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Adults and children prefer a plate food guide relative to a pyramid

doi: 10.6133/apjcn.112015.04

Published online: November 2015

Running title: Plate and pyramid food guides

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Author contributions: ZT and SP were responsible for study design, implementation, data collection and analysis, and manuscript preparation. All authors contributed to study conceptualisation and manuscript preparation.

ABSTRACT

Background and Objective: This study explored attitudes toward two food guides currently being widely used in Australia: the Healthy Eating Pyramid and the Australian Guide to Healthy Eating Plate. **Methods and Study Design:** Ten focus groups were conducted with adults (aged 18+ years) and children (aged 10-17 years) across various locations in Perth, Western Australia. The discussions focused on liked and disliked aspects of each food guide and the implications for participants' perceptions of their relative usefulness. **Results:** When asked to state their preference, a large majority of participants nominated the plate as their preferred nutrition guide. The style of presentation used for the plate was reportedly clearer and more aesthetically pleasing. The plate was also perceived to be more complex while the pyramid was considered by adults to be more child-friendly. **Conclusions:** This study provides information on consumers' reactions to different food guides and the implications for perceived relevance and utility.

Key Words: food guide; nutrition education; children; healthy eating pyramid; healthy eating plate

INTRODUCTION

A diverse range of healthy eating guides currently exists across different countries. While these guides do not vary substantially in food classification and recommended consumption proportions, they do differ considerably in their format (i.e., shape, colour, and graphics).¹ Researchers have attempted to establish whether certain presentation formats are more effective than others for conveying nutrition advice.²⁻⁴ The limited and dated literature on this topic is reviewed below and demonstrates the need for further work in this area to assist in the revision of existing guides to maintain their relevance to target audiences.

Hess and colleagues designed three nutritional guides (a plate, a pyramid, and a rainbow) containing the same nutritional advice and measured Swiss participants' recall of this advice.⁵ They found no differences across the three different guides. Similarly, Hunt and colleagues presented UK participants with food guides that varied in shape (flat plates, tilted plates, and pyramids), background colour (multi- or single-coloured), presentational style (photographic with more foods or cartoon with fewer foods), and food group heading type (less to more detail).⁶ The different design variables had little to no influence on performance in comprehension tasks. However, there were differences in people's self-reported preferences, with the tilted plate and realistic pictures of food being considered more attractive than the

presented alternatives. A circular plate design was also preferred over a pyramid among a sample of Australians.⁷

The finding that different food guide designs do not affect consumer understanding as much as they do liking suggests that it may be informative to study consumers' perceptions of food guides rather than just comprehension. There are numerous studies showing that the aesthetic quality of products and webpages influences perceived usability and satisfaction, often regardless of objective usability.^{8,9} This is partly because effective design can facilitate more effective allocation of attentional resources and reduce cognitive load.¹⁰ Good aesthetics can increase the communication potential of a graphic and increase its memorability.¹¹ Given these are the main aims of nutrition guides, visual appeal may be as important as comprehension since it could have a larger impact on people's processing of the information and ultimately their choice to use the food guide in decision making. The aim of the present study was therefore to update the limited documented research on consumers' perceptions of food guides by identifying those aspects considered most relevant and appealing to target audiences. Despite food guides being widely used to teach nutrition to children, previous research has focused primarily on adults.^{2,3,5,6} The present study thus also included children to identify similarities and differences in perceptions by age. The findings can inform future efforts to enhance nutrition guides to optimise their salience and effectiveness.

The Healthy Eating Pyramid and the Australian Guide to Healthy Eating Plate

In Western Australia, two food guides are currently in common use: the Healthy Eating Pyramid ('the pyramid', shown in Figure 1) and the Australian Guide to Healthy Eating Plate ('the plate', shown in Figure 2). The pyramid is used as a teaching aid in FOODcents, which is a government-funded nutrition education program that has been running since 1995.¹² The plate is the official nutrition information model endorsed by the National Health and Medical Research Council,¹³ and has been disseminated in various versions since 2003.¹⁴ The current version of the pyramid was designed in 2009 and the plate in 2013. The two guides are available to be used separately or in combination and for child or adult audiences.

The most obvious difference between the pyramid and plate is the central shape. Additionally, while the plate is a 2-dimensional representation and uses photographed images of foods, the pyramid is a 3-dimensional representation and uses cartoon images. The explanatory text provided in the plate describes the types of foods in each category while the text associated with the pyramid indicates consumption frequency for each category. The plate does not include the pyramid's 'Eat Least' (or 'Extras') category within the range of

foods depicted in the plate; these foods are shown off to the bottom of the page, implying that although they can be consumed sometimes, they are not considered part of a healthy diet. The plate also separates fruits and vegetables while the pyramid combines them into a single category. The two food guides are based on slightly different nutrition guidelines, which means they have some minor differences in their content and recommendations. However, the proportions of each recommended food group are very similar across the plate and pyramid.

MATERIALS AND METHODS

Ten focus groups were conducted in Perth, Western Australia at different times over a one-month period. In total, 85 participants were recruited by a social research agency and segmented into groups based on their gender (male, female), age (10-13, 14-17, 18-25, 26-45, 46+ years) The groups were conducted in a range of venues across low, medium, and high socioeconomic areas,¹⁵ and ranged in size from 7 to 10 participants (average of 9 per group). The same researcher conducted all 10 groups to minimise moderation differences. The group discussions covered a range of topics relating to food and nutrition, including food preferences, shopping habits, and awareness of various sources of nutrition information. Toward the end of each session, the pyramid and plate were presented separately for comment. Discussion prompts were kept very general (e.g., “What do you think about this?”) to elicit spontaneous feedback relating to the aspects of the models that were most salient and important to participants. Finally, both images were shown side by side and participants were asked which one they preferred. Subsequent discussions focused on their stated reasons for these preferences.

The group discussions ran for an average of 88 minutes (range 70 – 110 minutes). The adult groups (18+ years) lasted an average of 96 minutes, while the child groups (10 – 17 years) lasted an average of 76 minutes. All focus group discussions were digitally audio-recorded and then transcribed. The transcripts were coded and analysed in NVivo10. An iterative process was used whereby the transcripts were read in their entirety and specific nodes were interrogated to facilitate theme generation. Emergent interpretations were discussed among the authors and compared to the extant literature to produce the final themes. The study received ethics clearance from the XXXX University Human Research Ethics Committee. Participants were given information letters prior to the commencement of the discussions and provided signed consent.

RESULTS AND DISCUSSION

In almost all the groups, a clear preference was shown for the plate. The one exception was the group of females aged 46+ years. For these participants the proportions of breads and cereals shown in both the plate and pyramid were considered too high, which led to ambivalence over whether one guide was better than the other. Across the focus groups, participants consistently and spontaneously made observations that could be grouped into one of the following themes: the aesthetics of each food guide, the level of detail provided, and the types of people who each food guide was suitable for.

Aesthetics

Most participants considered the plate to be more visually attractive than the pyramid. They expressed appreciation for the clean, organised design and the use of real pictures in the plate. The modern look of the plate appeared to function as a heuristic for credibility and trustworthiness. The opposite was reported in discussions about the pyramid, with participants describing the graphics as dated.

[The plate] *is more modern* (Male, 46+).

It's [the plate] beautiful (Male, 10 – 13).

Female 1: It's [the plate] not a cartoon. It's actual pictures of real food.

Female 2: [The plate] seems more credible. I'd be more likely to believe this one than the other one [the pyramid] (Females, 18 – 25).

I think it's [the pyramid] a bit dated (Female, 18 – 25).

Participants noted that the plate provided a clear view of each food item, and the overall consensus was that it was easier on the eye. As food guides need to convey a considerable quantity of information, the way in which they utilise space is important. By spreading out the food, the plate adheres to the graphic design rule of reducing visual clutter and optimising whitespace.¹⁷ This is thought to decrease cognitive load and increase favourable impressions of an image.¹⁰ In contrast, the cartoon drawings in the pyramid were packed into a small amount of space and appeared to take longer to identify.

Male 1: This one [plate] you've got a good clear view of each item.

Male 2: It's relieving on the eye absolutely (Males, 18 – 25).

I like how it's a bird's eye view too [plate]. Because this one's [pyramid] all mooshed together like at the top. It's really hard to pick stuff out sometimes (Male, 18 – 25).

Precision

Participants felt that the pyramid communicated basic nutrition information that they already understood. By comparison, the plate with its clear divisions was perceived to be more instructive than the pyramid. The plate was often spontaneously referred to by participants as a pie chart. According to the participants, representing daily intake through a graph made it easier to interpret than the divisions in the pyramid accompanied by the “eat most”, “eat moderately”, and “eat least” text.

I think [the pyramid] was from a time where people just were completely uninformed. It was a good starting point to get a basic message across (Females, 18 – 25).

Male: I reckon it's a pie chart...

Male: Yeah, it looks kind of like a pie chart.

Male: [Vegetables are] thirty per cent of the pie chart (Males 18-25).

I think this [plate] is better for proportions than the other one [pyramid]. The pyramid's good for saying “Eat lots of these good things or eat less of these things that aren't so good for you”, whereas [the plate] is like, “Okay, this is the proportions that you need” (Female, 26 – 45).

Participants liked that the plate which went one step further than the pyramid by dividing fruit and vegetables into separate groups. They noted that it is more important to increase vegetable intake, which is consistent with recent surveys showing that the number of Australians meeting their daily fruit intake requirements (48.5%) greatly outweighs those meeting their vegetable intake requirements (8.2%).¹⁸

I like that they've separated the fruits and vegetables [in the plate] because a lot of people seem to think they are about the same thing (Female, 18 – 25).

[The plate] is telling you, you shouldn't eat too much fruit. Because me, I love fruit. I'll eat a lot more fruit than I will vegetables, but you should be eating more vegetables than fruit (Female, 14 – 17).

Participants also felt the plate took a clearer position on junk food. The fact that these foods were not included on the plate signalled that they should not be considered as part of one's diet.

The unhealthy stuff to me says "It's not on the plate, it's over here. It's something you shouldn't have all the time". I think that's quite clever (Male, 26 – 45).

When you look at the pyramid you see all of your foods there so you think, "I need to eat lots of these and I need to eat a small amount of these", as opposed to, "I need to eat this and there are foods down here which don't come into my plate, I just eat them occasionally". (Female 26 – 45).

Intended audience

The aesthetic and precision elements of each guide impacted not only *how* they were interpreted but also for *whom* participants perceived them to be suitable. Most adults felt that the plate was more appropriate for adults due to its more "mature" presentation style and its greater level of detail. By comparison, both adults and teenagers tended to view the pyramid as better suited to children because of its cartoon drawings.

The round one - it looks more sophisticated and it's got pictures of real food too. I think adults reading it would be more inclined to take interest in it than a cartoon version (Female, 14 – 17).

Yeah, the one on the right is for adults and stuff. It's more realistic and more credible for sure (Female, 18 – 25).

The pyramids more for little kids, I think. It's like easier for them to understand (Females, 14 – 17).

It's for kids, the one on the left [pyramid]. I think that's probably much easier to comprehend and I think the one on the right [plate] is a bit hard to figure out what's going on unless you spend a bit of time thoroughly looking at it, and then it is really good (Male, 26 – 45).

An exception to this general trend was for some parents to comment that the plate would be useful for them to teach their own children about healthy eating. While the pyramid was considered appropriate as a general educational resource for children, the plate was described

as being an effective tool for one-on-one interactions where an adult was present to provide individual guidance in interpreting the plate and applying it to specific food decisions.

Having an older child daughter, I think all through the years going through, that right one [plate] would have been much easier because you could pick out individual items. If you were intent on teaching your children, you could take that with you and say "Where's this sitting on that chart? Should we get it, should we not?" The one on the left [pyramid] where everything's lumped in together, it's kind of generic drawings of some foods. (Males, 26 – 45).

Contrary to the expectations of the adults and teens, the younger children (10-13 years) reported a strong preference for the plate. Their stated reasons were the same as those expressed by the adults and primarily related to aesthetic and precision elements.

I like the pie graph [plate] ...the pyramid is cartoons and they're all cluttered, so it looks like it's been done a bit as a collage. While the pie graph is nice and has been spread out and they've thought about it more (Female, 10 – 13).

I like the pie graph because like it shows more, and they're actually not cartoons so you can actually tell what they are (Female, 10 – 13).

You can see everything clearly (Male, 10 – 13)

In summary, these findings are consistent with previous research showing that people prefer plates over pyramids and real images of food over cartoons.^{6,7} They also support the general tendency for people to prefer rounded over angular objects.¹⁹ The plate was deemed more visually appealing and informative than the pyramid, yet the greater quantity of information conveyed did not appear to increase cognitive load as indicated by the relative ease with which participants were able to interpret the meaning. The style of presentation and level of detail in each guide also influenced perceptions of primary target audiences. While the pyramid was seen by adults and teenagers to be most suitable for children because of the lower level of complexity and depiction of foods via cartoons, children showed a preference for the plate. Some parents did, however, feel that they could teach healthy eating to their children more effectively by using the plate. This study provides a rare insight into children's impressions of food guides and demonstrates that adults may not always understand children's nutrition information preferences.

Overall, these findings support the idea that the presentation of food guides can play an important role in determining their perceived credibility and usefulness. In the present study,

perceptions of superior aesthetics and precision of the plate relative to the pyramid appeared to increase participants' willingness to engage with its content and contemplate the implications for their own diets. These results were generally consistent across gender and age groups. Future research could be conducted in other national contexts to assess the extent to which the preference for the plate identified in this and previous studies is relevant elsewhere. In addition, further work is needed to investigate the relative ability of different food guides to stimulate behavioural change in terms of dietary intake.

ACKNOWLEDGEMENTS

Data collection for this study was partially funded by an ARC Linkage grant (LP130100428).

CONFLICT OF INTEREST

There are no conflicts of interest to report.

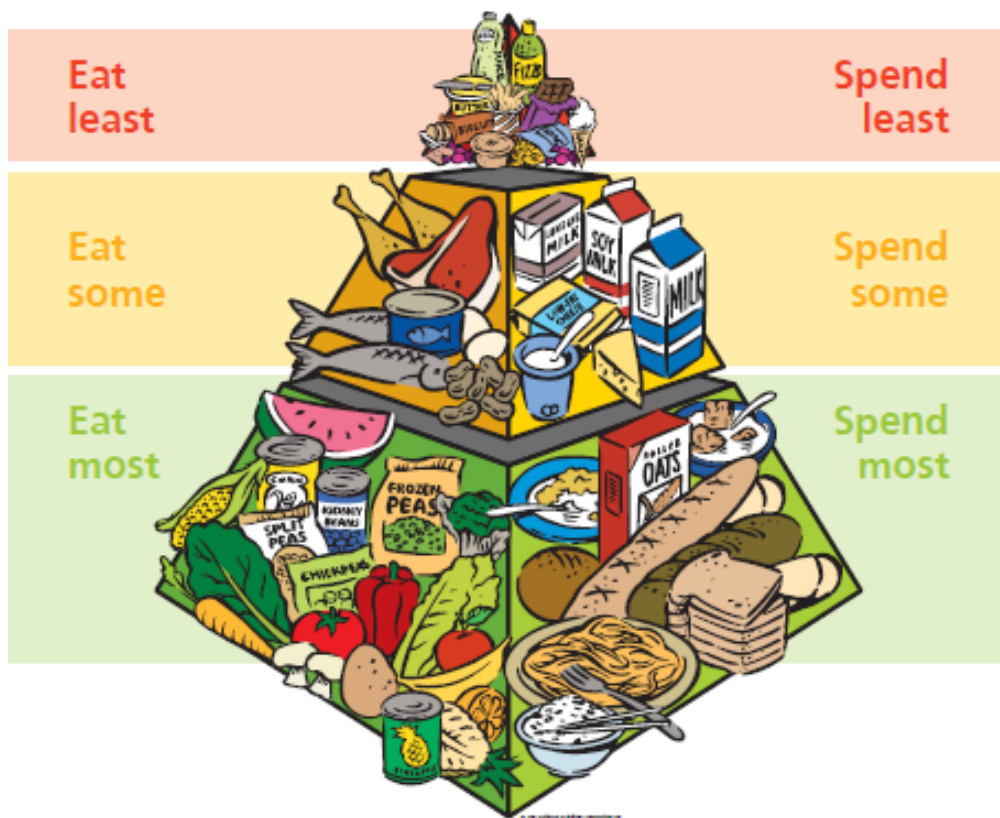
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Figure 1. The Healthy Eating Pyramid¹⁶, reproduced with permission from Nutrition Australia

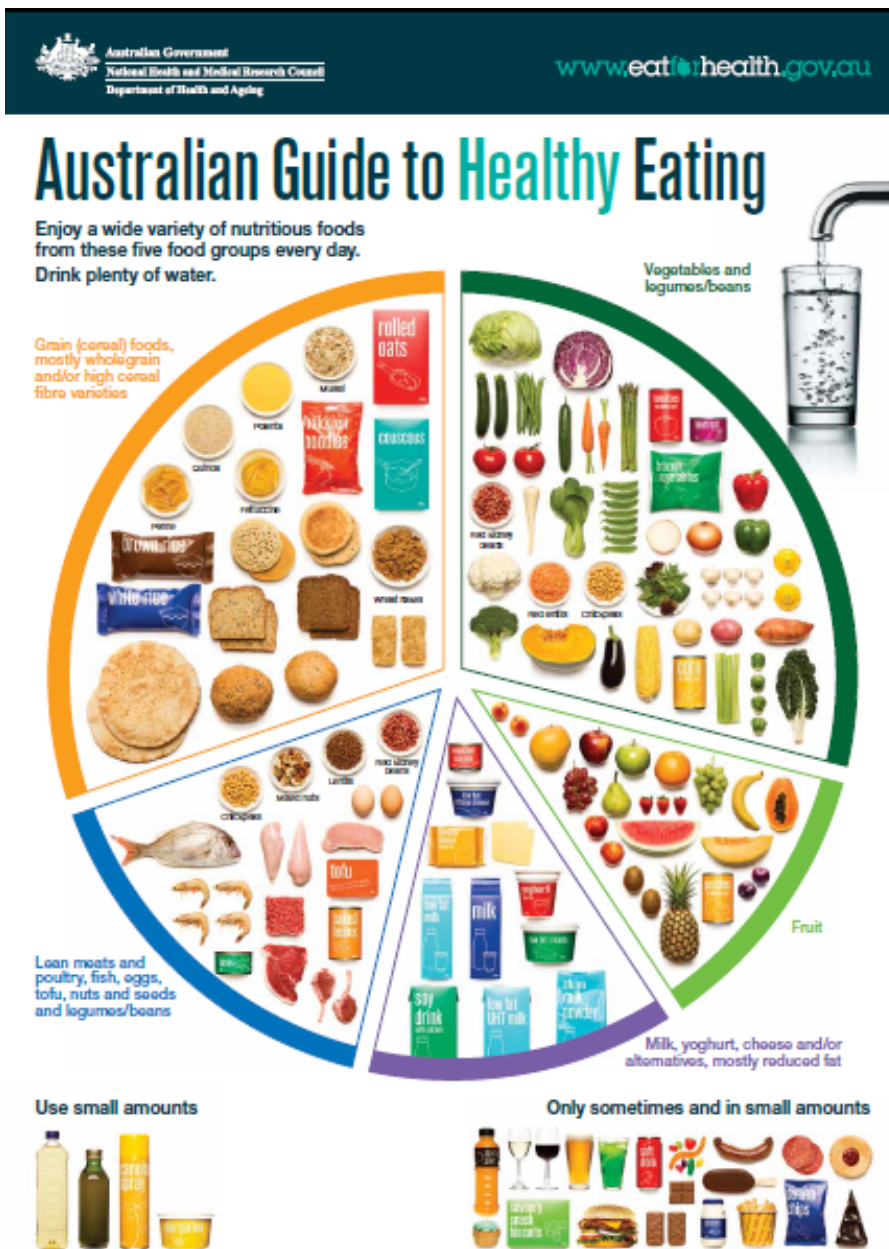


Figure 2. The Australian Guide to Healthy Eating. Source: National Health and Medical Research Council¹³