

# **Gastrophysics & the new science of plating**

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## **ABSTRACT**

Internet-based testing techniques are increasingly allowing chefs to optimize the visual presentation of their food online. This scientific approach to plating is part of the emerging field of gastrophysics, namely the application of psychophysical testing techniques to the design of enhanced food experiences. Here, three rules of thumb concerning the preferred orientation of food on the plate that have been identified by the research are outlined, namely: (1) angular elements on the plate are preferred when they point away from the diner/viewer; (2) people typically exhibit a preference for those elements on the plate that ascend to the right (rather than to the left); (3) people also exhibit a preference when linear/rectangular food presentations are aligned along the horizontal/vertical axis, rather than when they are oriented away from these principal axes.

## **Introduction**

In recent decades, many chefs have started to become increasingly interested in the way in which their dishes are presented (see Deroy, Michel, Piqueras-Fiszman, & Spence, 2014, for a

review). Until recently, chefs would tend to rely on intuition when determining the optimum orientation in which to present the dishes served to their guests. However, given the growing realization that people really do eat first with their eyes (see Spence, Okajima, Cheok, Petit, & Michel, 2016, for a review), together with the explosion of interest in sharing beautifully (or surprisingly) plated dishes of food on social media sites such as Instagram's *Art of Plating* ([https://www.instagram.com/\\_artofplating\\_/](https://www.instagram.com/_artofplating_/)), it is becoming increasingly important to assess the plating of food scientifically (see Spence, Piqueras-Fiszmanm Michel, & Deroy, 2014, for a review). The emerging gastrophysics research in this area shows that people exhibit clear preferences for certain orientations over others as far as plating of food is concerned (see Spence, 2017b, for a review).

### **Assessing orientation preferences for the plating of food**

One of the most exciting developments in the emerging field of gastrophysics research (see Spence, 2017a, for a review) has been the emergence of online testing as a legitimate, rapid, and cheap means of assessing people's impressions/associations/expectations with visually-presented stimuli, such as, for example, plates of food (see Woods, Velasco, Levitan, Wan, & Spence, 2015, for a review of the strengths and weaknesses of the online testing approach). Working together with those chefs interested in optimizing the eye appeal of their dishes, we have conducted a number of studies in which the orientation preferences of large numbers of individuals are assessed online. While such an approach can be merely exploratory in nature (i.e., involving the hypothesis-free assessment of people's plating preferences), there are a number of aesthetic 'rules' that have emerged from decades of research on painting that, it turns out, can be applied to the world of plating too (see Spence, 2017b, for a review). Below, three such rules of thumb that the research demonstrated help predict the preferred orientation of plates of food are highlighted.

#### *Pointing angularity away from the diner*

There is a literature out there showing that people's brains typically exhibit a short-lasting fear response (e.g., in the amygdala) when angular stimuli are seen pointing toward them (e.g., Larson, Aronoff, Sarinopoulos, & Zhu, 2009). This has been shown to translate into a slight preference for angular stimuli when they are seen point away from the viewer (rather than

towards them). We conducted an online study with the signature dish served by chef Alberto Landgraf (from restaurant Epice in Sao Paulo) showing a similar preference as far as the plating of food is concerned too (see **Figure 1**). This dish in question consists of red onions, tapioca, sugar cane vinegar, peanut, fermented cream. The picture of the dish was uploaded onto the internet and people were invited to select the preferred orientation for the dish (being asked the question of ‘If you were to be served this dish, how would you like it plated?’). The 1667 participants, who were paid a few cents each to take part in the study, saw the plate rotating (to avoid any bias attributable to end anchoring should a fixed initial position have been shown). As expected, the results highlighted a clear preference for the three onions when they were arranged so as to point away from the viewer (shown by the arrow and the bulge in the line surrounding the plate).

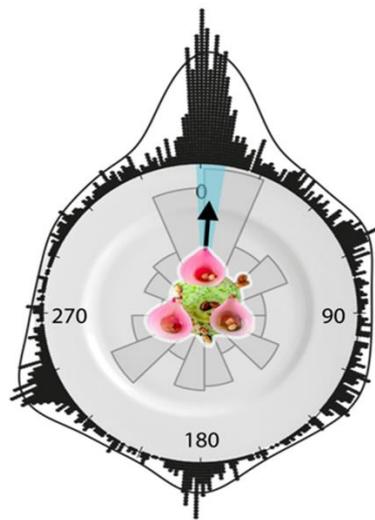


Figure 1. Circular data plot showing the results of a study in which 1667 participants indicated their preferred orientation for one of chef Alberto Landgraf's dishes. Each dot represents the preferred orientation indicated by one of the online participants. Hence, the greater the number of dots, the more pronounced the preference for a particular orientation. The line surrounding the plate provides an estimate of the preferred orientation (indicated by the bulge of the line). The food has been added to the figure and oriented by  $3.20^\circ$  clockwise (the bias-corrected, mean orientation in which the food was placed by participants). The arrow indicates the mean angle that participants placed the food in (beneath which is a blue shaded wedge indicating the lines 95% confidence intervals). In this case, the chef's decision to place the dish pointing at 12 o'clock was closely in line with the preferences demonstrated by the group. [Picture represented with permission from Michel et al. (2015).]

*Ascending to the right: Preferential orientation for linear elements*

When there is a dominant linear element on the plate, our research highlights a preference when that element ascends to the right (rather than to the left). So, for example, Youssef, Juravle, Youssef, Woods, and Spence (2015) presented viewers with two versions of the same dish created by chef Jozef Youssef, one more round/centred and the other presentation with a distinctive linear arrangement (see **Figure 2**). This two dishes were uploaded onto the internet and people (N = 521) invited to rotate each of the plates into their preferred orientation. While the results revealed no clear preferred orientation for the round/centred presentation of the dish, there was a clear (and significant) preference for the ascending to the right orientation for the linear plating arrangement, and hence that was the orientation in which the dish was served to diners at the chef's pop-up dining events.

But why, one might ask, should the ascending to the right orientation be preferred? According to Arnheim (1974), the bottom-left to top-right diagonal appears to be ascending, while the top-left to bottom-right diagonal appears to be descending. Meanwhile, marketing research shows that product logos ascending to the right are associated with notions of activity in the mind of the consumer (Schlosser, Rikhi, & Dagogo-Jack, 2016). However, when it comes to food, it is worth noting that our brains simulate the act of eating a plate of food even if it is seen on the internet (or on the front of product packaging). Importantly, anything that can be done to make it easier for the viewer to simulate the act of eating the plate of food tends to translate into increased liking (see Elder & Krishna, 2012). Hence, the ascending to the right preference in plating might also be explained in terms of this presentation of the food being easier to simulate eating than when the same food is shown ascending to the left instead.

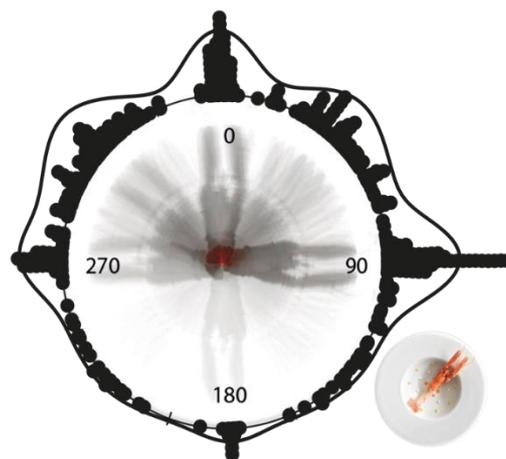


**Figure 2.** Circular data plots and purple rose diagrams of the preferred plate orientations for each dish selected by participants in Youssef et al. (2015; Experiment 3). The results clearly highlight a preference when the linear element ascends to the right (see left panel). For clarity and ease of interpretation, the food has been added to the

figure and oriented by the mean orientation in which the food was placed by participants. [Figure courtesy of Youssef et al. (2015),]

### *Orientation preference for the horizontal/vertical*

In the world of painting, a preference for paintings to be oriented along the horizontal/vertical axis has sometimes been reported. One might ask whether the same preference would also be observed as far as the plating of food is concerned. Evidence of a preference for food to be oriented along the main axes comes from another study in which one of chef Jozef Youssef's dishes was uploaded onto the internet for people ( $N = 401$ ) to rotate into their preferred orientation. In this case, the lobster shown in the bowl was preferred when oriented along the horizontal axis or else when oriented (pointing away from the viewer) along the vertical axis (see **Figure 3**). Such a preference may perhaps be explained in terms of a preference for balance (see Spence, 2017b).



**Figure 3.** Circular data plot highlighting the results of a study showing the preferred orientation of one of chef Jozef Youssef's dishes. For clarity and ease of interpretation, a composite of all 401 plate orientations has been added to the figure (colour filters have been applied to the composite to make it more legible). The original dish is shown in the bottom right of the above figure. [Picture copyright the author.]

## **Conclusions**

Optimizing the visual presentation of a dish is becoming more important than ever before. While the decision concerning how to plate a dish was traditionally left up to the intuitions of the chef, an emerging branch of gastrophysics research has started to provide techniques that

enable viewers to select/rate the orientation of a dish, and hence provide rapid cheap feedback to the chef (see Spence, 2017a, b). Interestingly, while the intuitions of the successful chef often turn out to be preferred by the population at large, that is not always the case. While some chefs/restaurateurs may wish to orient the plate so as to maximize the diner's willingness to pay for the food, others may wish to plate it as creatively as possible. While there is no space to cover it here, it is also worth noting that much the same approach to assessing orientation preferences for food can be used when assessing the orientation of those foods shown on product packaging (see Velasco, Woods, & Spence, 2015).

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