



# The influence of current food and nutrition trends on dietitians' perceptions of the healthiness of packaged food

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## Abstract

**Objective:** To investigate the influence of current food and nutrition trends on dietitians' perceptions of the healthiness of packaged foods.

**Design:** This observational study used a cross-sectional survey. Participants rated (strongly disagree to strongly agree) the extent to which a range of factors, independent of the energy, nutrient and ingredient content, influenced their perceptions of the healthiness of packaged foods. Two open-ended questions allowed for participants to list additional items they considered important.

**Setting:** Online survey.

**Participants:** Australian dietitians ( $n$  117).

**Results:** The greatest consensus was a positive influence of the fit within the core food groups and presence of seasonal ingredients, and a negative influence of an increasing number of additives. Mixed opinions were obtained for GM ingredients, locally sourced ingredients, labelling of animal welfare and organic certification. Nutritional indicators received a split where almost half of participants disagreed/strongly disagreed that they positively influenced their perception of healthiness. Content analysis of open-ended responses ( $n$  53, 45 %) revealed four broad categories as important in considering healthiness: 'a whole food approach', 'marketing and labelling', 'product information' and 'context of diet'. A small number of responses (count of 6, 5 %) reported that packaging, advertising and features such as celebrity endorsement were a negative influence.

**Conclusions:** Dietitians have a broad concept of the healthiness of packaged foods, which incorporates elements of food safety, wholeness of the ingredients and marketing. Providing unified messages to the consumer can help to build the public perception of dietitians as experts in nutrition advice and counselling.

**Keywords**  
Packaged food  
Perception  
Dietitian  
Food labelling

The dietitian's role in assisting the public with healthier food choices has become increasingly important due to the growing diversity and marketing of packaged and convenience foods. Many countries have developed guidelines, such as the Australian Guide to Healthy Eating (AGHE)<sup>(1)</sup> and the American MyPlate<sup>(2)</sup>, to help guide the public to choose healthy foods. These guidelines are based on five core food groups: (1) vegetables; (2) fruit; (3) grain (cereal) foods; (4) lean meats and poultry, fish, eggs, tofu, nuts, seeds, legumes; and (5) milk, yoghurt and cheese or alternatives<sup>(1,2)</sup>. Single food items that fit within these core food groups (e.g. apples, eggs, bread, fish) have made it easier for consumers to judge their healthiness than combination foods or meals<sup>(3)</sup>.

Foods with multiple ingredients that include many food groups require greater interpretation, and this may contribute to confusion for consumers. Food companies also use marketing strategies to promote health benefits and other positive attributes of food that may sway consumers in their food choice<sup>(4)</sup>. In the current food environment, there are many factors beyond the nutritional value of the food that require professional judgement from dietitians. These include consideration of environmentally conscious approaches to food production that encompass sustainable eating practices, sustainable farming practices and animal welfare<sup>(5)</sup>, and dietitians may be asked for professional opinion on topical areas such as organic certification and GM ingredients<sup>(6)</sup>.

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Studies investigating dietitians' and nutritionists' perceptions of the healthiness of food have focused on the influence of nutrients and ingredients<sup>(7–10)</sup>. We recently demonstrated that the majority of a sample of Australian dietitians reported using the nutrition information panel (NIP) and ingredient list to rate the healthiness of a sample of packaged foods<sup>(10)</sup>. However, many other factors were considered in their decision, including the fit within the AGHE core food groups, the food item name or brand, comparison to other foods, glycaemic index, satiety and the context of the food item in an individual's meal or diet<sup>(10)</sup>. Scarborough *et al.*<sup>(7)</sup> have previously demonstrated that the inclusion of words 'wholemeal', 'fruits or vegetables', 'fried' and 'takeaway' is used by nutrition experts to inform their ratings of healthiness. Furthermore, a Scandinavian study investigating nutrition professionals' perceptions of dairy products and their alternatives has found that non-nutrient factors (processing techniques, risk of soy allergy, GM ingredients and presence of additives) influenced their perceived healthiness of foods<sup>(9)</sup>. The aims of the current study were to investigate the influence of current food and nutrition trends on Australian dietitians' perceptions of the healthiness of packaged foods.

## Methods

This cross-sectional observational study was conducted using an online survey (surveyMonkey.com). Guidelines of STROBE-nut (STrengthening the Reporting of OBservational studies in Epidemiology – Nutritional Epidemiology) were followed for preparing this article<sup>(11)</sup>.

Dietitians were asked to rate the extent (strongly disagree, disagree, neutral, agree, strongly agree) to which eight factors influenced their perceptions of the healthiness of packaged foods, including: (1) seasonality of ingredients; (2) locally sourced ingredients (defined as 'within 100 km from my home region, town or city')<sup>(12)</sup>; (3) the presence of nutritional indicators or ratings; (4) organic certification; (5) fit within the AGHE core food groups; (6) number of additives; (7) presence of GM ingredients; and (8) the labelling of animal welfare (method of raising or feed provided). These factors were selected from previous studies that have investigated the influences on dietitians' or consumers' perceptions of the healthiness of foods<sup>(1,9,12–21)</sup>. Each statement was phrased positively or negatively to capture the direction of influence. Two open-ended questions were also included to allow participants to record any additional factors that may influence their perception of healthiness or to elaborate on the eight factors covered within the survey. The two open questions were: 'In the space below, please record any additional factors that influence your perception of the healthiness of packaged foods' and 'If you would like to elaborate on any of the topics covered in this survey or provide feedback please use the space below'. Demographic data

including age (years), gender, location of residence, employment status, primary area of employment and experience as a dietitian (years since graduating as a dietitian) were collected. Age was collected as categories of years, and years of experience as  $\leq 2$ , 3–5, 6–10, 11–15, 16–20 and  $> 20$ . Categories were collapsed for analysis due to a low number of responses in some age or experience groups.

A sample of Australian Accredited Practising Dietitians (APD) was recruited via the Dietitian's Association of Australia's (DAA) national e-newsletter between 1 February and 13 March 2016. No reminders for participation were sent. To be eligible, participants were required to have a professionally accredited tertiary qualification in dietetics enabling them to be eligible for an APD status. All participants provided consent prior to beginning the survey. Ethical approval was granted by the University of the Sunshine Coast (HREC no. S/15/858).

Statistical Package for Social Sciences (SPSS) Statistical software (version 24.0; IBM Corporation) was used for data analysis, and significance was set at  $P < 0.05$ . Participants' characteristics and scale responses were analysed descriptively.  $\chi^2$  and Fisher's exact tests were used to report between-group differences for participant characteristics and scale responses. The two open-ended questions were interpreted using content analysis, which included data preparation, organisation and reporting<sup>(22)</sup>. Descriptive codes were applied to the responses and counted<sup>(23)</sup>, then grouped by similarity into broad categories and reorganised into subcategories until all were categorised. The primary researcher undertook the preliminary application of descriptive codes and initial categorisation of responses. All researchers made adjustments to the responses to reach a consensus.

## Results

One hundred and fifty-three dietitians responded to the survey, an approximate response rate of 3% based on the DAA APD membership database (2015)<sup>(24)</sup>. Ten failed to meet the inclusion criteria. Another twenty-six participants were excluded for responding to less than five of the eight Likert-scale questions, leaving a final sample of 117. Participants were mostly female ( $n$  111, 96%), employed full-time in nutrition and dietetics ( $n$  89, 77%) and the majority were working within a public health or government organisation ( $n$  35, 30%). There was a significant association between participant's age and experience (Table 1;  $n$  114,  $\chi^2$  39.64,  $P < 0.001$ ).

There was a spread of responses across each of the eight factors investigated in the survey (Fig. 1). The majority of participants agreed/strongly agreed that their perceptions of the healthiness of packaged foods was positively influenced when the food fitted within the core food groups ( $n$  106, 91%) and when seasonal ingredients are used

**Table 1** Demographic characteristics of participating dietitians

	Experience (years since graduating)					
	Total†		≤5†		≥6†	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Age (years)	114	100				
≤25	20	17	20*	100	0	0
26–35	52	46	27	52	25	48
≥36	42	37	2	54	40*	95
Primary employment area‡	115	100				
Public health or government§	35	30	13	37	22	63
Private practice and community dietitian	23	20	11	48	12	52
Hospital	26	23	14	54	12	46
University and research	12	10	4	33	8	67
Other	19	17	7	37	12	63

\* $P < 0.001$ .

†Valid percentage represented; percentages rounded and may not equal 100%.

‡In a dietetic-related field.

§Including non-government organisations (not-for-profit organisations) and community nutrition.

||Including food service, food industry, sports nutrition, pharmaceutical.

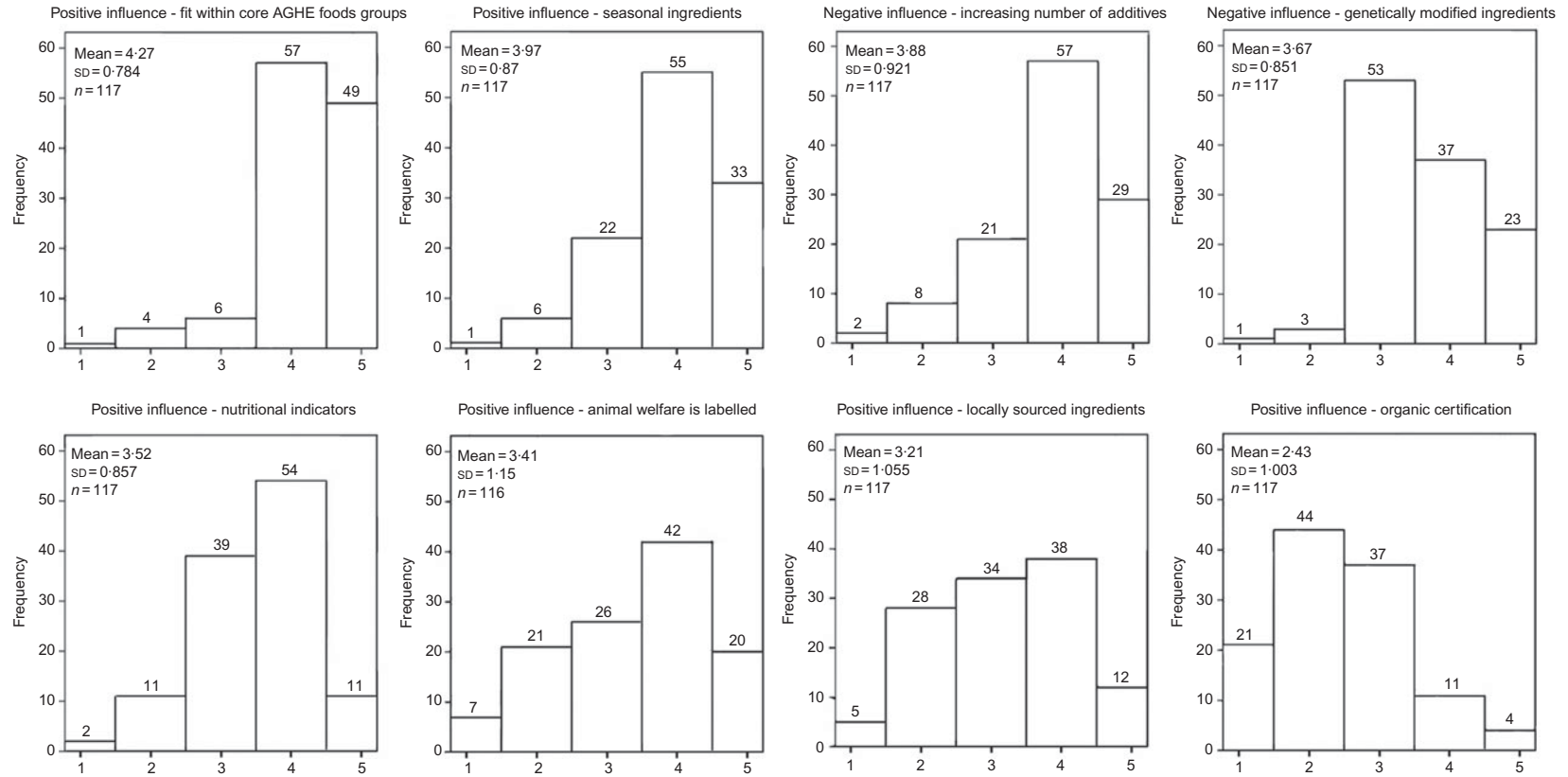
( $n = 88$ , 75.3%), and was negatively influenced with an increasing number of additives ( $n = 86$ , 74%). There were more disparity in results for organic certification, locally sourced ingredients and labelling of animal welfare, with a proportion (56, 28 and 24%, respectively) disagreeing/strongly disagreeing that these factors had a positive influence on healthiness. The influence of GM ingredients on the perceived healthiness of food received the highest number of neutral responses ( $n = 53$ , 45%). Almost half of the participants ( $n = 52$ , 44%) responded with either a neutral response (39, 33%) or disagreed/strongly disagreed ( $n = 13$ , 10%) that nutritional indicators (e.g. the Australian Health Star Rating<sup>(25)</sup> or Heart Foundation Tick<sup>(26)</sup>) positively influenced their perceptions of the healthiness of packaged foods. There was an association between years of experience and the influence of locally sourced ingredients. A higher proportion of those with ≤5 years of experience agreed/strongly agreed ( $n = 30$ , 60%) that locally sourced ingredients positively influenced their perceptions of the healthiness of packaged food compared to participants with ≥6 years of experience ( $n = 20$ , 40%,  $n = 116$ ,  $\chi^2 = 10.35$ ,  $P = 0.006$ ). No other significant associations between factors and demographic characteristics were identified.

Over half of the participants ( $n = 62$ , 53%) provided a response to the two open-ended questions. Content analysis of the fifty-three (45%) responses was coded into four broad categories of 'whole food approach', 'marketing and labelling', 'product information' and 'context of diet', and nine subcategories (Table 2). References to 'whole food' (count of fifteen), 'processing level or type' (count of nine) and 'country of origin' (count of eight) were the highest reported subcategories. Negative comments identified within the 'marketing and labelling' category were centred on celebrity endorsement, amount of packaging and misleading nutrition claims or indicators.

## Discussion

This study explored the influence of current food and nutrition trends on Australian dietitians' perceptions of the healthiness of packaged foods. The greatest consensus among dietitians was a positive influence for fit within core food groups, the presence of seasonal ingredients and the negative influence from an increasing number of additives. The consensus for a fit within the core food groups was supported by the majority of open responses that related to a 'whole food approach'. The positive influence of fit within the core food group can be attributed to dietitians' knowledge and understanding of the evidence for healthy dietary patterns and reduced risk of chronic disease<sup>(1)</sup>. This is supported by our earlier finding that dietitians primarily consider the nutrient content of foods that is associated with chronic disease risk (e.g. saturated fat, salt) in determining the healthiness of packaged foods<sup>(10)</sup>. It is interesting to note that there was a small number of dietitians who did not agree with the positive influence of core foods. We did not explore the reasons for these responses; thus, it is not clear why these participants responded in this way.

There was a consensus among dietitians on the positive influence of seasonal ingredients. Eating seasonally is a key message regarding food, nutrition and environmental sustainability outlined in AGHE and the recent EAT Lancet report<sup>(1,6)</sup>. There is some evidence that the nutritional compositions of plants and animals vary by season, and losses of micronutrients and bioactive compounds can occur through transport and storage of foods<sup>(27)</sup>. However, seasonal ingredients are not considered more healthful *per se* when we acknowledge the reduced variety of food available when eating seasonally and the small nutritional differences provided by foods in season<sup>(27)</sup>. It is possible that participants' personal definition of seasonal ingredients (and similarly for local ingredients) may primarily



**Fig. 1** The extent to which dietitians agree with eight statements that investigated the factors outside of the nutrition information panel and ingredient list that influenced their perceptions of the healthiness of packaged foods (1 – strongly disagree, 2 – disagree, 3 – neutral, 4 – agree, 5 – strongly agree)

**Table 2** Counts of factors outside of the nutrition information panel and ingredient list that influence dietitians' (*n* 53) perceptions of the healthiness of packaged foods

Category	Count*	Summarised responses grouped in each category
Whole food approach	24	
Whole food	15	Whole food (generic reference); ingredients identifiable as a food; food containing wholegrains; vegetables; fruit; legumes; number of whole food ingredients; core foods; consistent with the Australian Guide to Health Eating
Processing level or type	9	Level of processing (i.e. minimal v. ultra); less refined; less processed ingredients; type of processing; manufacturing process (e.g. extrusion, deep frying)
Marketing and labelling	17	
Health and nutrition claims	6	Misleading food claims; health claims; nutrient claims; free-from nutrition claims (e.g. diet, fat free)
Packaging and advertising	6	Celebrity endorsement; packaging colour; material (recyclable) and excessive amount; marketing aspects
Nutritional indicators	5	Health star rating; glycaemic index tested; misleading health ratings
Product information	13	
Country of origin	8	Country of origin; Australian-made or -produced; imported ingredients; supporting foreign countries
Shelf life and storage	5	Shelf life; date of packaging; use-by date; period of storage; refrigeration after opening
Context of diet	11	
Context of other foods or total diet	6	Moderation in context of an individual's total diet; addition of other ingredients (e.g. adding fresh produce to packaged curry paste); comparison and availability of alternatives; an individual's health status and goals
Serving or portion size	5	Serving size; portion size; realistic serving size
Other responses	5	
Single responses	5	Cooking temperature; country of origin or company's environmental, human and animal rights history; retail setting (e.g. health food store); grass-fed meat and dairy; smell and appearance

\*Participant responses may have included more than one content category.

relate to fruits and vegetables<sup>(27)</sup>. Therefore, the responses from these factors may be more reflective of the positive influence of packaged foods that contain fruits and vegetables. Alternatively, these findings may be related to a growing professional interest in sustainable food supply. This is emerging as a major area of importance where environmental impact is considered a part of dietetic interventions<sup>(5)</sup>.

Our findings for seasonal and local ingredients may be due to participants having a greater value for supporting local business and the environment. We found that less-experienced and younger dietitians agreed with the influence of locally sourced ingredients on the healthiness of the food, more so than experienced and older dietitians. This finding may have a relationship with the novel movement for eco-dietetics and the future direction of the profession. Eco-dietetics is a discourse that is defined as situating food, eating and health in a 'broader environmental and social framework than ... solely a collection of macro- and micro-nutrients'<sup>(28)</sup>. Some of the factors relating to the eco-dietetic discourse may have more of an underlying influence on early-career practitioners' perceptions, compared to their more experienced older colleagues, and elements of sustainability may form part of their definition of food healthiness. Importantly, the Australian Dietary Guidelines also promote the idea that food, eating and health involves factors other than macro- and micronutrients<sup>(1)</sup> (including the social determinants of health, whole foods and sustainability of diets); however, these factors are not central to the guidelines. The influence

of sustainability issues on the perceptions of packaged foods warrants further investigation, particularly in light of the recent EAT Lancet report that describes a reference diet that is healthy and sustainable for people and the planet<sup>(6)</sup>.

Mixed responses were received from dietitians regarding animal welfare. Over half agreed/strongly agreed and nearly a quarter disagreed/strongly disagreed that animal welfare labelling positively influences their perceptions of the healthiness of packaged foods. Animal feed practices show some differences in nutrient content; for example, grass-fed cattle can produce leaner beef with more nutritionally desirable fat profile than their grain-fed counterparts<sup>(29)</sup>. Evidence of the nutritional benefits of animal products where the animal has been specially raised or fed (e.g. free-range eggs or chicken meat) is minimal<sup>(30–32)</sup>. Animal raising and feeding methods are often considered an ethical or humane aspect of the food supply, and it is feasible that responses to this factor may have been evoked by personal values or beliefs. Similar to sustainable eating, consumer interest and demand for more ethically sourced foods is likely to shape the future of our food supply and the dietitian's role in advising on the nutritional value of these foods.

Some dietitians in this study reported 'shelf-life and storage' of packaged foods as important, indicating a broader perception of healthiness that includes elements of a product's freshness and potential to cause foodborne illness. This finding is expected as guideline five of the Australian Dietary Guidelines is centred around food



safety, including aspects related to checking best-before and use-by dates and storing food safely<sup>(1)</sup>. 'Country of origin' also emerged from the content analysis as an influence on some dietitians' perceptions of the healthiness of food. There is evidence to suggest that dietitians, similar to consumers, consider the country of origin due to the presumption of food safety practices and country-specific regulation<sup>(33–35)</sup>. These factors concur with previous findings whereby food safety was identified as a concern for dietitians<sup>(18)</sup>.

A number of dietitians commented on the level of food processing. The level of processing is an alternative way of classifying foods and is based on the extent and purpose of processing, rather than based on the nutrient composition of food<sup>(36,37)</sup>. One example is the NOVA system<sup>(38)</sup>, which contains four food groups, including unprocessed or minimally processed foods; processed culinary ingredients and foods that are not generally suitable for eating directly (e.g. flour, oil, sugar, salt); processed foods (e.g. bread, cheese, canned vegetables, salted nuts); and ultra-processed foods (e.g. biscuits, cake, chocolate, processed meats). Evidence indicates that diets high in ultra-processed foods contain greater energy density, added sugar, salt, saturated fat and are lower in fibre compared with diets high in other NOVA food groups<sup>(39)</sup>. Given that highly processed foods usually contain many additives, the presence of an increasing number of additives may be a factor used by dietitians as a proxy indicator of the level of processing of packaged food, subsequently influencing their perceptions of the healthiness of foods.

The context of how the food fits within the whole diet was also a category that emerged from the open-ended responses and was distinct from the comments on fit within the core foods. Factors such as the individual's health-related goals, the relationship to other foods and the serving or portion size were mentioned as relevant to the context of the whole diet. Thus, it is apparent that decisions about the healthiness of an individual food may be more complex than considering a single item in isolation, and that dietitians may consider the individual's personal health and goals as well as the context of other items in the diet.

Within the 'marketing and labelling' category, there were a few negative comments regarding celebrity endorsement, excessive amount of packaging and misleading nutrition claims or indicators. Dietitians have previously shown little confidence in the consumers' ability to understand and interpret health claims and have expressed that claims can be confusing or misleading for consumers<sup>(18)</sup>. This is further supported by evidence that consumers are confused by food labelling, health and nutrition claims<sup>(40–43)</sup>. Dietitians can play a significant role in assisting individuals with the interpretation of food labels and health claims. Further research on dietitians' perceptions of nutrition claims and indicators may provide better understanding of what divides professional opinion. In turn, this may assist in communicating more unified nutrition guidance to the public.

The majority of participants reported a neutral response about the negative influence on the healthiness of packaged foods associated with the presence of GM ingredients. These results align with a study on US dietitians where the majority of responses were either neutral or disagreed on the safety of GM foods<sup>(44)</sup>. Some participants' responses may reflect their lack of knowledge and, thus, they selected a neutral response to err on the side of caution. This was identified in a US study where >70 % of dietitians surveyed had inadequate knowledge of GM foods and reported feeling inadequately informed<sup>(44)</sup>. The more knowledgeable US dietitians were about GM, the more likely they were to be opposed<sup>(44)</sup>. Other research suggests that dietitians have divergent views on GM foods with the majority cautious about their use<sup>(45)</sup>. The presence of GM ingredients in the food supply has been a controversial topic globally where countries, governments and professional organisations differ in their position on the use and safety of GM foods<sup>(44,46,47)</sup>. The Food Standards Australian New Zealand (FSANZ) state that GM organisms undergo safety assessments prior to release in the food supply<sup>(48)</sup>. It is possible that some participants may be aware of the FSANZ regulation, and thus do not feel strongly that GM ingredients pose any unique benefits or detriments to food safety or nutrition.

Organic certification was not perceived as a positive influence on the perceptions of healthiness by most participants. This finding supports an Australian study involving sixty dietitians in which the majority believed that there are no differences between organic and non-organic foods' macronutrient composition, but were divided about the micronutrient and phytochemical contents<sup>(15)</sup>. There is no evidence to suggest that organic foods are significantly more nutritious than conventional foods, although the consumption of organic foods may reduce one's exposure to pesticide residues and antibiotic-resistant bacteria<sup>(49)</sup>. This view is in contrast to consumer studies that reported organic food as safe, healthy and of higher quality than conventionally produced foods<sup>(45,50)</sup>. The discrepancy between the views of dietitians on the positive influence of organic certification may impact the advice provided to consumers on healthy food choices. More research is needed to explore the reasons for this discrepancy among dietitians, and the commonalities that exist between dietitians' and consumers' views on organic certification.

There are some limitations in this study. Foremost is the validity of the survey instrument and reliability of the constructs examined, such as the meaning given to seasonal and local ingredients. These factors could have been interpreted to have different meanings to dietitians due to a lack of consistent definition. This study aimed to explore the factors, other than the NIP and ingredients, that dietitians use to inform their opinions on the healthiness of foods. Our previous study has found that over 87 % of dietitians agreed/strongly agreed that their healthiness ratings of the seven foods examined were influenced by the numeric

values in the NIP and the types of ingredients<sup>(10)</sup>. While the additional factors identified in this study may play a role in dietitians' perceptions of healthiness, this may be a minor influence when compared to the nutrition composition of the food. Regardless, the diversity of opinions for some responses may create mixed messages and confusion for the public when seeking healthy eating advice. In addition, there might emerge a broader definition of food healthiness particularly by those newer to the profession, which relates to sustainable diets and the health of the planet. It is important to consider that responses were obtained from a small non-random sample of dietitians and, thus, may not be representative of the entire profession. As such, these limitations restrict the generalisability of our findings, but provides a platform for more detailed research in the future.

## Conclusion

This study explored factors that influence dietitians' perceptions of the healthiness of packaged foods beyond the influence of nutrient values and ingredients. While there appears to be a general consensus around certain aspects of healthiness that relate to nutrient composition<sup>(10)</sup>, there are additional factors that contribute to dietitians' perceptions of healthiness, which may vary depending on personal values and experiences. Our findings suggest that most dietitians consider current scientific evidence in their judgements, including inclusion of the core food groups and a whole diet approach. The number of additives in the food, which may be a proxy for the level of processing, was considered by most dietitians as having a negative influence on healthiness. Seasonal ingredients that may allude to the aspects of sustainability, a factor that has been identified as a feature of emerging dietetic practice, was also rated by most dietitians as a positive influence.

From our findings, it appears that some dietitians have a broader concept of the healthiness of packaged foods that considers more than nutrient composition and ingredients, and which incorporates the elements of food safety, freshness and marketing. Future research should focus on those factors identified from this research as showing disparity in the opinions of dietitians on the healthiness of food, including organic certification, locally sourced ingredients and labelling of animal welfare. Providing unified messages to the consumer can help the public perceive dietitians as experts of nutrition advice and counselling.

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