

# The influence of colour and image on consumer purchase intentions of convenience food

Dan Luo<sup>†</sup>, Luwen Yu<sup>\*</sup>, Stephen Westland<sup>\*</sup> and Nik Mahon

*School of Arts and Humanities, University of Southampton, UK*

*\*School of Design, University of Leeds, UK*

*†Email: dananny1992@hotmail.com*

This study explored the relationship between colour and image of packaging on consumer perceptions and purchase intentions of convenience food and consisted of two parts. The first part was a questionnaire and interview to explore consumer opinions and the second part was a questionnaire completed by 200 participants in UK and China. The results of both parts of the study showed that consumers were influenced by the colour of packaging; red was most associated with the food being tasty and green was most associated with the food being healthy. The presence of appropriate images can enhance these effects. The work has implications for the design of packaging for convenience food and could play a role in changing consumer behaviour.

*Received 19 October 2018; revised 29 March 2019; accepted 01 April 2019*

*Published online: 14 June 2019*

## Introduction

The prevalence of obesity among children and adults has increased dramatically. Data from the World Health Organization shows a threefold increase in the number of obese individuals [1]. Nearly 40% of adults in the world are overweight, whilst over 41 million children under 5 years old in 2016 were obese or overweight. Numerous studies have indicated that convenience food consumption is one contributor to obesity [2-5]. The definition of convenience food is “any fully or partially prepared foods in which significant preparation time, culinary skills or energy inputs have been transferred from the home kitchen to the food processor and distributor” [6]. Convenience food is high in sugar, salt and fat and low in fibre [7]. Numerous studies have revealed that an increasing percentage of households, particularly in the UK, are consuming supermarket ready-meals more than once a week [4, 8]. Although the nutritional content of ready-meals played a critical role in identifying the range of ready-meals [2, 4], the visual appearance of packaging may convey health information [5]. A number of factors are therefore likely driving this increase in the consumption of convenience food such as convenience [9-10], but also including the use of images [11] and use of colour [12]. There is evidence that the visual attributes of packaging may affect consumer perceptions of food before eating [13-15]. It seems timely, therefore, that we seek a greater understanding of how packaging, and the colour of the packaging, in particular, influence consumer choice of food.

There is a clear evidence for a connection between colour preference and consumers behaviour. Previous research examined that the relationship between consumer preference and consumer decision-making [16-17]. For instance, colour preference might influence consumers' overall subjective perception, which in turn might affect consumer behaviour [18-19]. However, the extent of the impact of colour preferences on product purchase choices likely varies for different products [17]. For some products, colour may affect product expectation [15, 20], product evaluation [14] or perceived quality [21]. For example, water in a red or blue cup may be perceived to be more highly carbonated than identical water in a white cup [22]. Another example is that a positive association was found between colour saturation and product expectations [14]. However, these effects may be different depending upon age [3, 23] and gender [5, 10]. For example, younger children are more likely affected by the image of the packaging, while older children tended to consider the overall of packaging [21]. Older people, on the other hand, are more likely to be concerned with the perceived health factor of food [5].

## Methodology

### **Data collection**

This project adopts a mixed-method approach, including qualitative and quantitative data collection methods using a sample of people from the UK and from China. The study began with a qualitative approach to explore the views of participants toward ready meals and the factors that consumers might look for on packaging. Two quantitative approaches were then adopted to test and evaluate the effect of packaging colours and imagery on consumer perception and their purchase decisions. The combination of qualitative and quantitative methods may provide a more detailed explanation and a deeper understanding of the role of colour and imagery in this context. The socio-demographic characteristics of gender, nation, and age are a focus from which to explore the link between these variables and the likelihood of consumers buying convenience food.

### **Procedure**

This work conducted two study phases with visual elements to investigate associations between colours/imagery and health/taste perceptions. In the first study phase (an interview and a follow-up questionnaire) UK participants were approached on the street and invited to take part in a 'taste and health test' for a new fictional cottage pie brand. All participants received an informed consent form and were provided with a brief description before the interview. The interviews were followed by several in-depth, open-ended questions to obtain and clarify more details about the participants' views. At the beginning, participants were shown some ready-meal pictures on supermarket websites, such as Sainsbury, Asda, and Marks and Spencer to engage the participants. Participants began by answering the open-ended question 'What do you think about supermarket ready meals?' Subsequently, participants were asked questions such as 'To what extent do you think the colour/image on packaging will impact your buying decision?' and were encouraged to give their response. Following this, the participants were asked to complete a questionnaire (questionnaire 1) which included questions such as 'To what extent do you agree this is a healthy/tasty food product?' In the questionnaire, participants responded indicated using a 5-point rating scale (subsequently assigned numbers 0–100%). Participants completed the questionnaire for each of 12 examples of packaging and also asked to indicate which three they would prefer to buy. All 12 products had packaging images (six colours with the same food image and six colours without images) (Figure 1) and were digitally created in JPEG

format using Adobe Photoshop; the packaging of the 12 products had colour variants (red, orange, yellow, green, purple, and blue) and image variants (with a food image, without a food image) and were presented on an iPad screen. A total of six colours were chosen for this study: four generally unique hues (red, yellow, blue) and their approximate angle bisectors (orange, green, purple). These colours had almost equal brightness and chroma to ensure that only the hue was considered to be an experimental variable.



Figure 1: Packaging variants (product 1-6: with food image; product 7-12: without food image).

There was 6 (packaging colour: red, orange, yellow, green, purple and blue) x 2 (packaging image: with food image versus no food image) between-subject experimental design. The purpose of these questions was to see whether the food imagery and colour on the packaging would increase the likelihood of buying and to explore the impacts of colour and imagery on consumers' buying decisions and taste/health perceptions.

During the second phase of the study (usability testing), 100 participants who lived in the UK and 100 people living in China participated voluntarily in a questionnaire (questionnaire 2). The questionnaire collected participants' gender, age, living status, taste perceptions, and health perception, and ready meals preferences. Participants were given six different colours (similar colours to those in the first study phase) and were required to indicate which product they considered to be tasty/healthy (Figure 2).



Figure 2: The 6 images generated for ready-meals.

There were slight differences in colour between the images in the two phases. In addition, there is some lack of control because participants accessed the questionnaire through the internet. However, the participants could still readily distinguish between the colours. Regarding participants' favourite, seven products (two designed products and five products from the supermarket) (Figure 3) were presented and participants were asked which one they would like to purchase. Brand names and some outstanding information were concealed for the supermarket products.



Figure 3: The 7 products (2 designed packaging and 5 packaging selling in the supermarket).

## Findings and analysis

### Study 1

The first phase of the study (interview and questionnaire 1) was conducted in one city in the UK (Table 1). The results of questionnaire 1 indicated that 75% of participants aged 18–24 and 25–34 tended to buy ready meals 'less than once a month', while participants aged 35–44 and 45–54 agreed with 'few times a month'. In addition, 57% of males tended to buy ready meals more than once each month whereas only 43% of females did so (Figure 4). These results indicate that gender and age might have an effect on their buying behaviours.

UK (n=30)		
Gender	Male	53.3%
	Female	46.7%
Age	18-24	30.0%
	25-34	23.3%
	35-44	13.3%
	45-54	16.7%
	55+	16.7%
Purchase frequency	Less than once a month	40.0%
	A few times a month	16.7%
	About once a month	16.7%
	A few times a week	16.6%
	Once a week	10.0%

Table 1: The proportion of the participant groups by gender, ethnicity, age and purchase frequency (%).

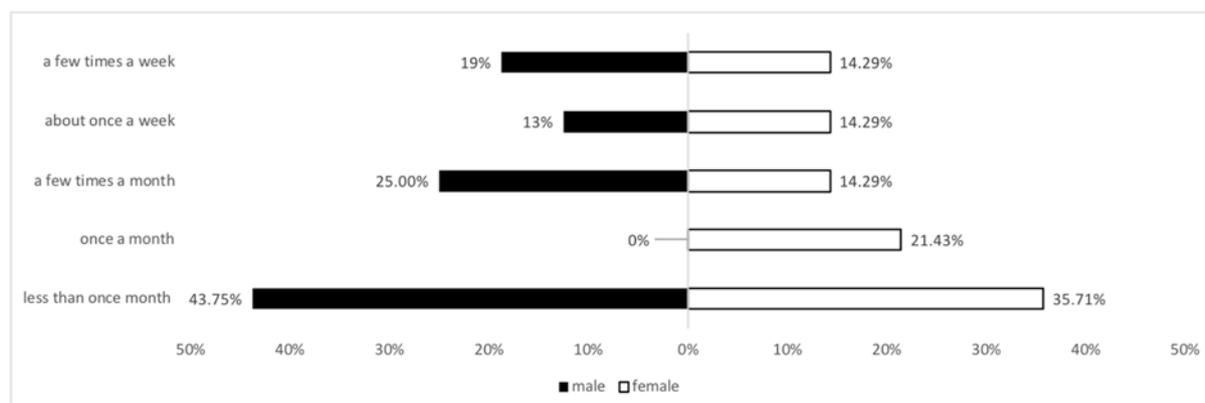


Figure 4: The proportion of male and female's purchase frequency (%).

### Opinion of ready meal

Several key themes related to ready meals (Figure 5). A large number of participants stated they are unhealthy (53%), convenient (63%) and tasty (40%), but tasty is a controversial issue that is worth addressing in this section. Examples of consumer responses include:

*"If it's Tesco, it's probably not going to be as good as Waitrose ... I will go for the expensive ones because you probably get better quality (Female aged 65-74)."*

*“I think it really depends on where you buy them ... Sometimes, you get the high premier product, which has the particular branding related to a particular chef or something like that. It suggests quality ... They prove the quality of the product (Male aged 25-34).”*



Figure 5: High frequency words of consumers' opinion of ready meals.

These results showed that consumers are concerned about health and taste, while it was interesting to discuss the role of health and taste in the buying decisions.

### ***What consumers see in the packaging***

Some participants reported that they would pay attention to ingredients, nutritional label, and the design of packaging (Figure 6). Thus, the health attributes of ready meals may be an important factor that affects consumers' likelihood of making purchasing decisions.



Figure 6: High frequency words of consumers who look at packaging when buying ready meals.

Example responses include:

*“I'd like to know the information about the ingredients, and the healthy, nutritional values (Male aged 35-44).”*

*“I'm looking for not too much fat, not too much sugar (Male aged 65-74).”*

*“If it looks attractive on the packaging, I like to think it's good inside (Male aged 35-44).”*

*“If the design packaging is quite nice, quite clear, that can suggest quality as well (Male aged 25-34).”*

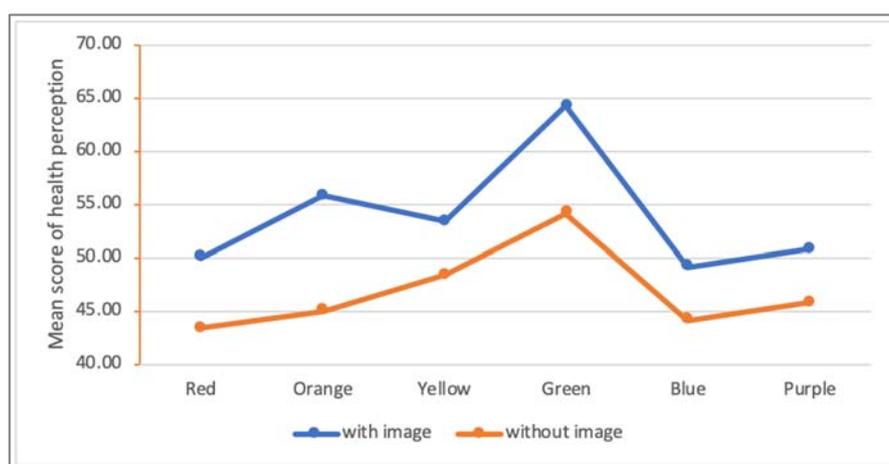
It is clear that packaging plays an influential role in consumers' food choices. Some participants stated that attractive or designed packaging was associated with taste and the high quality of a product.

The results demonstrate that many consumers look at the nutritional label and ingredients to identify whether food is healthy or not, which suggests that health attributes might be an influential role in packaging. Besides, there is a correlation between consumers' taste perceptions and the design of the packaging, which could affect the quality of the ingredients. Thus, packaging is positively associated with consumers' perceptions, which suggests that consumers' perceptions (i.e. health and taste perceptions) and packaging (e.g. colour and imagery) could influence consumers' food choices.

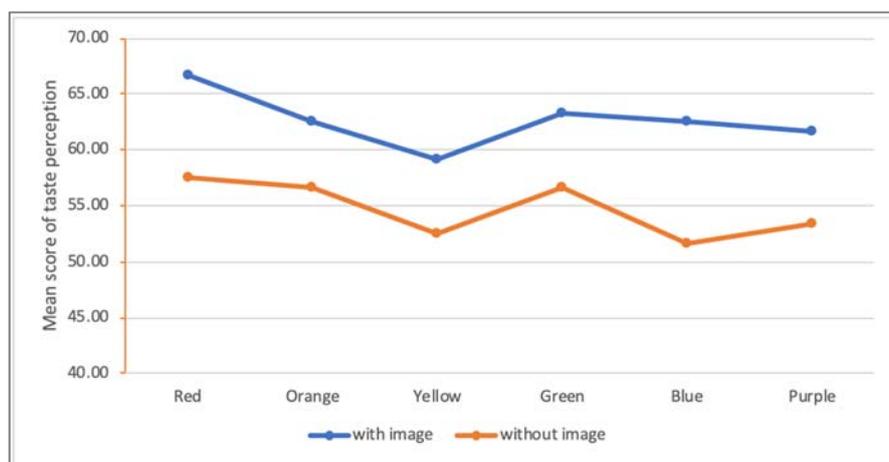
### **Image and colour**

Regarding the impact of packaging, the results of the questionnaire revealed that colour (73.3%) and imagery (83.3%) might affect their purchase decisions.

The average rating of 'taste perception' and 'health perception' (Figures 7 and 8), indicates that health and taste perceptions are significantly affected by images and colour on the packaging. The correlation between the colour green and health was quite high and products with red packaging were perceived to be the tastiest.



*Figure 7: Mean score of health perception.*



*Figure 8: Mean score of taste perception.*

Thus, these findings demonstrate that colour was an influential factor in consumers' taste and health perceptions. Additionally, results from a one-way ANOVA demonstrated that food imagery was a strong factor in terms of impacting consumers' perceptions. As demonstrated in Tables 2 and 3, the mean score of taste perceptions and health perceptions with imagery were higher than the mean scores without imagery. The effects of packaging imagery on the perceptions of products' health and taste were significant.

	Red	Orange	Yellow	Green	Purple	Blue
With food image	66.67	62.50	59.17	63.33	61.67	62.50
Without food image	57.50	56.67	52.50	56.67	53.33	51.67
Sig.	.000	.000	.003	.013	.041	.011

Table 2: Significant effects of imagery and colours on taste perceptions.

	Red	Orange	Yellow	Green	Purple	Blue
With food image	50.00	55.83	53.33	64.17	50.83	49.17
Without food image	43.33	45.00	48.33	54.17	45.83	44.17
Sig.	.000	.003	.006	.030	.000	.001

Table 3: Significant effects of imagery and colours on health perceptions.

## Study 2

The usability test (questionnaire 2) (Table 4) conducted online aimed to discover to what extent colour and imagery could impact the likelihood of consumers' buying decisions, by asking which one they preferred to buy from seven different packages of ready meals (two designed products and five from supermarkets). Figure 9 demonstrates that over 20% of participants chose the packaging ID 1 (designed red packaging with imagery) and more than 14% of respondents preferred to buy packaging ID 4 (designed green packaging with food imagery), which indicates that colour and imagery could significantly affect consumers' food choices (the average value is 13.3%). Figure 10 demonstrated that more than 79% of the participants selected the green packaging as being the healthiest, whilst over 44% of participants chose the red packaging as the tastiest. This result is largely consistent with study 1, which demonstrated that red had a high association with taste and green had a positive correlation with health.

UK and China (n=200)		
Gender	Male	36.0%
	Female	64.0%
Ethnicity	UK	50.0%
	China	50.0%
Age	18-24	36.0%
	25-34	52.5%
	35-44	4.5%
	45-54	6.5%
	55+	0.5%
Previously purchased	Yes	95.0%
	No	5.0%

Table 4: The proportion of the participants gender, ethnicity, age and previous purchases (%).

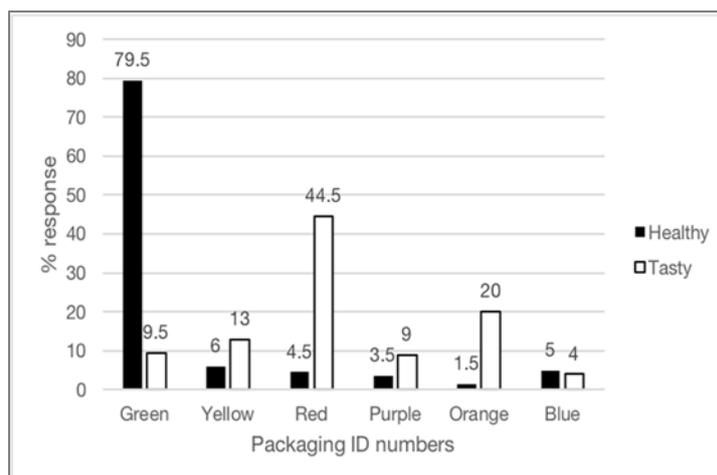


Figure 10: The percentage of respondents that indicated which packaging is healthy/tasty.

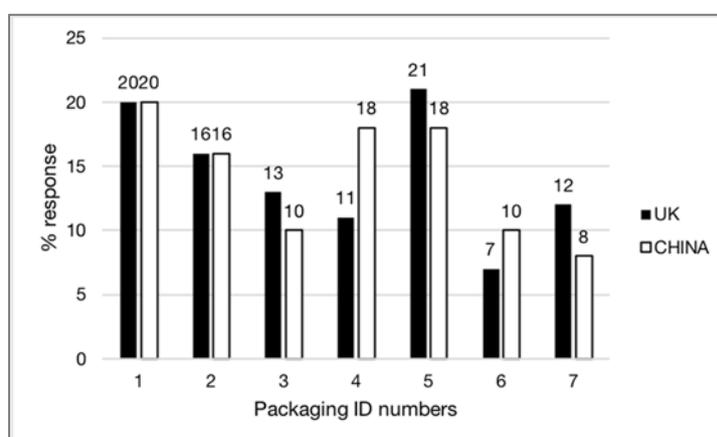


Figure 11: The distinction results between participants in UK and China (choose one prefer to buy).

Other factors, such as ethnicity, had a critical impact on consumers' food choices. Results from Chinese respondents and UK participants were showed some differences (Figure 11). Chinese respondents preferred to purchase ID 4 (designed green packaging), whilst UK respondents preferred ID 5 (blue packaging with image). There was no significant difference between the respondents in the two countries when they chose the healthiest packaging (green product) and the tastiest packaging (red product) (Figures 12 and 13).

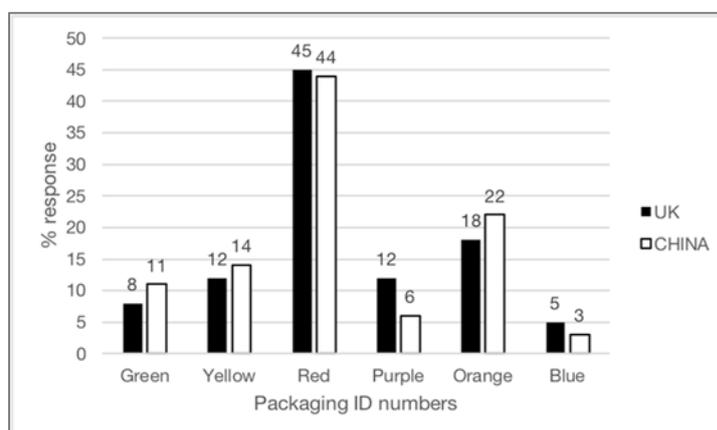


Figure 12: The distinction results between participants in UK and China (choose which one is the healthiest).

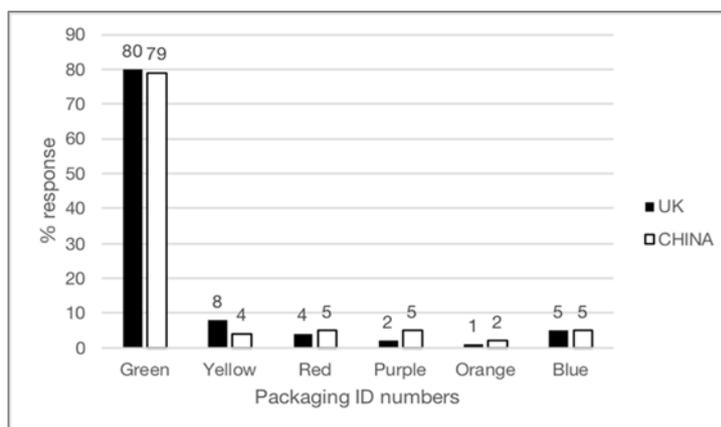


Figure 13: The distinction results between participants in UK and China (choose which one is the tastiest).

## Discussion

This study explored the relationship between colour and image of packaging on consumer perceptions and purchase intentions of convenience food and consisted of two parts. The first part was a questionnaire and interview to explore consumer opinions. The results showed that consumers were influenced by the colour of packaging; red was most associated with the food being tasty and green was most associated with the food being healthy. The presence of appropriate images can enhance these effects. The notion that packaging colour can influence consumers' expectation of how food may taste has also been discussed by other researchers [24]. For example, it has been demonstrated that light colours (such as white, silver and pastels) have historically been strongly associated with diet products or products that are low in fat and/or sugar [25].

The second part of the work involved a questionnaire that was completed by 100 participants in each of UK and China. Participants were shown packaging with varying colour and were asked which of the packages would most influence them to make a purchase.

The results illustrate that perceived health and taste seems to vary with the colour of the packaging but that the results are broadly consistent with those from the first part of the study. For instance, green packaging was strongly associated with health, while red was associated with food being tasty. One possible explanation of the relationship between green and health is the low arousal (e.g. green, blue) for these colours and their associations with peace and rest [26]. Relationships between colour and basic taste dimensions have been found in other previous studies [14, 20-21, 26-27]. For example, water is perceived to be more carbonated in a red or blue cup [22]. This study indicates that red packaging has a high association with taste and unhealthy food, which supports the results of a study by Huang and Lu [28]. It has been suggested that this may be because of succulent red leaves [29].

There is evidence from this study and from other studies that colour can play a critical role in affecting consumers' buying decisions [18, 30]. For instance, the colour of the package could grab shoppers' attention, with the aim of standing out on the shelf [14, 16, 20-21, 31]. Additionally, colour can convey emotions [32], such as warm or safe, which play an important role in food choices [11, 33-34]. The preference for buying red products could suggest that taste preferences are a stronger driver for the likelihood of consumers' purchase of ready meals than health benefits, regardless of the fact that many consumers state that they concerned about the health factor (e.g. looking for nutritional information). This result is consistent with previous work that demonstrates the importance of taste preferences [5, 33, 35-36] and their effects on clients' likelihood of making purchases [14, 37]. Besides, the results of

the one-way ANOVA demonstrate that food imagery is one of the influential factors of impacting consumers' perceptions of health and taste.

The results of this study demonstrate that factors such as age, gender and culture seem to have an impact on the likelihood of buying ready meals. One probable explanation is that older consumers tend not to be willing to change their traditional eating habits, while the younger generation tends to be affected by newly popularised food products [3]. Besides, it shows a linear relationship between gender and product choices, which is supported by numerous studies of gender differences in food choices and eating behaviour [5, 38]. A related explanation for gender differences in food choices holds that female tends to eat healthy food due to weight control and health beliefs [38]. Additionally, results in the UK and China showed a disparate preference for the 'preferred packaging', demonstrating that different cultures might modulate food choices. Therefore, the socio-demographic variables, such as gender, culture, and age could be considered essential factors affecting consumers' food choices.

Finally, it should be noted that this work was primarily about the effect of colour and image on a particular type of convenience food, cottage pie. This is a convenience food but is perhaps a convenience food that is healthier than some other convenience foods. There is no certainty that the results obtained in this study would apply to other convenience foods and more work is needed in this area.

## Acknowledgements

The authors would like to thank Dr Elliott Nikdel for his help and assistance with this work.

## References

1. World Health Organization (2018), Obesity and overweight – <http://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight> – last accessed 18 August 2018.
2. Celnik D, Gillespie L and Lean MEJ (2012), Time-scarcity, ready-meals, ill-health and the obesity epidemic, *Trends in Food Science & Technology*, **27** (1), 4-11.
3. Keller K, López SR and Moreno MMC (2015), Association between meal intake behaviour and abdominal obesity in Spanish adults, *Appetite*, **92**, 1-6.
4. Remnant J and Adams J (2015), The nutritional content and cost of supermarket ready-meals: Cross-sectional analysis, *Appetite*, **92**, 36-42.
5. Olsen NV, Menichelli E, Sørheim O and Næs T (2012), Likelihood of buying healthy convenience food: An at-home testing procedure for ready-to-heat meals, *Food Quality and Preference*, **24** (1), 171-178.
6. Traub LG and Ödland OD (1979), Convenience foods and home-prepared foods, *Agricultural Economic Report*, **428**, Washington.
7. Kanzler S and Wagner KH (2009), Guidelines for the improvement of the nutritional quality of ready meals in Europe, *Ernährung*, **33** (1), 13-15.
8. Mahon D, Cowan C and McCarthy M (2006), The role of attitudes, subjective norm, perceived control and habit in the consumption of ready meals and takeaways in Great Britain, *Food Quality and Preference*, **17** (6), 474-481.
9. Burch D and Lawrence GA (2005), Supermarket own brands, supply chains and the transformation of the agri-food system, *International Journal of Sociology of Agriculture and Food*, **13** (1), 1-18.
10. Heiniö RL, Arvola A, Rusko E, Maaskant A and Kremer S (2017), Ready-made meal packaging—A survey of needs and wants among Finnish and Dutch 'current' and 'future' seniors, *LWT-Food Science and Technology*, **79**, 579-585.

11. Wardy W, Sae - Eaw A, Sriwattana S, No HK and Prinyawiwatkul W (2015), Assessing consumer emotional responses in the presence and absence of critical quality attributes: a case study with chicken eggs, *Journal of Food Science*, **80** (7), S1574-S1582.
12. Westland S and Shin MJ (2015) The relationship between consumer colour preferences and product-colour choices, *Journal of the International Colour Association*, **14**, 47-56.
13. Abidin SZ, Effendi RAARA, Ibrahim R and Idris MZ (2014), A semantic approach in perception for packaging in the SME's food industries in malaysia: A case study of malaysia food product branding in United Kingdom, *Procedia - Social and Behavioral Sciences*, **115**, 115-130.
14. Becker L, van Rompay TJ, Schifferstein HN and Galetzka M (2011), Tough package, strong taste: The influence of packaging design on taste impressions and product evaluations, *Food Quality and Preference*, **22** (1), 17-23.
15. Teixeira Lopes MM, Passos Rodrigues MDC and Souza de Araújo AM (2018), Influence of expectation measure on the sensory acceptance of petit suisse product, *Journal of Food Science*, **83** (3), 798-803.
16. Gidlöf K, Anikin A, Lingonblad M and Wallin A (2017), Looking is buying. How visual attention and choice are affected by consumer preferences and properties of the supermarket shelf, *Appetite*, **116**, 29-38.
17. Yu L, Westland S, Li Z, Pan Q, Shin MJ and Won S (2018), The role of individual colour preferences in consumer purchase decisions, *Color Research and Application*, **43** (2), 258-26.
18. Kauppinen-Räsänen H (2014), Strategic use of colour in brand packaging, *Packaging Technology and Science*, **27** (8), 663-676.
19. Palmer SE and Schloss KB (2010), An ecological valence theory of human color preference, *Proceedings of the National Academy of Sciences*, 200906172.
20. Spence C and Velasco C (2018), On the multiple effects of packaging colour on consumer behaviour and product experience in the 'food and beverage' and 'home and personal care' categories, *Food Quality and Preference*, **68**, 226-237.
21. Elliott C (2009), Healthy food looks serious: How children interpret packaged food products, *Canadian Journal of Communication*, **34** (3), 359-380.
22. Risso P, Maggioni E, Olivero N and Gallace A (2015), The association between the colour of a container and the liquid inside: an experimental study on consumers' perception, expectations and choices regarding mineral water. *Food Quality and Preference*, **44**, 17-25.
23. Thaichon P and Quach TN (2016), Online marketing communications and childhood's intention to consume unhealthy food, *Australasian Marketing Journal*, **24** (1), 79-86.
24. Hutchings JB (2003), *Expectations and the Food Industry*, New York: Kluwer Academic.
25. Musso ML (2010), Colour as a code in food packaging: an Argentine case, *Proceedings of the Interim Meeting of the International Colour Association: Color and Food*, 57-60.
26. van Rompay TJ, Deterink F and Fenko A (2016), Healthy package, healthy product? Effects of packaging design as a function of purchase setting, *Food Quality and Preference*, **53**, 84-89.
27. Spence C (2016), Multisensory packaging design: color, shape, texture, sound, and smell, in *Integrating the Packaging and Product Experience in Food and Beverages: A Road-Map to Consumer Satisfaction*, Woodhead Publishing, 1-22.
28. Huang L and Lu J (2015), Eat with your eyes: Package color influences the expectation of food taste and healthiness moderated by external eating, *Marketing Management*, **25** (2), 71-87.
29. Hurlbert AC and Ling Y (2007), Biological components of sex differences in color preference, *Current Biology*, **17** (16), R623-R625.
30. Won S and Westland S (2017), Colour meaning and context, *Color Research and Application*, **42** (4), 450-459.
31. Tijssen I, Zandstra EH, de Graaf C and Jager G (2017), Why a 'light' product package should not be light blue: Effects of package colour on perceived healthiness and attractiveness of sugar- and fat-reduced products, *Food Quality and Preference*, **59**, 46-58.
32. Ou LC, Luo MR, Woodcock A and Wright A (2004), A study of colour emotion and colour preference. Part I: Colour emotions for single colours, *Color Research and Application*, **29** (3), 232-240.

33. Gutjar S, de Graaf C, Kooijman V, de Wijk RA, Nys A, Ter Horst GJ and Jager G (2015), The role of emotions in food choice and liking, *Food Research International*, **76**, 216-223.
34. Spinelli S, Masi C, Dinnella C, Zoboli GP and Monteleone E (2014), How does it make you feel? A new approach to measuring emotions in food product experience, *Food Quality and Preference*, **37**, 109-122.
35. Bryant R and Dundes L (2008), Fast food perceptions: A pilot study of college students in Spain and the United States, *Appetite*, **51** (2), 327-330.
36. Glanz K, Basil M, Maibach E, Goldberg J and Snyder DAN (1998), Why Americans eat what they do: taste, nutrition, cost, convenience, and weight control concerns as influences on food consumption, *Journal of the American Dietetic Association*, **98** (10), 1118-1126.
37. Olsen SO (2003) Understanding the relationship between age and seafood consumption: the mediating role of attitude, health involvement and convenience, *Food Quality and Preference*, **14** (3), 199-209.
38. Wardle J, Haase AM, Steptoe A, Nillapun M, Jonwutiwes K and Bellis F (2004), Gender differences in food choice: the contribution of health beliefs and dieting, *Annals of Behavioral Medicine*, **27** (2), 107-116.