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## Research report

## Studying the impact of plating on ratings of the food served in a naturalistic dining context ☆

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## ABSTRACT

An experiment conducted in a naturalistic dining context is reported, in which the impact of different styles of plating on diners' experience of the food was assessed. A hundred and sixty three diners were separated into two groups during a luncheon event held in a large dining room. Each group of diners was served the same menu, with a variation in the visual presentation of the ingredients on the plate. The results revealed that the diners were willing to pay significantly more for the appetizer (a salad), when arranged in an artistically-inspired manner ( $M = £5.94$  vs.  $£4.10$ ). The main course was liked more, and considered more artistic, when the various elements were presented in the centre of the plate, rather than placed off to one side. The participants also reported being willing to pay significantly more for the centred than for the offset plating ( $M = £15.35$  vs.  $£11.65$ ). These results are consistent with the claim that people "eat first with their eyes", and that a diner's experience of the very same ingredients can be significantly enhanced (or diminished) simply by changing the visual layout of the food elements of the dish. Results such as these suggest that theories regarding the perception of food can potentially be confirmed (or disconfirmed) outside of the confines of the laboratory (i.e., in naturalistic dining settings).

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## Introduction

Eating is one of the most multisensory of our everyday experiences, one in which all of the senses often interact (e.g., Auvray & Spence, 2008; Stevenson 2009). Many different product-extrinsic cues can influence a diner's experience of the food served in a restaurant, and complex interactions may occur amongst them (see Spence & Piqueras-Fiszman, 2014, for a recent review).

The visual arrangement (composition) of food elements on a plate exerts a profound influence over what a customer thinks about the dish: It has often been suggested that we eat first with our eyes (e.g., Apicius, 1936; Delwiche, 2012; Michel, Velasco, Gatti, & Spence, 2014; see also Ledwith, 2014; Spence, 2015; Van der Laan, de Ridder, Viergever, & Smeets, 2011). While such a statement might at first strike the reader as obvious, it turns out that there have been surprisingly few scientific studies on the topic to date. Historically,

culinary practitioners have intuitively developed guidelines to try and enhance the visual appeal of the food (see Deroy, Piqueras-Fiszman, Michel, & Spence, 2014; The Culinary Institute of America, 2012, for reviews); however, the approach has usually been more artistic, rather than empirical.

Certainly, what we see on the plate rapidly generates expectations concerning the taste, flavour, liking, and presumably also the probable healthiness of a given dish (Spence & Piqueras-Fiszman, 2014). Recently, researchers have become increasingly interested in assessing how subtle changes in the visual presentation of a dish may affect a diner's perception of its flavour, and how much the food ends up being liked (e.g., Michel et al., 2014; Zampollo, Kniffin, Wansink, & Shimizu, 2012; Zellner, Lankford, Ambrose, & Locher, 2010; Zellner, Loss, Zearfoss, & Remolina, 2014; Zellner et al., 2011). For instance, Zellner et al. (2010) assessed whether varying basic visual features, borrowed from the visual arts (namely complexity and balance), would affect people's perception of a plate of food consisting of water chestnuts and tahini. Manipulating the colour and balance of the elements on the plate affected the perceived attractiveness of the food and people's Willingness-To-Try, but did not affect their liking for the flavour of the food.

In a follow-up study, Zellner et al. (2011) went on to demonstrate that people like food more when it is presented in a neat as compared to a messy arrangement. The visual presentation of the food influenced participants' Willingness-To-Pay (WTP), and their judgments of the perceived quality of the product offering, with more

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**Fig. 1.** Appetizer, 'Salad with a taste of Kandinsky': (A) artistic; (B) regular, as served in the present study.

positive ratings being given when the visual presentation was neater. While the aforementioned results undoubtedly represent an interesting contribution to the study of how the visual arrangement of food influences the way in which it is perceived, the food presentations used in these studies were not comparable to the kinds of plating that one might find in the restaurant setting (and that the professional chef might be interested in).

Recently, Zellner et al. (2014) conducted a study in which the same food (chicken, rice, sauce, and vegetables) was presented in two different arrangements on two different nights, in a dining room situated at the Culinary Institute of America in New York. Although the two presentations were judged as equally "neat", one was rated as being significantly more attractive than the other. The diners who took part in this study also tended to like the food more when it was presented in a 'contemporary' manner than when presented in a more 'traditional' style.

Meanwhile, Michel et al. (2014) reported an experiment in which the same ingredients were arranged in three different presentations: one was a conventionally plated (or tossed) salad, another had the elements artfully arranged to look like one of Kandinsky's paintings, while a third had them organized in a neat (but non-artistic) manner. The participants rated the dish both before and after consumption. Prior to consumption, the Kandinsky-inspired presentation of the salad was considered to be more artistic and more complex than the other two visual presentations. Importantly, it was also liked more than the other presentations. After consumption, the participants' rated the food in the art-inspired presentation as significantly tastier than expected, and they were also willing to pay twice as much for it ( $M = £4.25$  vs.  $£2.08$ ).

It is worth noting that, to date, most of the research on plating has been conducted in the setting of the science laboratory, where participants' expectations probably differ from those of the average restaurant diner. While there have been a few studies in which participants have been asked to rate the food presentations shown in a picture displayed on a card or else over the internet (see Reisfelt, Gabrielsen, Aaslyng, Bjerre, & Møller, 2009), far fewer studies have actually attempted to assess participants' ratings of the consumption experience (Michel et al., 2014; Zellner et al., 2010, 2011). When it comes to studies conducted in naturalistic or semi-naturalistic settings, we are aware of only a single study having been published to date (Zellner et al., 2014).

In the present research, we build on these earlier studies and report an experiment conducted in a large naturalistic dining environment, a dining room at an Oxford college. The appetizer was inspired by the results of Michel et al.'s (2014) recent plating study.

The two visual arrangements of the dishes were clearly different (see Fig. 1), despite containing the same quantity of exactly the same ingredients.

The plating of the main course (see Fig. 2) was inspired by a recent trend observed in several top restaurants to arrange the elements in an unbalanced, or asymmetrical, fashion (i.e., with all of the ingredients arranged off to one side; what can be seen as a 'contemporary' trend in plating) rather than centred in the middle of the plate (a more 'traditional' approach to plating).

## Materials and methods

### Participants

The 163 diners consisted of a mix of students (c. 30%), their parents and families (c. 60%), and a small number of academics and college staff (c. 10%). All of the participants were at least 18 years of age. The study was conducted in the dining hall of Somerville College, Oxford University. The occasion was a luncheon for the parents of the students studying there. We only report the data from those diners who agreed to participate in the study and who successfully completed the questionnaire ( $N = 150$ ). This study was approved by the Central University Research Ethics Committee of the University of Oxford.

### Apparatus and materials

The lunch served consisted of three courses. The appetizer, a salad, was a simplified version of the 'Salad with a taste of Kandinsky'<sup>1</sup> (see Michel et al., 2014) consisting of different 'sauces', raw and cooked vegetables, and various seasonings. The 'sauces' included a teaspoon of beetroot purée, one of lemongrass-scented cauliflower purée, one of carrot purée, and one of mushroom essence. The vegetables consisted of finely diced ('brunoise' cut) red and yellow peppers, green salad, a slice of pan-fried Portobello mushroom, and a piece of steamed broccoli. The seasonings consisted of red pepper oil, extra virgin olive oil, and salt flakes. The 'artistic' plating of the appetizer presented the elements of the dish spread over a large surface of a small squared plate, with all of the sauces being placed

<sup>1</sup> Given the practical culinary constraints on serving more than 160 people in a single sitting, the aesthetic design of the plating had to be simplified somewhat from the rather more intricate and time-consuming presentation utilized in Michel et al.'s (2014) original study.

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