminders. Incentives in the form of refreshments were offered to the respondents to encourage participation.

A response rate of 70% was obtained as 400 questionnaires were distributed while a total of 279 useful questionnaires were retrieved over a three week period. Since respondents were ensured that they could withdraw at any stage, no pressure was exerted to return the rest of the questionnaires. Questionnaires that were incomplete to perform the statistical procedures were

discarded (n=25) and due to time constraints, no further effort was made to retrieve the remaining questionnaires that were not returned in time.

### 3.4 Data analysis

Data analysis was statistically performed, using Statistical Package for Social Science (SPSS) version 17 (SPSS Inc., Chicago, IL, USA) by the Statistical Consultation Services of the North-West University. The analysis of the data involved descriptive statistics, namely frequencies and means, as well as factor analysis to distinguish the elements of 'primary label information' and 'secondary label information'. In addition, inferential statistics such as dependant t-tests were done to do a gap analysis by comparing expectations (section B) and the performance (section C) of food label elements in order to deduce respondents' satisfaction. Analysis of variance (ANOVA) was performed to determine if significant differences existed in terms of respondents' expectations and performance judgement of food labels for respondents from different language groups. Because ANOVA does not indicate between which of the groups there were significant differences[29], the Tukey test was used as post hoc test to determine the significant differences between the language groups. A t-test was used to determine if significant differences existed between male and female respondents' expectations and performance judgement of food labels. Spearman's correlation coefficient was used to determine if significant relationships and pertinent differences existed between groups of different age and education categories in terms of their expectations and performance judgement of food labels.

Throughout the analysis, p-values were determined to indicate statistical significance. However due to the non-probability sample used in the present study, effect sizes were also calculated to indicate practical significance[30]. Cohen's d-values, which are the standardised difference between the means, were used to indicate practical significance between group means. In the present study, d-values of 0.5 or larger will be interpreted as an indication of practical significance as this is the expected effect size for human sciences[30]. The correlation itself is used as a measure of the strength of a relationship, where r-values of 0.3 or larger can be

interpreted as an indication of practical significance. Responses in the open ended question were categorised and coded whereafter frequency distributions were performed.

### 3.5 Validity and reliability

As the questionnaire was newly designed, procedures were thoroughly checked to ensure the validity and reliability of all the stages of the research. A thorough literature review was done on consumers' use of food labels as well as satisfaction measurement to ensure content- and construct validity[26]. To further ensure content validity of the questionnaire, it was designed by a panel of experts within the field of consumer science. After completion of the questionnaire, Statistical Consultation Services of the North-West University screened the questionnaire to ensure face validity and that it would be analysable. A small-scale pilot test with ten respondents was performed to guarantee that all relevant concepts of food labels were included and to reduce error. Factor analysis was performed to ensure construct validity in order to ensure that the clustering of items of the Likert scales were theoretically interpretable. The internal consistency and reliability of the questionnaire was statistically tested by calculating Cronbach's alpha coefficients to determine the items' relatedness to each other[31,32]. The items of the questionnaire were strongly correlated, as reliable consistencies of between 0.7 and 0.9 were obtained for all the constructs[33]. The researcher furthermore distributed and collected the questionnaires personally to reduce error and the possibility of fieldworker unreliability[26]. All statistical procedures were checked by a qualified statistician.

## 4. RESULTS AND DISCUSSION

### 4.1 Demographic characteristics

Of the 279 urban respondents, 35% were male and 65% female, who were an average age of 33 years. Only 10% of the respondents were between the ages of 51 and 67. With regard to the languages, there were more Afrikaans speaking respondents (41.8%) than English speaking

respondents (19.9%) while 38.8% of the respondents spoke African languages. This more or less reflects the language distribution of South Africa as Afrikaans is the third most widely spoken language[34] while English was the home language of only 8.2% of consumers in 2001[35]. More respondents completed secondary school at grade 12 level (29.4%) than those who had no or little education (9.7%). Respondents' with post secondary education were well represented as 21.2% were in possession of a diploma and 20.1% and 19.7% respectively held degrees and post-graduate degrees.

### 4.2 General food shopping and label reading practices

The majority of the respondents in this study indicated that they read food labels when doing food shopping (results not shown), as 19% indicated that they always, 22.2% that they mostly and 37.6% that they sometimes read food labels. The results indicated a tendency for the majority of the respondents to always (23-34%), mostly (17-31%) or sometimes (17-28%) read labels, when purchasing products for the first time, comparing different products, verifying nutrition information and considering a special diet of a household member. Only a minority of respondents indicated that they seldom (12-18%) or never (4-14%) read labels under the first three circumstances. An alarming 22% of the respondents reported that they never read labels even when considering a special diet for a household member, which contradicts previous research that reported that consumers read food labels more often when a household member is on a special diet[36]. Reasons for this discrepancy could be that the respondents in the present study either did not pay much attention to the diets of family members; that household members were not on special diets at the time of the data collection or that the younger respondents might have been single and living on their own, not having to pay attention to household members' diets. The majority of respondents were the main food purchasers for their households as 53.8% apparently always did the household food shopping. Only 1.5% of the sample was never responsible for household food shopping. The majority further indicated that they did food shopping less frequently, i.e. at maximum two to three times per month (31.5%) or once per month (26.4%). Less frequent food shopping could be due to the fact that all the respondents were employed and had limited time for household chores such as shopping. Only 45.5% of the respondents indicated that they were satisfied with food labels in general. As many as 39.6%

seemed uncertain, although they did not outright express dissatisfaction, they also did not unequivocally express satisfaction with food labels, which suggests that their judgements are indicative of some deficiency on the label that prevented them from acting affirmatively.

### 4.3 Categorisation of label information

Exploratory, Principal Axis factor analysis with Oblimin rotation was done to identify different groups of variables of label information. The same elements of information were used as items throughout the questionnaire. Table 1 is an example of the question on respondents' *believability* of information on food labels.

Table 1: Summary of exploratory factor analysis of a 10-item scale on the believability of information on food labels

| Item | Rotated factor loadings | |
|---|---|---|
| | Primary information | Secondary information |
| One can believe/trust **nutrition/health information** | .89 | |
| One can believe/trust **information on allergens** | .73 | |
| One can believe/trust **expiry dates** | .69 | |
| One can believe/trust **quality guarantees** | .67 | |
| One can believe/trust **ingredient lists** | .64 | |
| One can believe/trust well-known **logos/symbols** | | .85 |
| One can believe/trust **names of manufacturers** | | .75 |
| One can believe/trust **information on countries of origin/geographical regions** | | .70 |
| One can believe/trust information on the **number of servings** | | .63 |
| One can believe/trust **usage instructions** | | .56 |
| **Cronbach alpha** | 0.85 | 0.85 |
| **Mean** | 3.42 | 3.62 |
| **Standard deviation** | 0.79 | 0.74 |

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
Shading indicates primary information

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was used and a value of 0.8 was obtained, which indicates that the data were adequate[37]. Two factors were extracted with 63.5% of the variance explained. Throughout the factor analysis of the different sections of the questionnaire, the aforementioned pattern was repeated with regard to the information on food labels, which is also an indication of construct validity. Thus, according to the factor analysis,

the informational elements of food labels were categorised as either primary information (factor 1) or secondary information (factor 2). Primary information refers to ingredient lists, expiry dates, nutrition and health information, information on allergens and quality guarantees while secondary information refers to names of manufacturers, information on countries of origin/geographical regions, well-known logos/symbols, usage instructions and information on the number of servings.

### 4.4 Respondents' expectations of food labels

Concerning their expectations of label attributes, the indicators of importance were interpreted as means: ≥4.5 = very important; means: ≥3.5<4.5 = important; means: ≥2.5<3.5 = neutral/indifferent; means: ≥1.5<2.5 = less important and means: <1.5 = unimportant. Respondents indicated that the readability, understandability and adequacy of food labels were very important to them (means: ≥4.5), while believability seemed important (mean: =4.4) (Table 2). The majority of the respondents (67.2%) regarded the understandability of food labels as very important. Overall, little or no practical significant differences existed between respondents' consideration of the importance of food label attributes ($d$<0.5) (Table 2).

Primary information seemed significantly (statistically and practically) more important than secondary label information with a medium effect size ($p \leq 0.05$; $d$=0.7). An expiry date was the only information that seemed to be very important (mean: =4.7) for 80% of the respondents, which is consistent with Peters-Texeira and Badrie[6] who found that an expiry date is the most important food label element to consumers in Trinidad, West Indies. All other information elements were indicated to be important (means: ≥3.5<4.5).

Table 2: Respondents' expectations of food labels in terms of importance (N=279)

| ***Importance of label attributes*** | **n*** | **Mean** | **SD** | **SE** | **1 %** | **2 %** | **3 %** | **4 %** | **5 %** |
|---|---|---|---|---|---|---|---|---|---|
| The information on the food label should be believable. | 275 | 4.4 | 0.81 | 0.05 | 0.7 | 4.0 | 4.0 | 33.8 | 57.5 |
| The information on the food label should be easy to read. | 273 | 4.5 | 0.74 | 0.04 | 0.4 | 1.5 | 8.1 | 28.9 | 61.1 |
| Language used on the food label should be easy to understand. | 274 | 4.6 | 0.74 | 0.04 | 0.4 | 2.6 | 4.7 | 25.1 | 67.2 |
| There should be enough information to help me make an informed product choice. | 272 | 4.5 | 0.75 | 0.05 | 0.7 | 0.7 | 8.8 | 26.1 | 63.7 |
| ***Importance of label information*** | **n*** | **Mean** | **SD** | **SE** | **1 %** | **2 %** | **3 %** | **4 %** | **5 %** |
| **Primary information** | 276 | $4.3^{a}$ | 0.66 | 0.04 | | | | | |
| An ingredient list | 272 | 4.1 | 1.02 | 0.06 | 3.3 | 5.9 | 8.8 | 38.2 | 43.8 |
| An expiry date | 275 | 4.7 | 0.69 | 0.04 | 0.7 | 1.5 | 4.7 | 13.1 | 80.0 |
| Nutrition/health information | 272 | 4.2 | 0.91 | 0.06 | 1.1 | 4.3 | 11.8 | 34.6 | 48.2 |
| Information about allergens | 273 | 4.3 | 0.97 | 0.06 | 2.6 | 2.6 | 13.1 | 23.1 | 58.6 |
| A quality guarantee | 274 | 4.1 | 0.98 | 0.06 | 1.8 | 4.4 | 18.2 | 31.4 | 44.2 |
| **Secondary information** | 276 | $3.8^{b}$ | 0.78 | 0.05 | | | | | |
| The name of the manufacturer | 272 | 3.8 | 1.10 | 0.07 | 3.8 | 9.2 | 20.6 | 34.2 | 32.4 |
| The country of origin/geographical region | 269 | 3.5 | 1.19 | 0.07 | 7.3 | 12.3 | 28.3 | 28.3 | 23.8 |
| Well-known logos/symbols | 271 | 3.8 | 1.15 | 0.07 | 5.2 | 9.2 | 18.5 | 34.3 | 32.8 |
| Usage instructions | 272 | 4.2 | 0.97 | 0.06 | 2.2 | 5.1 | 10.3 | 34.6 | 47.8 |
| Number of servings | 269 | 3.6 | 1.18 | 0.07 | 7.8 | 7.4 | 24.5 | 33.5 | 26.8 |

n=Sample size
SD = Standard deviation
SE = Standard error
$^{a,b}$Means with different superscripts differed only with medium effect sizes
1=Unimportant 2=Slightly important 3=Neutral 4=Important 5=Very important
Effect size (Cohens' *d*): 0.2=small; 0.5=medium; 0.8=large
*df=n-1

### 4.5 Respondents' performance judgement of food labels

Performance indicators according to the means of respondents' performance judgement of food labels were categorised as means: ≥4.5 = excellent; means: ≥3.5<4.5 = good; means: ≥2.5<3.5 = uncertain; means: ≥1.5<2.5 = poor and means: <1.5 = unacceptable. Respondents indicated by their judgement of food labels (results not shown), readability as well as understandability to be good (means: ≥3.5<4.5), while respondents seemed uncertain about the believability (mean: =3.4) of food labels, but with little or no practical significant differences. In general, respondents indicated secondary information to be good (mean: =3.6) while they were uncertain about primary information (mean: =3.4), although little or no practical significant differences existed in respondents' judgement of primary and secondary food label information.

Respondents, however, did not indicate label attributes or label information to be poor or unacceptable (results not shown).

Performance indicators according to the means of respondents' judgement of the adequacy of food labels were means: ≥4.5 = strongly agree; means: ≥3.5<4.5 = agree; means: ≥2.5<3.5 = neutral; means: ≥1.5<2.5 = disagree and means: <1.5 = strongly disagree. On average, respondents were neutral in their judgement as to whether food labels contain too much (mean: =2.8) or too little information (mean: =3.3). This neutral response can be explained by the fact that almost the same percentage of respondents disagreed (34%) or were neutral (32%) that food labels contain too much information and agreed (31%) or were neutral (35%) that food labels contain too little information (results not shown). Thus, it seems that respondents in this study were unprejudiced about the adequacy of food label information which might indicate that they reckon it as sufficient to make informed product choices. The aforementioned result contradicts previous research that indicated some controversy on the amount of food label information as some found it to be insufficient[2,38,39], while others found it to be excessive[1].

### 4.6 Respondents' satisfaction with food labels

Overall, respondents seemed dissatisfied with all the food label attributes as their expectations exceeded the performance of food labels practically significantly with large effect sizes ($p \leq 0.05$; $d > 0.8$). Figure 2 indicates the comparison of means (expectations and performance) to explain respondents' dissatisfaction with attributes of food labels by means of a gap analysis within the expectancy disconfirmation paradigm. These results indicate that respondents might experience difficulty in interpreting food labels as the readability, believability, understandability and adequacy of the information is not satisfactory. This is consistent with previous research indicating that some consumers experience difficulty to understand[4], believe[2] and read food label information[1].

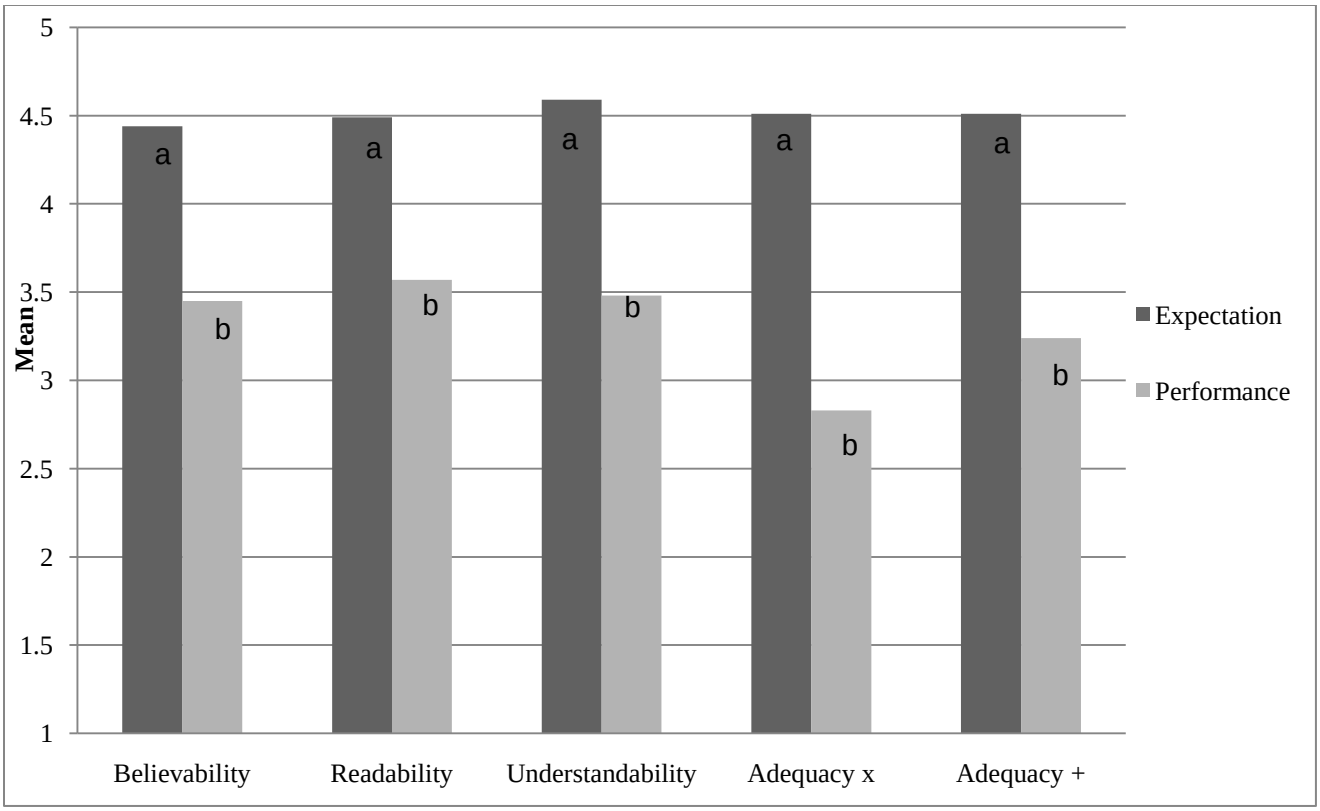


Figure 2: Gap analysis of respondents' expectations and the performance of label attributes
x Too much information
+ Too little information
[a,b]Means with different superscripts differed practically significant with a large effect size
Effect size (Cohen's d): 0.2=small; 0.5=medium; 0.8=large

On average, respondents were dissatisfied with primary label information but satisfied with secondary label information according to p-values and effect sizes (Figure 3). In the cases of the expiry date, nutrition/health information, information about allergies and the quality guarantee, the means of respondents' expectations were practically significantly greater ($p \leq 0.05$; $d > 0.8$) than the means of the performance of the abovementioned food label information which indicate dissatisfaction.

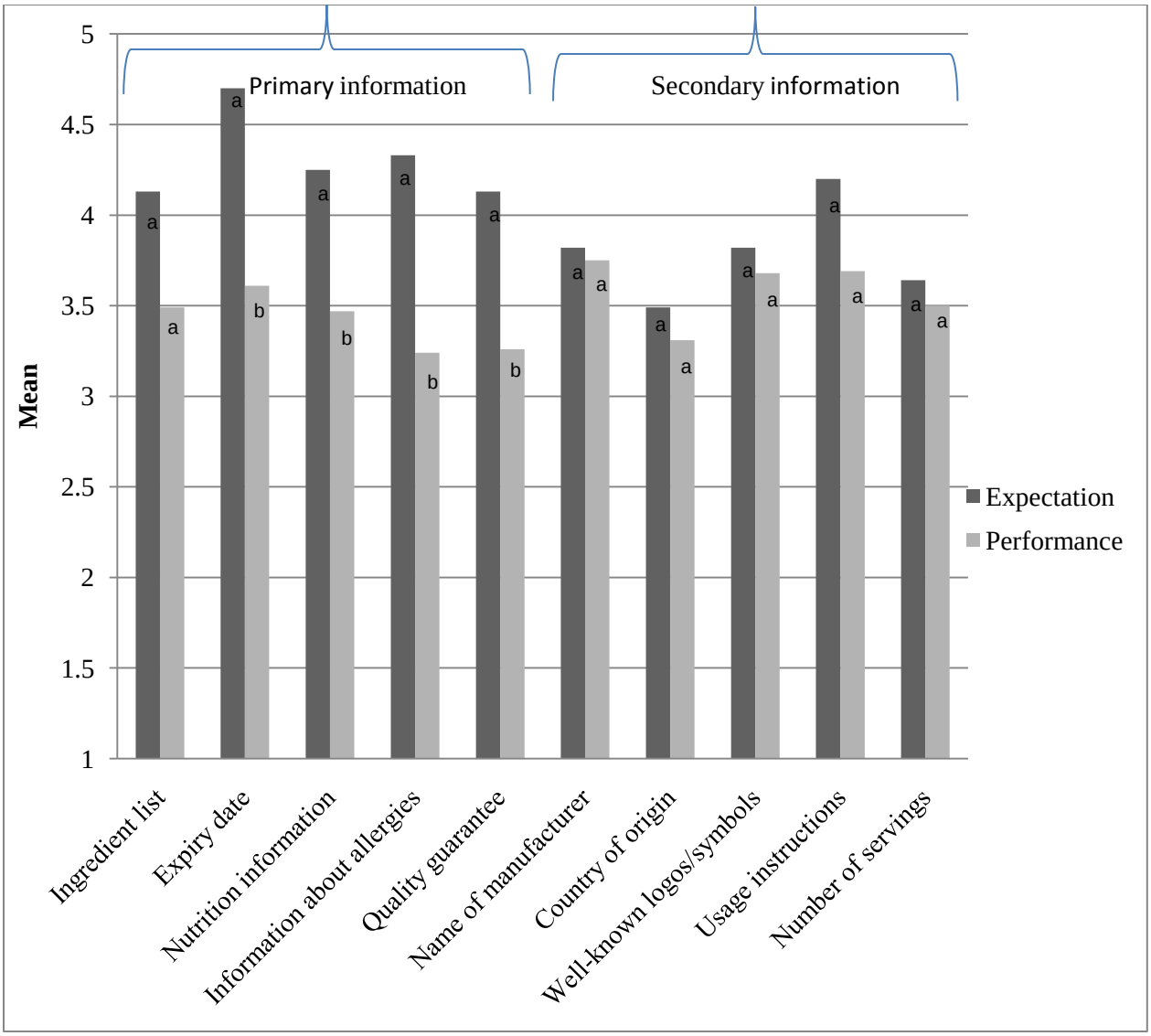


Figure 3: Gap analysis of respondents' expectations and the performance of label information

[a,b]Means with different superscripts differed practically significant with a large effect size

Effect size (Cohen's *d*): 0.2=small; 0.5=medium; 0.8=large

Respondents' expectations were not statistically significantly different from the performance in the cases of the ingredient list and all of the secondary information (Figure 3). Therefore, it can be concluded that respondents were on average satisfied with the abovementioned information of food labels according to the confirmation/disconfirmation paradigm. However, the information that respondents were dissatisfied with, imply crucial information that is required to make informed, responsible purchasing decisions considering a family's nutritional status, which is

consistent with previous research indicating that consumers are frustrated with food labels due to the absence of expiry dates[4] and confusing health/nutrition information[1]. Thus, consumers' decision-making of packaged food products might be impaired due to ineffective labelling. Although 45% of the respondents in this study indicated that they are satisfied with current food labels in general, the abovementioned results show that respondents were only partially satisfied with food labels.

### 4.7 The influence of food label elements on respondents' product choice

The means pertaining to an investigation of the influence of food label elements on product choice were interpreted as follows: means: ≥4.5 = very likely; means: ≥3.5<4.5 = possibly; means: ≥2.5<3.5 = uncertain; means: ≥1.5<2.5 = unlikely and means: <1.5 = very unlikely. Respondents indicated all label attributes to possibly have an influence on their product choices (means: ≥3.5<4.5) (Table 3). This result is consistent with Silayoi and Speece[1], who found that information that is properly communicated, creates a significant impact on consumers' product choice. The effectiveness of food labels is greatly reduced if consumers are unable to evaluate the information[9] which will lead consumers to ignore the information or even reject the product in favour of another product on which information is more effectively communicated[1].

Respondents further indicated that all the measured information on food labels possibly has an influence on their product choice (means: ≥3.5<4.5) except for the country of origin/geographical region which they were uncertain about (mean: =3.4). Respondents indicated that primary information had a statistically greater influence, but only with medium effect (thus not practically significant), on their product choice than secondary information ($p \leq 0.05$; $d=0.5$) (Table 3). Consistent with these findings, Kempen *et al*.[8] found that nutrition information, ingredient lists and expiry dates could have a reasonable impact on food product choice. The majority of the respondents (70%) indicated that the expiry date was very likely to influence their product choice (Table 3). The results concerning the likelihood of an expiry date to influence respondents' product choice is consistent with previous findings in the present study as the expiry date was the only information element indicated to be very important.

Table 3: The influence of food labels on respondents' product choice (N=279)

| Items | n* | Mean | SD | SE | 1 % | 2 % | 3 % | 4 % | 5 % |
|---|---|---|---|---|---|---|---|---|---|
| ***Label attributes*** | 276 | 3.9[ab] | 0.80 | 0.05 | | | | | |
| The believability of information on food labels | 275 | 4.0 | 1.03 | 0.06 | 2.5 | 9.8 | 10.0 | 44.0 | 32.8 |
| The readability of information on food labels | 274 | 4.0 | 0.44 | 0.03 | 1.5 | 7.7 | 12.7 | 46.7 | 31.4 |
| The understandability of information on food labels | 272 | 4.0 | 0.98 | 0.06 | 1.1 | 9.9 | 11.4 | 43.4 | 34.2 |
| The amount of information on food labels | 274 | 3.8 | 0.96 | 0.06 | 1.1 | 9.9 | 23.0 | 41.6 | 24.5 |
| **Primary information** | 276 | 4.0[a] | 0.75 | 0.05 | | | | | |
| An ingredient list | 274 | 3.9 | 1.00 | 0.06 | 1.8 | 9.5 | 14.6 | 43.1 | 31.0 |
| An expiry date | 271 | 4.4 | 0.85 | 0.05 | 1.5 | 3.0 | 6.3 | 28.2 | 70.0 |
| Nutrition/health information | 271 | 4.0 | 0.98 | 0.06 | 1.1 | 9.3 | 12.5 | 40.6 | 36.5 |
| Information about allergies | 272 | 3.9 | 1.10 | 0.07 | 2.9 | 9.9 | 20.3 | 30.9 | 36.0 |
| A quality guarantee | 271 | 4.0 | 1.06 | 0.06 | 3.0 | 7.8 | 17.3 | 35.4 | 36.5 |
| **Secondary information** | 276 | 3.7[b] | 0.78 | 0.05 | | | | | |
| The name of the manufacturer | 272 | 3.7 | 1.11 | 0.07 | 5.9 | 8.8 | 22.1 | 39.7 | 23.5 |
| The country of origin/geographical region | 274 | 3.4 | 1.13 | 0.07 | 6.2 | 15.7 | 27.0 | 33.6 | 17.5 |
| Well-known logos/symbols | 272 | 3.8 | 1.06 | 0.06 | 4.0 | 8.5 | 19.1 | 40.8 | 27.6 |
| Usage instructions | 273 | 3.9 | 0.98 | 0.06 | 1.5 | 9.2 | 15.4 | 42.8 | 31.1 |
| Number of servings | 274 | 3.6 | 1.12 | 0.07 | 5.5 | 12.8 | 21.9 | 38.3 | 21.5 |

n=Sample size
SD = Standard deviation
SE= Standard error
*df=n-1
1=Very unlikely 2=Unlikely 3=Uncertain4=Possibly 5=Very likely
[a,b]Means with different superscripts differed practically significantly with medium effect sizes
Effect size (Cohen's *d*): 0.2=small; 0.5=medium; 0.8=large

## 4.8 The influence of demographic characteristics on respondents' expectations and judgement of food labels

### 4.8.1 Gender

Gender did not have a significant influence on respondents' expectations or performance judgement of food labels as no statistically or practically significant differences existed between male and female respondents ($p>0.05$; $d<0.2$) (results not shown). This result is contradictory to previous research indicating that gender has a prominent effect on the use and importance of food labels with food labels being more important to female (frequent label users) than male consumers[(36,40)]. However, the results of the present study can be substantiated by the changing roles of women and men within households. Working women is an increasing phenomenon in

South Africa which results in more men being responsible for household responsibilities such as grocery shopping[34], indicating that food labels might be of increasing importance to men.

### 4.8.2 Age

Age did not have any significant relationship with respondents' expectations of secondary label information or their performance judgement of both primary and secondary food label information ($p>0.05$). The only significant relationship, although not practically significant ($r=0.15$), was found between age and respondents' expectations of primary food label information ($p=0.02$) (results not shown). Contrary to former research, there was no correlation between age and the performance of the readability of food labels. Previous researchers reported that the elderly usually experience difficulty in reading food labels due to small fonts and dense writing styles[1,41]. The relatively young age of respondents might explain why no practically significant differences were found in the present study as the average age of respondents was 33 years and only 10% of the respondents were between the ages of 51 and 67.

### 4.8.3 Education

The only statistical significant relationship ($p\leq0.000$; $r=-0.3$) was between respondents' level of education and the performance judgement of the adequacy of primary label information, yet with a medium effect size (Table 4). This correlation was negative, thus as respondents' level of education increased, the performance judgement of the adequacy of primary label information tended to decrease. Therefore, it can be said that respondents' with a higher level of education tended to have higher expectations of food labels. Du Plessis and Rousseau[23] revealed that South African consumers with high levels of education are informed, knowledgeable and health conscious which might explain why they seek more information on food labels than consumers with lower levels of education. There were, however, no practically significant correlations between respondents' level of education and any other expectations or performance judgements of food label elements.

Table 4 Spearman's correlation coefficient: The influence of respondents' level of education on their expectations, and performance judgement of food labels (N=279)

| Food label elements | n | Correlation coefficient (r) | P-value (2-tailed) |
|---|---|---|---|
| Expectations: Primary information | 269 | 0.15 | 0.810 |
| Performance: Readability of primary information | 268 | -0.19 | 0.002 |
| Performance: Understandability of primary information | 268 | -0.20 | 0.001 |
| Performance: Believability of primary information | 269 | -0.18 | 0.004 |
| Performance: Adequacy of primary information | 269 | -0.30 | 0.000 |
| Judgement of primary information | 269 | -0.23 | 0.000 |
| Judgement of secondary information | 269 | -0.10 | 0.109 |
| Performance: Adequacy of secondary information | 269 | -0.08 | 0.184 |
| Performance: Believability of secondary information | 269 | -0.09 | 0.167 |
| Performance: Understandability of secondary information | 268 | -0.08 | 0.179 |
| Performance: Readability of secondary information | 266 | -0.18 | 0.003 |
| Expectations: Secondary information | 268 | 0.01 | 0.917 |
| Age | 269 | 1.000 | |

n=sample size
Statistical significant difference: $p \leq 0.05$
Effect size (r): 0.1=small; 0.3=medium; 0.5=large

### 4.8.4 Language

The only statistically significant difference with a tendency of practical significance was between the performance judgement of the readability of primary food label information with a medium effect size ($p \leq 0.05$, $d=0.5$). Thus, respondents who spoke African languages tended to judge readability of primary food label information to be significantly better than Afrikaans and English speaking respondents (Table 5). On average, no other practical significant differences were found for other food label elements.

These results might be explained as Afrikaans and English (Eurocentric) speaking respondents might have tended to judge the performance of readability of primary information to be poorer than respondents speaking African languages, as Eurocentric consumers might be more easily discontent[34]. One can therefore assume that respondents speaking African languages might be

more enduring and consequently tended to judge the readability of primary label information to be better than their Afrikaans and English speaking counterparts.

Referring to the understandability of food labels, some contradiction is evident in the abovementioned finding as African languages are difficult to translate into other languages while maintaining the meaning[23]. According to Alexander[24], not being able to use one's mother tongue in every situation or encounter is disempowering. Thus, respondents speaking African languages would have been expected to judge the performance of understandability of food labels to be lower than English speaking respondents due to possible confusion in the English-dominated market environment.

Table 5 One-way ANOVA analysis: Mean differences in respondents' expectations, and performance judgement of food labels based on their language (N=279)

| | **English** | | **Afrikaans** | | **African languages** | | MSE | P-value ANOVA |
|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | | |
| Expectations: Primary information | 4.2 | 0.71 | 4.3 | 0.65 | 4.4 | 0.63 | 0.43 | 0.384 |
| Readability Primary information | 3.2[b] | 0.83 | 3.2[b] | 0.74 | 3.6[a] | 0.81 | 0.61 | 0.00 |
| Understandability primary information | 3.5 | 0.59 | 3.5 | 0.62 | 3.7 | 0.79 | 0.47 | 0.168 |
| Believability primary information | 3.3 | 0.66 | 3.4 | 0.65 | 3.6 | 0.92 | .058 | 0.074 |
| Adequacy primary information | 3.5 | 0.66 | 3.5 | 0.62 | 3.7 | 0.83 | 0.51 | 0.026 |
| Performance primary information | 3.3 | 0.60 | 3.3 | 0.63 | 3.6 | 0.8 | 0.48 | 0.003 |
| Performance secondary information | 3.6 | 0.54 | 3.6 | 0.59 | 3.7 | 0.72 | 0.40 | 0.487 |
| Adequacy secondary information | 3.6 | 0.53 | 3.6 | 0.58 | 3.6 | 0.76 | 0.42 | 0.825 |
| Believability secondary information | 3.7 | 0.68 | 3.7 | 0.65 | 3.6 | 0.8 | 0.52 | 0.827 |
| Understandability secondary information | 3.9 | 0.56 | 3.7 | 0.6 | 3.7 | 0.78 | 0.45 | 0.254 |
| Readability secondary information | 3.7 | 0.67 | 3.5 | 0.65 | 3.8 | 0.74 | 0.48 | 0.013 |
| Expectations: secondary information | 3.8 | 0.74 | 3.7 | 0.69 | 3.8 | 0.81 | 0.56 | 0.560 |

SD = Standard deviation
MSE= Mean square error of ANOVA
Statistical significant difference: $p \leq 0.05$
[a,b]Means with different superscripts differed statistically significantly with practically medium effect sizes only
Effect size (Cohen's *d*): 0.2=small; 0.5=medium; 0.8=large

### 4.9 Respondents' recommendations for the improvement of food labels

A total of 160 respondents spontaneously made use of the opportunity to provide recommendations on how current food labels can be improved which are discussed in this section. Twenty two percent (n=35) of the respondents recommended the improvement of expiry dates. Recommendations to improve expiry dates involved the printing (*"The expiry date should not be printed with an invisible or black ink but be printed like the logo"*); the visibility and positioning (*"Expiry dates are incredibly important to me, make sure that you don't have to search for the info"*) and the credibility (*"Make sure the expiry dates are correct"*). Previous results of the present study showed that the expiry date was the only information element that respondents rated as "very important" while respondents also indicated that they were dissatisfied with expiry dates. Therefore, this result confirms that respondents in this study expressed a need for improvements on expiry dates.

In terms of the improvement of the understandability of food labels, only 19% (n=31) of the respondents made recommendations. Recommendations to improve understandability included the simplification of linguistics on food labels *("Information must be provided in laymens term. Most of the time labels are too complicated to truly make informed choices about healthy options"*); understandability in general (*"Provide information that be easy understandable"*); understandability of nutrition information and ingredient lists *("Understandable ingredient list and nutritional information."*; *"To put down the ingredients in the understandable language, not with those bombastic words not all of us are good with those words"*) as well as the language used on food labels (*"I will suggest the manufacturers they must try and write the instructions on three different language for example Zulu, English and Afrikaans"*).

To improve the readability of food labels, only 17% (n=27) of the respondents made recommendations. Recommendations to improve the readability of food labels included amendments to font sizes and writing styles (*"Please enlarge the printing on the label for people that can't see the small printing"*) as well as to improve the readability of specific information ("*List ingredients in readable font size"*).

In terms of the adequacy of food labels, only 16% (n=26) of respondents made recommendations to increase information of which the majority held post-graduate degrees (42%) (n=11) as highest qualification. This result is consistent with previous results in this study as a correlation existed between respondents' level of education and performance judgement of the adequacy of food labels. Thus, this result confirms that the respondents with higher levels of education tended to seek more information on food labels. Recommendations to improve the adequacy of food labels included the increase of health and nutrition information as well as ingredient information (*"I would like to see more info on nutrition and health issues, i.e. fat, fibre etc. content"*; *"Clear indication of animal products in ingredients e.g. animal rennet not suitable for vegetarians"*); the increase of information on serving sizes (*"As an African, we battle a lot with serving-size calculations, so more information regarding calculations might help"*) as well as general recommendations to improve adequacy *("Don't worry about the design and overlook all of product but rather let all the important information be on the labels"*). Only 2% (n=3) of the respondents made recommendations to decrease the information on food labels such as *"Keep it simple and to the point. Just enough information to make informed decision"*.

Only 10% (n=16) of the respondents made recommendations to improve the credibility of food labels. Recommendations included aspects about the general credibility of food labels (*"Be honest so that consumers can trust what is being written on the labels"*) as well as the credibility of nutrition information and ingredient lists (*"Honesty about the ingredients because of health matters"*).

The improvement of information on allergens was reported by 9% (n=14) of the respondents. Recommendations included the improvement of allergen information in general ("*Mainly improve information about allergies*"); the improvement of visibility of allergen information (*"Put the names of information on allergies very big on the label, preferably on the front and in bright colours!"*) as well as the improvement of the understandability of allergen information (*"Always have the allergies described in good language that everybody can understand"*).

In terms of the design of current food labels, 5% (n=8) of the respondents who made recommendations suggested that the format (*"Problem is that different food labels display different info – makes it difficult to compare. A 'standardized' version could make things easier in comparing before buying"*) and graphic representations (*"Logo design can include more information, instead of excessive copy"*) of current food labels should be improved.

In summary, not many respondents took the time and opportunity to make recommendations on how to improve food labels. However, one may assume that those who did, felt strongly about whatever they were concerned about and therefore cognisance should be taken of their recommendations. In terms of the attributes of food labels, respondents recommended: easier readable as well as more understandable and credible food labels. Although previously in the present study respondents indicated that information on food labels were adequate, respondents recommended that more information especially on health and nutrition and serving sizes for South Africans should be portrayed on food labels. Yet, the implementation to increase label information is difficult as space is limited and the readability of information could be compromised.

The information on food labels that respondents singled out to be improved was expiry dates and information about allergens. Therefore expiry dates and allergen information should be reflected in a bigger font on the front-of-package label for easy access and to ease consumers' decision-making. In addition, the most important information, such as allergen information should be in more than one national language to ensure that more consumers would understand the information. This confirms previous findings in the present study as respondents indicated to be dissatisfied with both expiry dates and information about allergens.

A standardised format with consistency of information on food labels should be implemented in South Africa. Although regulations stipulate what information should be portrayed on food labels, it is believed that when all food products within a specific category have the same

information portrayed in the same format, consumers would be more satisfied with food labels and they would be able to make more informed product choices. Information should be reflected on all food labels in an easy readable format using simple terminology. Colour differentiation and pictorial elements might also be implemented, especially to better inform consumers about nutrition aspects and serving sizes.

## 5. CONCLUSION

In the present study, the majority of the consumers indicated that they do read food labels as the information is used to assist them in finding a product consistent with their needs. Although consumers indicated that all information on food labels is important, they distinguished primary information as being more important than secondary information. Thus, consumers generally have higher expectations of primary information (ingredient lists, expiry dates, nutrition and health information, allergen information and quality guarantees) than of secondary food label information (names of manufacturers, information on countries of origin/geographical regions, well-known logos/symbols, usage instructions and information on the number of servings). Primary information is considered crucial in diet planning and overall consumer well-being and should therefore be regarded as such by food regulators and manufacturers. Consumers were uncertain about the primary information on food labels while secondary information was judged to be good, which confirms that consumers were more concerned about the adequacy of primary food label information. Accepting that a food label has limitations in terms of size, it therefore seems crucial that at least the design of primary information on food labels should be addressed. Especially the believability, readability, understandability and adequacy of primary information should be adapted in order to meet or exceed consumers' expectations.

Although neither label attributes nor label information was judged to be poor or unacceptable, the results of the study suggest that consumers are only partially satisfied with food labels. The findings and recommendations of this study may not directly be implemented to change the

labelling regulations, but it is, however, an indication to retailers and manufacturers on how dis/satisfied consumers are with food labels. Results furthermore show that primary information has a greater influence on consumers' product choice than secondary label information. Thus, a product with effectively communicated primary information might have a better chance of being selected because it meets consumers' needs and expectations and reduces risk perception. Thus, retailers and manufacturers might benefit from improving food labels in accordance to consumers' needs, as more effective food labels can result in an increase in sales and profit. The improvement of food labels can therefore be considered as a potentially mutual beneficial assignment – to consumers as well as retailers and manufacturers.

Demographic characteristics of respondents had little effect on their expectations and performance judgement of food labels, which confirms the importance of food labels across all consumer groups, even in a diverse consumer market such as in South Africa. Due to the quantitative nature of this study, an in-depth understanding of the heterogeneous sample in terms of their demographic characteristics and subsequent different expectations, performance judgement and satisfaction with food labels were intricate to investigate. A follow-up qualitative approach might be useful to fully explore consumers' expectations, performance judgement and consequent satisfaction with food labels which might have not been observed by this exploratory study which followed a quantitative approach. In addition, the sample used in this study was relatively small and research was conducted in an urban area, therefore the results of this study cannot be generalised to the entire South African population. A large scale study which includes both rural and urban areas is therefore recommended for future research on consumers' satisfaction with food labels. A probability sampling method should also be considered when a representative sample is required. When a future quantitative approach is used, interviewer administered questionnaires in more than one national language should be considered as some consumers might experience difficulty in reading and writing in a language other than their mother tongue, which might be the reason for a number of the incomplete self-administered questionnaires in the present study.

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# *Chapter 4*

# *Concluding discussion*

## 4.1 INTRODUCTION

In this final chapter, a summary of the main findings will be presented. As the results of this study have previously been discussed, only general conclusions will be drawn in the present chapter. Based on the results of this study, recommendations will further be made to food manufacturers and regulators on how to improve current food labels whereafter the implications and limitations of the study will be discussed.

## 4.2 CONCLUSION

Due to the diversity of the South African consumer market, research on their behaviour and especially decision-making might add valuable insight into how to improve the retail environment to better satisfy consumers' needs. During a typical store encounter when doing food shopping, consumers are confronted with several marketing stimuli including food labels. Because of technological advances in the food industry and consumers' increased health and environmental awareness, food labels have become fundamental in pre-purchase in-store decision-making of packaged food products. Not only do food labels provide consumers with essential information on nutritional content, allergens and expiry dates, they also act as the medium of comparison on which consumers base their product choices, especially during rational decision-making. Food labels thus have an important communicative function and the information and how it gets portrayed on these labels should be satisfactory to consumers. Therefore, this study aimed to explore and describe consumers' satisfaction with food labels by a comparison of their expectations and performance judgement within the confirmation/disconfirmation paradigm.

Respondents generally had higher expectations of primary information as it was indicated to be more important than secondary information. Respondents furthermore judged secondary

information to be good while they were uncertain about primary information, possibly because they had higher expectations of primary information. Although respondents did not judge food labels to be poor or unacceptable, the results of this study showed that respondents were only partially satisfied with food labels. They were satisfied with secondary information (name of manufacturer, well-known logos/symbols, country of origin/geographical region, usage instructions and number of servings) as their expectations met the performance thereof. Respondents were, however, dissatisfied with primary information (ingredient lists, expiry dates, health and nutrition information, information about allergens and quality guarantees) as well as label attributes (believability, readability, understandability and adequacy) as their expectations exceeded the performances thereof.

This study also aimed to explore the influence of food labels on consumers' product choice and the results of this study showed that primary information tends to be more likely than secondary information to influence respondents' product choice. When consumers are satisfied with effectively communicated primary information, a food product might have a better chance of being selected. Therefore, it can be concluded that consumers' satisfaction or dissatisfaction with certain information on food labels inevitably influenced their product choice.

The influence of demographic characteristics on respondents' expectations and performance judgement were also determined in the present study. In general, demographics had little influence on respondents' expectations and judgement of food labels. It was found that gender as well as age did not have any influence on respondents' expectations or performance judgement of food labels. However, respondents speaking African languages tended to judge the readability of primary label information to be better than respondents speaking Afrikaans or English. Furthermore, respondents with a higher level of education tended to judge the adequacy of primary label information not to be as good as consumers with a lower level of education, which might indicate that consumers with higher levels of education seek more information on food labels.

Lastly, although quantitative, this study aimed to make recommendations to regulators and manufacturers on how food labels could be improved and therefore provided the opportunity for respondents to spontaneously make recommendations. The majority of the respondents who

made recommendations requested that expiry dates, the understandability, adequacy as well as legibility of food labels should be improved. A number of the respondents made recommendations to improve information about allergens as well as the credibility of food labels while a few made recommendations to improve the design.

## 4.3 RECOMMENDATIONS

Based on the results of the present study, primary information and the way primary information gets portrayed on food labels should be the focus of regulators and manufacturers. Primary information could, for example, be printed in a standardised, bigger font than secondary information and should at all times be easy readable, credible, comprehensive but short and written in simple and understandable language. Furthermore, primary information, especially expiry dates (non-removable print) and allergen information should be reflected in a bigger font, preferably on the front-of-package label for easy location. Information, such as allergen information which is essential for consumer well-being, should be in more than one national language, specifically an African language, to ensure that the majority of consumers understand the information.

Although the researcher recommends that more information be displayed on food labels, the implementation thereof is difficult, as space is restricted and the readability of information could be compromised. Based on the results of this study, it is believed that when all food products within a specific category have the exact same information portrayed in the same format, consumers would be more satisfied with food labels and they would be able to make more informed product choices. In conclusion, colour differentiation and pictorial elements might be implemented, especially to better inform consumers about nutrition and health information as well as serving sizes.

## 4.4 IMPLICATIONS

Consumers' needs and recommendations to improve food labelling should be adhered to by regulators and manufacturers. When consumers are better informed by effective and consistent labelling, their satisfaction could increase, and improved food labels might empower consumers

to make better, healthier and quicker product decisions in-store. As the South African Department of Health aims to educate consumers on health and nutrition matters via food label information, their efforts might also be more successful when food labels are improved to effectively communicate such information over a broad socio-economic spectrum. Manufacturers and retailers might also benefit from improved food labels as products that are labelled according to consumers' expectations might have a competitive advantage over other products within the same product category. Therefore sales and profit for manufacturers and retailers might be enhanced by improving current food labels.

## 4.5 LIMITATIONS

Due to the quantitative nature of this study, an in-depth understanding of consumers' expectations, judgement and consequent satisfaction with current food labels was difficult. Therefore, a future qualitative approach using focus groups or interviews might be useful to fully explore consumers' satisfaction with food labels which might have not been observed by a quantitative approach. In addition, the non-probability sample used in this study was relatively small and research was conducted only in Gauteng which is an urban area, therefore the results of this study cannot be generalised to the greater South African population. A larger scale study where respondents are selected by a probability sampling method in both rural and urban areas is therefore recommended for future research on consumers' satisfaction with food labels. For potential quantitative research, a questionnaire in more than one official language might be considered as a number of questionnaires in the present study were incomplete, possibly due to language barriers.

# Addendum A: Letter of consent to participate in the research project

NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT

***LETTER OF CONSENT***

**TITLE OF THE RESEARCH STUDY:**

**Consumer satisfaction with food labels during the pre-purchase in-store evaluation: a study in Gauteng**

Dear Mr. /Mrs. /Miss Date …/ …/2010

**THE AIM AND NATURE OF THE RESEARCH STUDY:**

The aim of this research study is to explore consumers' satisfaction with food labels during their in-store evaluation process. Questionnaires will be used to gather data for this study which will be completed at selected offices and business premises in Gauteng.

**RESEARCH PROCEDURE:**

1) You will be asked to complete a questionnaire which is aimed at exploring consumers' satisfaction with food labels.
2) The questionnaire will take approximately 15 minutes to complete.
3) All data gathered during this study will be handled and stored confidentially and only the members of the research study will have access to the data. Data published in theses or journals will not contain any information which may result in the identification of respondents. Therefore, your anonymity is assured.
4) It is possible that you may not derive any benefit personally from your participation in the study, although the knowledge gained by means of the study may benefit other persons or communities.
5) By agreeing to take part in the study, you are also giving consent that data generated to be used by the researchers for scientific purposes as they see fit, with the caveat that it will be confidential and that your name will not be linked to any of the data.

**POSSIBLE BENEFITS OF THE STUDY**

The present study will provide insight regarding consumers' satisfaction and use of food labels which will then be utilised to suggest amendments in designing more consumer friendly food labels. This study can also help establish consumer education programmes aimed at promoting healthy food choices.

**INFORMATION**

Should you require more information, please do not hesitate to contact Nadia Prinsloo, (Masters Degree student) at 083 306 9298 or Prof. Daleen van der Merwe (study leader) at 018 299 2470.

**WITHDRAWAL OF PARTICIPATION**

Participation in the study is completely voluntary and you are free to withdraw from the study at any time, without stating reasons and you will in no way be harmed by doing so. However, you are kindly requested not to withdraw from the study without careful consideration.

**DECLARATION OF CONSENT**

I, the undersigned _____ (Full names and surname) have read through the information provided about the research study and declare that I fully understand the content thereof. I hereby voluntarily agree to participate in the study. I would hereby like to exempt the University or any employee or any student of the University from any liability which I might incur during this study.

I furthermore waive my right to institute any claims whatsoever against the University which may arise during the running of the study or the conduct of any person involved in the study, except for claims arising from the negligent conduct of the University or its employees or students.

Signature of the respondent:_____

Signed at_____on the _____day of _____2010

# Addendum B: Questionnaire

**SECTION A: GENERAL FOOD SHOPPING**

**Please mark the appropriate <u>empty</u> boxes on the <u>left</u>, for example:**

| | | |
|---|---|---|
| **X** | **I live in Gauteng** | **1** |
| | **I live elsewhere** | **2** |

**Example**

| **1. When doing food shopping, how often do you read food labels? (Mark one option only)** | | **For office use only** |
|---|---|---|
| | Always | 1 |
| | Mostly | 2 |
| | Sometimes | 3 |
| | Seldom | 4 |
| | Never | 5 |
| **IF YOU INDICATED ALWAYS/MOSTLY/SOMETIMES/SELDOM, PLEASE CONTINUE WITH THE REST OF THE QUESTIONNAIRE** | | |

| **2. How often do you do food shopping? (Mark one option only)** | | |
|---|---|---|
| | Once a month | 1 |
| | Maximum 2-3 times a month | 2 |
| | Maximum once a week | 3 |
| | More than once a week | 4 |
| | Every day | 5 |

| **3. Who is responsible for doing food shopping in your household?**<br>**Please mark on the appropriate numbered option (Always/Mostly/Sometimes/Seldom/Never) for <u>each</u> of the following with an X** | | **Never** | **Seldom** | **Sometimes** | **Mostly** | **Always** | |
|---|---|---|---|---|---|---|---|
| 3.1 | I myself | 1 | 2 | 3 | 4 | 5 | 1 |
| 3.2 | My spouse/partner | 1 | 2 | 3 | 4 | 5 | 2 |
| 3.3 | My child/children | 1 | 2 | 3 | 4 | 5 | 3 |
| 3.4 | Other (please specify) | | | | | | 4 |

| Please mark on the appropriate numbered option (Always/Mostly/Sometimes/Seldom/Never) for <u>each</u> of the following with an X: **4. Do you use food label information** | | Never | Seldom | Sometimes | Mostly | Always | |
|---|---|---|---|---|---|---|---|
| 4.1 | when buying a product for the first time? | 1 | 2 | 3 | 4 | 5 | 1 |
| 4.2 | when comparing two different brands of the same product? | 1 | 2 | 3 | 4 | 5 | 2 |
| 4.3 | when verifying nutrition information on the package? | 1 | 2 | 3 | 4 | 5 | 3 |
| 4.4 | when someone in your household is on a special diet? | 1 | 2 | 3 | 4 | 5 | 4 |
| 4.5 | Other (please specify) | | | | | | 5 |

| **5. How satisfied are you with food labels in general?** **Please mark on the appropriate numbered option (Very dissatisfied/Dissatisfied/Neutral/Satisfied/Very satisfied) with an X.** | Very dissatisfied | Dissatisfied | Neutral/Indifferent | Satisfied | Very satisfied | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 1 |

**SECTION B: YOUR EXPECTATIONS OF FOOD LABELS: Please mark on the appropriate numbered option (Unimportant/Slightly important/Neutral/Important/Very Important) with an X.**

| **6. Concerning your <u>expectations</u> of food labels, <u>how important</u> are <u>each</u> of the following *criteria* to you?** | Unimportant | Slightly important | Neutral/Indifferent | Important | Very important | |
|---|---|---|---|---|---|---|
| The information on the food label should be **believable.** | 1 | 2 | 3 | 4 | 5 | 1 |
| The information on the food label should be easy to **read**. | 1 | 2 | 3 | 4 | 5 | 2 |
| Language used on the food label should be easy to **understand**. | 1 | 2 | 3 | 4 | 5 | 3 |
| There should be enough information to help me make an informed product choice. | 1 | 2 | 3 | 4 | 5 | 4 |

| **7. Concerning your <u>expectations</u> of food labels, <u>how important</u> is the following *information* to you?** | **Unimportant** | **Slightly important** | **Neutral/Indifferen** | **Important** | **Very important** | |
|---|---|---|---|---|---|---|
| An ingredient list. | 1 | 2 | 3 | 4 | 5 | 1 |
| An expiry date. | 1 | 2 | 3 | 4 | 5 | 2 |
| Nutrition/health information. | 1 | 2 | 3 | 4 | 5 | 3 |
| Information about allergies. | 1 | 2 | 3 | 4 | 5 | 4 |
| A quality guarantee. | 1 | 2 | 3 | 4 | 5 | 5 |
| The name of the manufacturer. | 1 | 2 | 3 | 4 | 5 | 6 |
| The country of origin/geographical region. | 1 | 2 | 3 | 4 | 5 | 7 |
| Well-known logos/symbols, (for example heart foundation and halaal.) | 1 | 2 | 3 | 4 | 5 | 8 |
| Usage instructions. | 1 | 2 | 3 | 4 | 5 | 9 |
| Number of servings. | 1 | 2 | 3 | 4 | 5 | 10 |

**SECTION C: PERFORMANCE OF FOOD LABELS: Please mark on the appropriate numbered option (Strongly disagree/Disagree/Neutral/Agree/Strongly agree) with an X.**

| **8. Based on your experience of food labels, how would you describe the <u>readability</u> of food labels in general?** | **Strongly disagree** | **Disagree** | **Neutral** | **Agree** | **Strongly agree** | |
|---|---|---|---|---|---|---|
| **Ingredient lists** are clearly readable. | 1 | 2 | 3 | 4 | 5 | 1 |
| **Expiry dates** are clearly readable. | 1 | 2 | 3 | 4 | 5 | 2 |
| **Nutrition/health information** is clearly readable. | 1 | 2 | 3 | 4 | 5 | 3 |
| Information about **allergies** is clearly readable. | 1 | 2 | 3 | 4 | 5 | 4 |
| **Quality guarantees** are clearly readable. | 1 | 2 | 3 | 4 | 5 | 5 |
| The **names of manufacturers** are clearly readable. | 1 | 2 | 3 | 4 | 5 | 6 |
| The **countries of origin/geographical regions** are clearly readable. | 1 | 2 | 3 | 4 | 5 | 7 |
| Well-known **logos/symbols**, (for example heart foundation and halaal) are clearly readable. | 1 | 2 | 3 | 4 | 5 | 8 |
| **Usage instructions** are clearly readable. | 1 | 2 | 3 | 4 | 5 | 9 |
| The **number of servings** is clearly readable. | 1 | 2 | 3 | 4 | 5 | 10 |

| **9. Based on your experience of food labels, how would you describe the <u>understandability</u> of food labels in general?** | **Strongly disagree** | **Disagree** | **Neutral** | **Agree** | **Strongly agree** | |
|---|---|---|---|---|---|---|
| **Ingredient lists** are easy to understand. | 1 | 2 | 3 | 4 | 5 | 1 |
| **Expiry dates** are easy to understand. | 1 | 2 | 3 | 4 | 5 | 2 |
| **Nutrition/health information** is easy to understand. | 1 | 2 | 3 | 4 | 5 | 3 |
| Information about **allergies** is easy to understand. | 1 | 2 | 3 | 4 | 5 | 4 |
| **Quality guarantees** are easy to understand. | 1 | 2 | 3 | 4 | 5 | 5 |
| The **names of manufacturers** are easy to understand. | 1 | 2 | 3 | 4 | 5 | 6 |
| Information on **countries of origin/geographical regions** is easy to understand. | 1 | 2 | 3 | 4 | 5 | 7 |
| Well-known **logos/symbols**, (for example heart foundation and halaal) are easy to understand. | 1 | 2 | 3 | 4 | 5 | 8 |
| The **usage instructions** are easy to understand. | 1 | 2 | 3 | 4 | 5 | 9 |
| Information on the **number of servings** is easy to understand. | 1 | 2 | 3 | 4 | 5 | 10 |

| **10. Based on your experience of food labels, how would you describe the <u>believability/credibility</u> of food labels in general?** | **Strongly disagree** | **Disagree** | **Neutral** | **Agree** | **Strongly agree** | |
|---|---|---|---|---|---|---|
| One can believe/trust **ingredient lists**. | 1 | 2 | 3 | 4 | 5 | 1 |
| One can believe/trust **expiry dates**. | 1 | 2 | 3 | 4 | 5 | 2 |
| One can believe/trust **nutrition/health information**. | 1 | 2 | 3 | 4 | 5 | 3 |
| One can believe/trust **information on allergies**. | 1 | 2 | 3 | 4 | 5 | 4 |
| One can believe/trust **quality guarantees**. | 1 | 2 | 3 | 4 | 5 | 5 |
| One can believe/trust the **names of manufacturers**. | 1 | 2 | 3 | 4 | 5 | 6 |
| One can believe/trust information on **countries of origin/geographical regions**. | 1 | 2 | 3 | 4 | 5 | 7 |
| One can believe/trust well-known **logos/symbols**, (for example heart foundation and halaal) | 1 | 2 | 3 | 4 | 5 | 8 |
| One can believe/trust **usage instructions**. | 1 | 2 | 3 | 4 | 5 | 9 |
| One can believe/trust information on the **number of servings**. | 1 | 2 | 3 | 4 | 5 | 10 |

| **11. Based on your experience of food labels, how would you describe the <u>adequacy</u> of food labels in general?** (Does it provide **enough** information?) | **Strongly disagree** | **Disagree** | **Neutral** | **Agree** | **Strongly agree** | |
|---|---|---|---|---|---|---|
| **Ingredient lists** are adequate to help me make an informed buying decision. | 1 | 2 | 3 | 4 | 5 | 1 |
| **Expiry dates** are adequate to help me make an informed buying decision. | 1 | 2 | 3 | 4 | 5 | 2 |
| **Nutrition/health information** is adequate to help me make an informed buying decision. | 1 | 2 | 3 | 4 | 5 | 3 |
| Information on **allergies** is adequate to help me make an informed buying decision. | 1 | 2 | 3 | 4 | 5 | 4 |
| **Quality guarantees** are adequate to help me make an informed buying decision. | 1 | 2 | 3 | 4 | 5 | 5 |
| **Names of manufacturers** are adequate to help me make an informed buying decision. | 1 | 2 | 3 | 4 | 5 | 6 |
| Information on **countries of origin/geographical regions** are adequate to help me make an informed buying decision. | 1 | 2 | 3 | 4 | 5 | 7 |
| Well-known **logos/symbols**, (for example heart foundation and halaal) are adequate to help me make an informed buying decision. | 1 | 2 | 3 | 4 | 5 | 8 |
| **Usage instructions** are adequate to help me make an informed buying decision. | 1 | 2 | 3 | 4 | 5 | 9 |
| Information on the **number of servings** is adequate to help me make an informed buying decision. | 1 | 2 | 3 | 4 | 5 | 10 |

**SECTION D: YOUR JUDGEMENT OF FOOD LABELS**

| **12a. Please indicate your <u>judgement</u> of food labels by marking on the appropriate option (Unacceptable/Poor/Uncertain/Good/Excellent) for <u>each</u> of the following with an X** | **Unacceptable** | **Poor** | **Uncertain** | **Good** | **Excellent** | |
|---|---|---|---|---|---|---|
| The believability/credibility (truth) of the information on the food label | 1 | 2 | 3 | 4 | 5 | 1 |
| The readability of the information | 1 | 2 | 3 | 4 | 5 | 2 |
| The understandability of the information | 1 | 2 | 3 | 4 | 5 | 3 |
| **12b. Please indicate your <u>judgement</u> of the <u>amount of information</u> on food labels by marking on the appropriate option (Strongly disagree/Disagree/Neutral/Agree/Strongly agree) for <u>each</u> of the following with an X.** | **Strongly disagree** | **Disagree** | **Neutral** | **Agree** | **Strongly agree** | |
| Food labels contain too much information. | 1 | 2 | 3 | 4 | 5 | 1 |
| Food labels contain too little information. | 1 | 2 | 3 | 4 | 5 | 2 |

| **13 Please indicate your judgement of information on food labels by marking on the appropriate option (Unacceptable/Poor/Uncertain/Good/Excellent) for each of the following with an X.** | **Unacceptable** | **Poor** | **Uncertain** | **Good** | **Excellent** | |
|---|---|---|---|---|---|---|
| Ingredient lists | 1 | 2 | 3 | 4 | 5 | 1 |
| Expiry dates | 1 | 2 | 3 | 4 | 5 | 2 |
| Nutrition/health information | 1 | 2 | 3 | 4 | 5 | 3 |
| Information about allergies | 1 | 2 | 3 | 4 | 5 | 4 |
| Quality guarantees | 1 | 2 | 3 | 4 | 5 | 5 |
| Names of manufacturers | 1 | 2 | 3 | 4 | 5 | 6 |
| Countries of origin/geographical regions | 1 | 2 | 3 | 4 | 5 | 7 |
| Well-known logos/symbols, (for example heart foundation and halaal.) | 1 | 2 | 3 | 4 | 5 | 8 |
| Usage instructions | 1 | 2 | 3 | 4 | 5 | 9 |
| Number of servings | 1 | 2 | 3 | 4 | 5 | 10 |

**SECTION E: THE INFLUENCE OF FOOD LABELS ON YOUR PRODUCT CHOICE**

| **14. How likely is it that each of the following would influence your choice of a food product?** **Mark on the appropriate option (Very unlikely/Unlikely/Uncertain/Possibly/Very likely) for each of the following with an X** | **Very unlikely** | **Unlikely** | **Uncertain** | **Possibly** | **Very likely** | |
|---|---|---|---|---|---|---|
| The believability/credibility (truth) of the information on the food label | 1 | 2 | 3 | 4 | 5 | 1 |
| The readability of the information | 1 | 2 | 3 | 4 | 5 | 2 |
| The understandability of the information | 1 | 2 | 3 | 4 | 5 | 3 |
| The amount of information on the food label | 1 | 2 | 3 | 4 | 5 | 4 |
| An ingredient list | 1 | 2 | 3 | 4 | 5 | 5 |
| An expiry date | 1 | 2 | 3 | 4 | 5 | 6 |
| Nutrition/health information | 1 | 2 | 3 | 4 | 5 | 7 |
| Information about allergies | 1 | 2 | 3 | 4 | 5 | 8 |
| A quality guarantee | 1 | 2 | 3 | 4 | 5 | 9 |
| The name of the manufacturer | 1 | 2 | 3 | 4 | 5 | 10 |
| The country of origin/geographical region | 1 | 2 | 3 | 4 | 5 | 11 |
| Well-known logos/symbols, (for example heart foundation and halaal.) | 1 | 2 | 3 | 4 | 5 | 12 |
| Usage instructions | 1 | 2 | 3 | 4 | 5 | 13 |
| Number of servings | 1 | 2 | 3 | 4 | 5 | 14 |

**15. What would you recommend to manufacturers to improve food labels? Briefly describe your suggestions.**

_____

_____

_____

_____

_____

_____

_____

**SECTION F: DEMOGRAPHIC INFORMATION**

**Please mark the appropriate <u>empty</u> boxes on the <u>left</u>, e.g.**

| | | | | | |
|---|---|---|---|---|---|
| **X** | **Male** | **1** | | **Female** | **2** |

Example

**16. What is your gender?**

| | | | | | |
|---|---|---|---|---|---|
| | Male | 1 | | Female | 2 |

**17. What is your age? _____**

**18. What is your home language?**

| | | | | | |
|---|---|---|---|---|---|
| | English | 1 | | IsiNdebele | 7 |
| | Afrikaans | 2 | | Sepedi | 8 |
| | Setswana | 3 | | Tshivenda | 9 |
| | Sesotho | 4 | | SiSwati | 10 |
| | IsiZulu | 5 | | Xitsonga | 11 |
| | IsiXhosa | 6 | | Other | 12 |

**19. What is your highest qualification?**

| | | |
|---|---|---|
| | No formal school education | 1 |
| | Primary school (7 years or less of schooling) | 2 |
| | Secondary school (11 years or less of schooling) | 3 |
| | Secondary school (Matric/12 years) | 4 |
| | Diploma | 5 |
| | Degree | 6 |
| | Postgraduate qualification (degree/diploma) | 7 |
| | Doctoral degree | 8 |
| | Other (please specify) | 9 |

*Thank you for your participation!*

# Addendum C: Additional result tables

Table 1: Summary of respondents' recommendations on how regulators and manufacturers can improve existing food labels

| Category | Sub-category | |
|---|---|---|
| **Expiry dates** | ***Printing*** | *"The expiry date should not be printed with an invisible or black ink but be printed like the logo."* |
| | | *"To use non-removable prints, especially on the expiry dates because some shop owners use to remove expiry dates on products. So it becomes difficult for us to buy the products."* |
| | | *"Improve printing of expiry date (same format dd/mm/yy)."* |
| | ***General visibility and positioning*** | *"They should improve on expiry dates, most of the time it's not clearly visible."* |
| | | *"Expiry date have to be bold on the label."* |
| | | *"I recommend that the expiry date would be visible on all the products for people with poor vision."* |
| | | *"Expiry date be written clearly and not be obstructed."* |
| | | *"The expiry date should be clearly marked."* |
| | | *"Expiry dates are incredibly important to me, make sure that you don't have to search for the info."* |
| | | *"The expiry date to be visible to every consumer. Consumer doesn't have to spend time looking for expiry date."* |
| | | *"My main concern in the SA market would be the expiry date, as it is not always visible and clear!"* |
| | | *"Food labels must put expiry date big and clear. Because some are easily wiped off some are not clear and readable."* |
| | | *"Mark clearly the expiry dates."* |
| | | *"Expiry dates should be visible."* |
| | | *"Expiry date must be clear all the time."* |
| | | *"Try to write the expiry date were visible and neat."* |
| | | *"To write the expiry date on the bigger letters."* |
| | | *"Make expiry dates visible."* |

| Category | Sub-category | |
|---|---|---|
| | | *"Visible expiry dates."* |
| | | *"Expiry date should be very clear."* |
| | | *“On some products you can’t read the expiry date.”* |
| | | *“Clear at all times regarding the expiry dates.”* |
| | | *“Expiring date must be written clearly.”* |
| | | *“Their expiry dates should be clear on their products.”* |
| | | *“The expiry date should be visible.”* |
| | | *“I think expiry dates' must be more visible so that one doesn’t have to search for it.”* |
| | | *“Dates should be in a prominent position.”* |
| | ***Credibility*** | *“Expiry dates to be true and believable.”* |
| | | *“Make sure the expiry dates are correct.”* |
| | | *"Expire dates not correct."* |
| | | *"Make sure the expiry dates are correct."* |
| | | *“The expiry date must be true.”* |
| | | *“Expiry dates often incorrect.”* |
| | | *"To be more accurate when labelling their products especially when it comes to expiry dates on their products."* |
| | | *“Use reliable expiry dates.”* |
| **Readability of information on food labels** | ***Font and writing style*** | *“Please enlarge the printing on the label for people that can’t see the small printing.”* |
| | | *“The print is too small.”* |
| | | *“Clear fonts.  Not too small.”* |
| | | *“Bigger more easily read info.”* |
| | | *“I would suggest that they improve the writing of instructions to be in bold letters so that it can be easy to read for those who have bad eye sight.”* |
| | | *“Make it readable!”* |

| Category | Sub-category | |
|---|---|---|
| | | *“Write bigger font.”* |
| | | *“Meer sigbaar.” [“More visible”]* |
| | | *“More readable.”* |
| | | *“…size of print is often miniscule and makes shopping tedious for me as I have to read labels for the sake of my family’s health.”* |
| | | *“Text should be readable by all.”* |
| | | *“Provide information that be easy to read.”* |
| | | *"Improve readability."* |
| | | *"Improve readability of text on the label."* |
| | | *"Food labels should be easy to read."* |
| | | *"Easily readable info."* |
| | | *"Produce labels that you can read."* |
| | | *“Make labels easy to read.”* |
| | | *"Bigger font."* |
| | | *“Make food labels easy to read.”* |
| | | *“Information should be easier to read.”* |
| | | *“Keep it easy to read.”* |
| | | *“List information don’t describe in condensed paragraphs.”* |
| | ***Specific information*** | *“Ingredient list should use a larger font.”* |
| | | *“On the ingredient list I think they must be made more visible so that everyone can be able to read them.”* |
| | | *"Product name, manufacturers name, due date, quality guarantee must be the first of utmost all to be considered legible."* |
| | | *“List ingredients in readable font size.”* |
| **Understandability of information on food labels** | ***Understandability in general*** | *“They must make things clear so that anyone can understand that.”* |
| | | *"Make food labels easy to understand."* |
| | | *"We want to understand."* |

| Category | Sub-category | |
|---|---|---|
| | | *"Provide information that be easy understandable."* |
| | | *“Keep it understandable.”* |
| | | *“Because: sometimes when you buy something you may see that the information you read you do not understand.”* |
| | ***Linguistics*** | *“I recommend that the language used on food labels must be simple, understandable so that everybody will understand.”* |
| | | *“To go easy on difficult words because most of the words they use we don’t even understand.”* |
| | | *“I recommend that food labelling to be clear and understanding simply language.”* |
| | | *“Information must be provided in layman’s term. Most of the time labels are too complicated to truly make informed choices about healthy options.”* |
| | | *“Gebruik taal wat die algemene mens sal verstaan!”* |
| | | *“The language is very difficult to understand.”* |
| | | *“Use descriptions everyone can understand.”* |
| | | *“Use understandable language.”* |
| | | *“Use language everyone understands.”* |
| | | *“Don’t use terms and words for example of ingredients which the customer does not understand.”* |
| | | *“…the language must be simple for everyone.”* |
| | ***Specific information*** | *“To put down the ingredients in the understandable language, not with those bombastic words not all of us are good with those words.”* |
| | | *“Understandable ingredient list and nutritional information.”* |
| | | *“All ingredients listed should be understandable (not using codes).”* |
| | | *“% RDA is difficult to understand.”* |
| | | *“The general person on the street is not a dietician to understand all the label info on nutrition.”* |

| Category | Sub-category | |
|---|---|---|
| | | *"Better understandable ingredient lists."* |
| | | *"Information on nutrition, health and allergies should be written in a language that uneducated people can understand."* |
| | | *"The numbers used for preservatives etc, mean nothing to the average consumer. We still do not know exactly what we consume."* |
| | | *"Nutrition information must be understandable."* |
| | ***Language*** | *"If the instruction labels would be written in different languages."* |
| | | *"They have to use 11 languages so that people can understand at their own language."* |
| | | *"I will suggest the manufacturers they must try and write the instructions on three different language (example Zulu, English and Afrikaans)."* |
| | | *"Use simple English so that everyone can be able to understand and make the right choice when buying food."* |
| | | *"Instructions both in English/other languages."* |
| **Credibility of information on food labels** | ***Honesty in general*** | *"Be honest so that consumers can trust what is being written on the labels."* |
| | | *"Honesty is more important a consumer should be well informed about the products."* |
| | | *"Accurate information about the product."* |
| | | *"Always to be honest."* |
| | | *"To always say the truth."* |
| | | *"To be honest."* |
| | | *"Telling the truth."* |
| | | *"They must be honest & not deceive the customer."* |
| | | *"Write true information on the label."* |
| | | *"Information should be valid and reliable at all times."* |
| | | *"Be honest."* |
| | | *"Convince consumers on the credibility/truth of the information."* |
| | ***Honesty about ingredients and*** | *"Make it more believable. Don't write on it light & then on more/further investigation you see that it actually contains the same/more carbohydrates, fat, energy etc."* |

| Category | Sub-category | |
|---|---|---|
| | ***nutrition/health information*** | *"In short, food labels do not tell us what sorts of ingredients were used that generally not good for us."* |
| | | *"Honesty about the ingredients because of health matters."* |
| | | *"All ingredients and nutritional info to be correct."* |
| **Adequacy of information on food labels – seeking more information.** | ***Health, nutrition information and ingredient lists*** | *"Especially with food products we need to know if we consume more of this product what are the results and if it's bad for your health in the long run."* |
| | | *"There should be enough information to know what's good for your body and health."* |
| | | *"More specific information in regards to specific people for example: diabetics."* |
| | | *"Food labels should include the long term effect in using a specific ingredient e.g. aspartame side effects."* |
| | | *"More emphasis on vitamins and minerals than carbohydratess etc."* |
| | | *"Impact on weight – how it will contribute to gaining or losing."* |
| | | *"I would like to see more information on nutrition and health issues, i.e. fat, fibre etc. content – colour coded."* |
| | | *"More health ingredients."* |
| | | *"Describe the effects of long term use of a certain product."* |
| | | *"Benefit of the product."* |
| | | *"Indication of GI on product is important."* |
| | | *"Focus more on the product and its ingredients and less about the design. We want to know more what it contains."* |
| | | *"List all preservatives."* |
| | | *"Clear indication of animal products in ingredients eg animal rennet not suitable for* |

| Category | Sub-category | |
|---|---|---|
| | | *vegetarians."* |
| | | *"Exactly saying which additives are in the food – more specific info – not just (E45 etc.)."* |
| | ***Serving sizes*** | *"Include info such as total recommended servings per day (for both men & women)."* |
| | | *"Servings for South Africans, or children."* |
| | | *"Specify serving size in terms of the actual thing, not grams (example 1 cookie = 127 kj)."* |
| | | *"Clear serving measurement."* |
| | | *"As an African, we battle a lot with serving-size calculations, so more information regarding calculations might help."* |
| | ***Other information*** | *"Recipes or ideas how to use product are helpful."* |
| | | *"Better serving suggestions."* |
| | | *"Better serving suggestions."* |
| | | *"Additional scientific and test result data should be included in food labels."* |
| | ***General adequacy*** | *"Supply all the information needed for us."* |
| | | *"Don't worry about the design and overlook all of product but rather let all the important information be on the labels."* |
| **Adequacy of information on food labels – seeking simpler/less information** | ***Reduced information*** | *"Keep it short."* |
| | | *"To keep all information simple."* |
| | | *"Keep it simple + to the point. Just enough info to make informed decision."* |
| **Design & Graphics** | ***Standardised format*** | *"Problem is that different food labels display different info – makes it difficult to compare. A 'standardized' version could make things easier in comparing before buying."* |
| | | *"Consistency of information on different types of packaging."* |

| Category | Sub-category | |
|---|---|---|
| | | *"Standardisation: for example 1kj ="* |
| | ***Pictures and colours*** | *"Good realistic pictures of prepared product."* |
| | | *"Pictures of serving suggestions."* |
| | | *"More colourful pictures."* |
| | | *"Logo design can include more information, instead of excessive copy."* |
| | | *"Highlight the good and bad qualities of the food."* |
| **Allergen information** | ***General recommendation on allergen information*** | *"They must inform us about the allergies that the food have. As human being we have different allergies and are caused by various things, some are in the foods that we eat."* |
| | | *"More information about allergies."* |
| | | *"Better info on allergies."* |
| | | *"Display of possible allergies."* |
| | | *"The allergies information is not clear."* |
| | | *"Some don't have allergy information."* |
| | | *"Improve allergy information."* |
| | | *"Allergens must be specified."* |
| | | *"Mainly improve information about allergies."* |
| | ***Visibility*** | *"Put the names of information on allergies very big on the label, preferably on the front and bright colours!"* |
| | | *"Companies must state clearly whether the product is allergic or not."* |
| | | *"Allergies info I think they must be made more visible."* |

| Category | Sub-category | |
|---|---|---|
| | | *"Allergies should be stated visibly so that you don't have to look too much for them."* |

Table 2: Respondents' judgement of the performance of food labels (N=279)

| ***Judgement of label attributes*** | **n** | **Means ± SD** | **1# %** | **2 %** | **3 %** | **4 %** | **5 %** |
|---|---|---|---|---|---|---|---|
| The believability of label information | 273 | 3.4 ± 0.84 | 1.1 | 11.7 | 36.6 | 42.9 | 7.7 |
| The readability of label information | 273 | 3.6 ± 0.94 | 0.7 | 17.9 | 15.8 | 54.2 | 11.4 |
| The understandability of label information | 270 | 3.5 ± 0.90 | 0.7 | 16.3 | 26.7 | 46.7 | 9.6 |
| ***Judgement of label information*** | **n** | **Means ± SD** | **1# %** | **2 %** | **3 %** | **4 %** | **5 %** |
| **Primary information** | 276 | 3.4 ± 0.72 | | | | | |
| An ingredient list | 276 | 3.5 ± 0.92 | 1.1 | 16.7 | 24.3 | 48.6 | 9.3 |
| An expiry date | 276 | 3.6 ± 1.03 | 2.3 | 16.3 | 18.1 | 45.3 | 18.1 |
| Nutrition/health information | 269 | 3.5 ± 0.91 | 1.5 | 14.1 | 30.9 | 43.5 | 10.0 |
| Information about allergies | 273 | 3.2 ± 0.98 | 2.2 | 20.5 | 39.9 | 25.6 | 11.7 |
| A quality guarantee | 272 | 3.3 ± 0.96 | 1.1 | 21.7 | 37.5 | 28.7 | 11.0 |
| **Secondary information** | 276 | 3.6 ± 0.66 | | | | | |
| The name of the manufacturer | 273 | 3.8 ± 0.86 | 1.8 | 5.9 | 23.8 | 52.7 | 15.8 |
| The country of origin/geographical region | 272 | 3.3 ± 0.92 | 1.8 | 15.8 | 42.3 | 29.8 | 10.3 |
| Well-known logos/symbols | 272 | 3.7 ± 0.87 | 1.1 | 8.5 | 25.7 | 49.6 | 15.1 |
| Usage instructions | 274 | 3.7 ± 0.89 | 1.5 | 8.7 | 24.5 | 49.2 | 16.1 |
| Number of servings | 276 | 3.5 ± 1.00 | 3.3 | 12.0 | 31.5 | 37.3 | 15.9 |
| ***Judgement of the amount of information on food labels*** | **n** | **Means ± SD** | **1## %** | **2 %** | **3 %** | **4 %** | **5 %** |
| Food labels contain too much information | 270 | 2.8 ± 1.06 | 8.5 | 33.7 | 31.5 | 19.6 | 6.7 |
| Food labels contain too little information | 272 | 3.3 ±1.03 | 4.8 | 18.4 | 34.9 | 30.9 | 11.0 |

n=Sample size
SD = Standard deviation
#1=Unacceptable 2=Poor 3=Uncertain 4=Good 5=Excellent
##1=Strongly disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly agree

Table 3: Independent t-test analysis: Mean differences in respondents' expectations and performance judgement of food labels based on gender (N=279)

| **Items** | **Male** | | **Female** | | p-value t-Test | Effect Sizes |
|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | | |
| Expectations of primary information | 4.2 | .68 | 4.3 | .63 | .313 | .123 |
| Performance: readability of primary information | 3.3 | .81 | 3.4 | .80 | .664 | .056 |
| Performance: understandability of primary information | 3.5 | .72 | 3.6 | .68 | .149 | .180 |
| Performance: believability of primary information | 3.4 | .81 | 3.4 | .77 | .609 | .064 |
| Performance: adequacy of primary information | 3.5 | .78 | 3.6 | .71 | .235 | .144 |
| Judgement of primary information | 3.4 | .70 | 3.4 | .73 | .378 | .112 |
| Judgement of secondary information | 3.6 | .66 | 3.6 | .66 | .407 | .106 |
| Adequacy of secondary information | 3.5 | .67 | 3.7 | .66 | .183 | .170 |
| Performance: believability of secondary information | 3.7 | .67 | 3.6 | .76 | .810 | .030 |
| Performance: understandability of secondary information | 3.7 | .69 | 3.8 | .67 | .746 | .041 |
| Performance: readability of secondary information | 3.6 | .71 | 3.6 | .69 | .685 | .051 |
| Expectations of secondary information | 3.8 | .69 | 3.8 | .78 | .695 | .048 |

SD = Standard deviation
Effect sizes (r): 0.2 = small; 0.5 = medium; 0.8 = large
Statistical significant difference: p≤0.05

Table 4: Spearman's correlation coefficient: The influence of respondents' age on their expectations and performance judgement of food labels (N=279)

| Food label elements | n | Correlation coefficient (r) | p-value (2-tailed) |
|---|---|---|---|
| Expectations: Primary information | 241 | 0.15 | 0.022 |
| Performance: Readability of primary information | 240 | -0.60 | 0.353 |
| Performance: Understandability of primary information | 240 | -0.03 | 0.652 |
| Performance: Believability of primary information | 241 | -0.02 | 0.733 |
| Performance: Adequacy of primary information | 241 | -0.07 | 0.273 |
| Judgement of primary information | 241 | -0.08 | 0.223 |
| Judgement of secondary information | 241 | -0.07 | 0.315 |
| Performance: Adequacy of secondary information | 241 | 0.00 | 0.991 |
| Performance: Believability of secondary information | 241 | -0.11 | 0.100 |
| Performance: Understandability of secondary information | 240 | -0.04 | 0.588 |
| Performance: Readability of secondary information | 238 | 0.00 | 0.959 |
| Expectations: Secondary information | 240 | 0.06 | 0.353 |
| Age | 241 | 1.000 | |

Statistical significant difference: p≤0.05
Effect size (r): 0.1=small; 0.3=medium; 0.5=large

# Addendum D: Author’s guidelines for research article

# Author's guidelines: Public Health Nutrition

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1. Setchell KD, Faughnan MS, Avades T *et al*. (2003) Comparing the pharmacokinetics of daidzein and genistein with the use of 13C-labeled tracers in premenopausal women. *Am J Clin Nutr* **77**, 411–419.
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References to material available on websites should include the full Internet address, and the date of the version cited. Thus:

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**Mathematical modelling of nutritional processes.** Papers in which mathematical modelling of nutritional processes forms the principal element will be considered for publication provided: (a) they are based on sound biological and mathematical principles; (b) they advance nutritional concepts or identify new avenues likely to lead to such advances; (c) assumptions used in their construction are fully described and supported by appropriate argument; (d) they are described in such a way that the nutritional purpose is clearly apparent; (e) the contribution of the model to the design of future experimentation is clearly defined.

**Units.** Results should be presented in metric units according to the International System of Units (see Quantities, Units, and Symbols (1971) London: The Royal Society, and Metric Units, Conversion Factors and Nomenclature in Nutritional and Food Sciences (1972) London: The Royal Society – as reproduced in *Proceedings of the Nutrition Society* (1972) **31**, 239–247). SI units should be used throughout the paper. The author will be asked to convert any values that are given in any other form. The only exception is where there is a unique way of expressing a particular variable that is in widespread use. Energy values must be given in Joules (MJ or kJ) using the conversion factor 1 kcal = 4·184 kJ. If required by the author, the value in kcal can be given afterwards in parentheses. Temperature is given in degrees Celsius (ºC). Vitamins should be given as mg or μg, not as IU.

For substances of known molecular mass (Da) or relative molecular mass, e.g. glucose, urea, Ca, Na, Fe, K, P, values should be expressed as mol/l; for substances of indeterminate molecular mass (Da) or relative molecular mass, e.g. phospholipids, proteins, and for trace elements, e.g. Cu, Zn, then g/l should be used.

Time. The 24 h clock should be used, e.g. 15.00 hours.

Units are: year, month, week, d, h, min, s, kg, g, mg, μg, litre, ml, μl, fl. To avoid misunderstandings, the word litre should be used in full, except in terms like g/l. Radioactivity should be given in becquerels (Bq or GBq) not in Ci. 1 MBq = 27·03 μCi (1Bq = 1 disintegration/s).

**Statistical treatment of results.** Data from individual replicates should not be given for large experiments, but may be given for small studies. The methods of statistical analysis used should be described, and references to statistical analysis

packages included in the text, thus: Statistical Analysis Systems statistical software package version 6.11 (SAS Institute, Cary, NC, USA). Information such as analysis of variance tables should be given in the paper only if they are relevant to the discussion. A statement of the number of replicates, their average value and some appropriate measure of variability is usually sufficient.

Comparisons between means can be made by using either confidence intervals (CI) or significance tests. The most appropriate of such measures is usually the standard error of a difference between means (SED), or the standard errors of the means (SE or SEM) when these vary between means. The standard deviation (SD) is more useful only when there is specific interest in the variability of individual values. The degrees of freedom (df) associated with SED, SEM or SD should also be stated. The number of decimal places quoted should be sufficient but not excessive. Note that pH is an exponential number, as are the log(10) values often quoted for microbial numbers. Statistics should be carried out on the scalar rather than the exponential values.

If comparisons between means are made using CI, the format for presentation is, e.g. 'difference between means 0·73 (95 % CI 0·314, 1·36) g'. If significance tests are used, a statement that the difference between the means for two groups of values is (or is not) statistically significant should include the level of significance attained, preferably as an explicit *P* value (e.g. *P*=0·016 or *P*=0·32) rather than as a range (e.g. *P*<0·05 or *P*>0·05}. It should be stated whether the significance levels quoted are one-sided or two-sided. Where a multiple comparison procedure is used, a description or explicit reference should be given. Where appropriate, a superscript notation may be used in tables to denote levels of significance; similar superscripts should denote lack of a significant difference.

Where the method of analysis is unusual, or if the experimental design is at all complex, further details (e.g. experimental plan, raw data, confirmation of assumptions, analysis of variance tables, etc.) should be included.

**Figures.** In curves presenting experimental results the determined points should be clearly shown, the symbols used being, in order of preference, ○, ●, Δ, ▲, □, ■, ×, +. Curves and symbols should not extend beyond the experimental points. Scale-marks on the axes should be on the inner side of each axis and should extend beyond the last experimental point. Ensure that lines and symbols used in graphs and shading used in histograms are large enough to be easily identified when the figure is reduced to fit the printed page.

Figures and diagrams can be prepared using most applications but please do not use the following: cdx, chm, jnb or PDF. All figures should be numbered and legends should be provided. Each figure, with its legend, should be comprehensible without reference to the text and should include definitions of abbreviations. Latin names for unusual species should be included unless they have already been specified in the text. Each figure will be positioned near the point in the text at which it is first introduced unless instructed otherwise.

Refer to a recent copy of the journal for examples of figures.

**Plates.** The size of photomicrographs may have to be altered in printing; in order to avoid mistakes the magnification should be shown by scale on the photograph itself. The scale with the appropriate unit together with any lettering should be drawn by the author, preferably using appropriate software.

**Tables.** Tables should carry headings describing their content and should be comprehensible without reference to the text. Tables should not be subdivided by ruled lines. The dimensions of the values, e.g. mg/kg, should be given at the top of each column. Separate columns should be used for measures of variance (SD, SE etc.), the ± sign should not be used. The number of decimal places used should be standardized; for whole numbers 1·0, 2·0 etc. should be used. Shortened forms of the words weight (wt) height (ht) and experiment (Expt) may be used to save space in tables, but only Expt (when referring to a specified experiment, e.g. Expt 1) is acceptable in the heading.

Footnotes are given in the following order: (1) abbreviations, (2) superscript letters, (3) symbols. Abbreviations are given in the format: RS, resistant starch. Abbreviations appear in the footnote in the order that they appear in the table (reading from left to right across the table, then down each column). Abbreviations in tables must be defined in footnotes. Symbols for footnotes should be used in the sequence: *†‡§| ¶, then ** etc. (omit * or †, or both, from the sequence if they are used to indicate levels of significance).

For indicating statistical significance, superscript letters or symbols may be used. Superscript letters are useful where comparisons are within a row or column and the level of significance is uniform, e.g. '$^{a,b,c}$Mean values within a column with unlike superscript letters were significantly different (*P*<0·05)'. Symbols are useful for indicating significant differences between rows or columns, especially where different levels of significance are found, e.g. 'Mean values were significantly different from those of the control group: **P*<0·05, ***P*<0·01, ****P*<0·001'. The symbols used for *P* values in the tables must be consistent.

Tables should be placed at the end of the text. Each table will be positioned near the point in the text at which it is first introduced unless instructed otherwise.

Please refer to a recent copy of the journal for examples of tables.

**Chemical formulas.** These should be written as far as possible on a single horizontal line. With inorganic substances, formulas may be used from first mention. With salts, it must be stated whether or not the anhydrous material is used, e.g. anhydrous $CuSO_4$, or which of the different crystalline forms is meant, e.g. $CuSO_4.5H_2O$, $CuSO_4.H_2O$.

**Descriptions of solutions, compositions and concentrations.** Solutions of common acids, bases and salts should be defined in terms of molarity (M), e.g. 0·1 M-$NaH_2PO_4$. Compositions expressed as mass per unit mass (w/w) should have values expressed as ng, μg, mg or g per kg; similarly for concentrations expressed as mass per unit volume (w/v), the denominator being the litre. If concentrations or compositions are expressed as a percentage, the basis for the composition should be specified (e.g. % (w/w) or % (w/v) etc.). The common measurements used in nutritional studies, e.g. digestibility, biological value and net protein utilization, should be expressed as decimals rather than as percentages, so that amounts of available nutrients can be obtained from analytical results by direct multiplication. See *Metric Units, Conversion Factors and Nomenclature in Nutritional and Food Sciences*. London: The Royal Society, 1972 (para. 8).

**Nomenclature of vitamins.** Most of the names for vitamins and related compounds that are accepted by the Editors are those recommended by the IUNS Committee on Nomenclature. See *Nutrition Abstracts and Reviews* (1978) **48**A, 831–835.

*Acceptable name Other names**

*Vitamin A*
Retinol Vitamin $A_1$
Retinaldehyde, retinal Retinene
Retinoic acid (all-*trans* or 13-*cis*) Vitamin $A_1$ acid
3-Dehydroretinol Vitamin $A_2$

*Vitamin D*
Ergocalciferol, ercalciol Vitamin $D_2$ calciferol

Cholecalciferol, calciol Vitamin $D_3$

*Vitamin E*
α-, β- and γ-tocopherols plus
tocotrienols
*Vitamin K*
Phylloquinone Vitamin $K_1$

Menaquinone-n (MK-n)† Vitamin $K_2$

Menadione Vitamin $K_3$,

menaquinone,

menaphthone

*Vitamin $B_1$*

Thiamin Aneurin(e), thiamine

*Vitamin $B_2$*

Riboflavin Vitamin G, riboflavine,

lactoflavin

*Niacin*
Nicotinamide Vitamin PP

Nicotinic acid

*Folic Acid*
Pteroyl(mono)glutamic acid Folacin, vitamin $B_c$ or M

*Vitamin $B_6$*
Pyridoxine Pyridoxol

Pyridoxal

Pyridoxamine

*Vitamin $B_{12}$*
Cyanocobalamin

Hydroxocobalamin Vitamin $B_{12a}$ or $B_{12b}$

Aquocobalamin

Methylcobalamin

Adenosylcobalamin

*Inositol*
*Myo*-inositol *Meso*-inositol

*Choline*
*Pantothenic acid*
*Biotin* Vitamin H
*Vitamin C*
Ascorbic acid

Dehydroascorbic acid

*Including some names that are still in use elsewhere, but are not used by the *British Journal of Nutrition*.

†Details of the nomenclature for these and other naturally-occurring quinones should follow the Tentative Rules of the IUPAC-IUB Commission on Biochemical Nomenclature (see *European Journal of Biochemistry* (1975) **53**, 15–18).

*Generic descriptors.* The terms **vitamin A**, **vitamin C** and **vitamin D** may still be used where appropriate, for example in phrases such as 'vitamin A deficiency', 'vitamin D activity'.

Vitamin E. The term **vitamin E** should be used as the descriptor for all tocol and tocotrienol derivatives exhibiting qualitatively the biological activity of α-tocopherol. The term **tocopherols** should be used as the generic descriptor for all methyl tocols. Thus, the term **tocopherol** is not synonymous with the term **vitamin E**.

Vitamin K. The term **vitamin K** should be used as the generic descriptor for 2-methyl-1,4-naphthoquinone (menaphthone) and all derivatives exhibiting qualitatively the biological activity of phylloquinone (phytylmenaquinone).

Niacin. The term **niacin** should be used as the generic descriptor for pyridine 3-carboxylic acid and derivatives exhibiting qualitatively the biological activity of nicotinamide.

Vitamin $B_6$. The term **vitamin $B_6$** should be used as the generic descriptor for all 2-methylpyridine derivatives exhibiting qualitatively the biological activity of pyridoxine.

Folate. Due to the wide range of C-substituted, unsubstituted, oxidized, reduced and mono- or polyglutamyl side-chain derivatives of pteroylmonoglutamic acid that exist in nature, it is not possible to provide a complete list. Authors are encouraged to use either the generic name or the correct scientific name(s) of the derivative(s), as appropriate for each circumstance.

Vitamin $B_{12}$. The term **vitamin $B_{12}$** should be used as the generic descriptor for all corrinoids exhibiting qualitatively the biological activity of cyanocobalamin. The term **corrinoids** should be used as the generic descriptor for all compounds containing the corrin nucleus and thus chemically related to cyanocobalamin. The term **corrinoid** is not synonymous with the term **vitamin $B_{12}$**.

Vitamin C. The terms **ascorbic acid** and **dehydroascorbic acid** will normally be taken as referring to the naturally-occurring L-forms. If the subject matter includes other optical isomers, authors are encouraged to include the L- or D-prefixes, as appropriate. The same is true for all those vitamins which can exist in both natural and alternative isomeric forms.

*Amounts of vitamins and summation.* Weight units are acceptable for the amounts of vitamins in foods and diets. For concentrations in biological tissues, SI units should be used; however, the authors may, if they wish, also include other units, such as weights or international units, in parentheses.

See *Metric Units, Conversion Factors and Nomenclature in Nutritional and Food Sciences* (1972) paras 8 and 14–20. London: The Royal Society.

**Nomenclature of fatty acids and lipids.** In the description of results obtained for the analysis of fatty acids by conventional GLC, the shorthand designation proposed by Farquhar JW, Insull W, Rosen P, Stoffel W & Ahrens EH (*Nutrition Reviews* (1959), **17**, Suppl.) for individual fatty acids should be used in the text, tables and figures. Thus, 18 : 1 should be used to represent a fatty acid with eighteen carbon atoms and one double bond; if the position and configuration of the double bond is unknown. The shorthand designation should also be used in the abstract. If the positions and configurations of the double bonds are known, and these are important to the discussion, then a fatty acid such as linoleic acid may be referred to as *cis*-9,*cis*-12-18 : 2 (positions of double bonds related to the carboxyl carbon atom 1). However, to illustrate the metabolic relationship between different unsaturated fatty acid families, it is sometimes more helpful to number the double bonds in relation to the terminal methyl carbon atom, *n*. The preferred nomenclature is then: 18 : 3*n*-3 and 18 : 3*n*-6 for α-linolenic and γ-linolenic acids respectively; 18 : 2*n*-6 and 20 : 4*n*-6 for linoleic and arachidonic acids respectively and 18 : 1*n*-9 for oleic acid. Positional isomers such as α- and γ-linolenic acid should always be clearly distinguished. It is assumed that the double bonds are methylene-interrupted and are of the *cis*-configuration (see Holman RT in *Progress in the Chemistry of Fats and Other Lipids* (1966) vol. 9, part 1, p. 3. Oxford: Pergamon Press). Groups of fatty acids that have a common chain length but vary in their double bond content or double bond position should be referred to, for example, as $C_{20}$ fatty acids or $C_{20}$ PUFA. The modern nomenclature for glycerol esters should be used, i.e. triacylglycerol, diacylglycerol, monoacylglycerol *not* triglyceride, diglyceride, monoglyceride. The form of fatty acids used in diets should be clearly stated, i.e. whether ethyl esters, natural or refined fats or oils. The composition of the fatty acids in the dietary fat and tissue fats should be stated clearly, expressed as mol/100 mol or g/100 g total fatty acids.

**Nomenclature of micro-organisms.** The correct name of the organism, conforming with international rules of nomenclature, should be used: if desired, synonyms may be added in parentheses when the name is first mentioned. Names of bacteria should conform to the current Bacteriological Code and the opinions issued by the International Committee on Systematic Bacteriology. Names of algae and fungi must conform to the current International Code of Botanical Nomenclature. Names of protozoa should conform to the current International Code of Zoological Nomenclature.

**Nomenclature of plants.** For plant species where a common name is used that may not be universally intelligible, the Latin name in italics should follow the first mention of the common name. The cultivar should be given where appropriate.

**Ethics of human experimentation.** The notice of contributors is drawn to the guidelines in the World Medical Association (2000) Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects, with notes of clarification of 2002 and 2004 http://www.wma.net/e/policy/b3.htm, the *Guidelines on the Practice of Ethics Committees Involved in Medical Research Involving Human Subjects* (3rd ed., 1996; London: The Royal College of Physicians) and the Guidelines for the Ethical Conduct of Medical Research Involving Children, revised in 2000 by the Royal College of Paediatrics and Child Health: Ethics Advisory Committee (*Arch Dis Child* (2000) **82**, 177–182). A paper describing any experimental work on human subjects should include a statement that ethical approval has been obtained.

**Animal experimentation.** The Editors will not accept papers reporting work carried out using inhumane procedures. Authors should indicate that their experiments have been approved by the appropriate local or national ethics committee for animal experiments.

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