RUNNING HEAD: THE PSYCHOLOGY OF LEAFY (SALAD) GREENS

Gastrophysics: Nudging consumers toward eating more leafy (salad) greens

Professor Charles Spence,

Crossmodal Research Laboratory, Oxford University

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CORRESPONDENCE TO: Prof. Charles Spence, Department of Experimental Psychology, Anna Watts Building, University of Oxford, Oxford, OX2 6GG, UK. E-mail: charles.spence@psy.ox.ac.uk

ABSTRACT

According to nutritional recommendations, the majority of us should be eating more leafy (salad) greens in order to maintain a healthier and more balanced diet. Yet the overwhelming evidence suggests that despite widespread publicity, most people consistently fail to meet the guidelines. This review assesses the multisensory appeal of leafy (salad) greens at various stages of the consumer journey from initial purchase in store through presentation in a dish/meal, and eventual consumption. The review identifies the current limited sensory appeal of leafy (salad) greens, and highlights a number potential means to enhance their multisensory desirability, be it in the store or else on the plate / in the bowl in the future. The argument is made that the latter approach likely represents a more promising means of 'nudging' the consumer toward a more balanced and healthy diet than current informational campaigns and/or the publicizing of nutritional guidelines.

KEYWORDS: LEAFY GREENS; SALAD; HEALTHY; NUTRITIOUS; GASTROPHYSICS; MULTISENSORY APPEAL.

Introduction

Leafy greens, otherwise known as salad greens, leaf vegetables, pot herbs, vegetable greens, or simply greens, are defined as plant leaves that are eaten as a vegetable. They constitute an important source of fiber, folate, and carotenoids, as well as containing vitamins C and K, and minerals such as iron and calcium (Adams, n.d.; Van Duyn & Pivonka, 2000). They are low in salt, sugar, and fat, and constitute an important part of dietary recommendations in many countries, often being rich in anti-oxidants (see Nestle, 2013). Dark green leafy greens such as salad rocket/arugula, spinach, leaf lettuce, kale, collard greens, romaine lettuce, chicory and Swiss chard also have beneficial effects in terms of cancer prevention (Drewnowski & Gomez-Carneros, 2000). Furthermore, there is an emerging body of research demonstrating that the various nutrients and bioactive compounds found in many leafy green vegetables may also help to slow cognitive decline, at least if consumed as part of a balanced diet (e.g., see Morris, Wang, Barnes, Bennett, Dawson-Hughes, & Booth, 2018; see Kang, Ascherio, & Grodstein, 2005; Morris, Evans, Tangney, Bienias, & Wilson, 2006, for a similar story with regards to the preventative effects of consuming leafy green and cruciferous vegetables). At the same time, however, the evidence from many countries continues to show that people are simply not eating enough leafy (salad) greens, vegetables, and fruits. Specifically, according to a recent study published in the medical journal, *The Lancet*, poor diet was identified as the top risk for death and disability around the world, according to a 27-year global study covering 195 nations (GBD 2017 Diet Collaborators, 2019).

According to online comments by Peters (2019): *"only around 1 in 10 Americans eat as many fruits and vegetables each day as federal guidelines recommend"* (see also Krebs-Smith, Guenther, Subar, Kirkpatrick, & Dodd, 2010). And, amongst children, the situation is often reported to be even more challenging (e.g., see Edgecliffe-Johnson, 2000, for a press report; and Heath, Houston-Price, & Kennedy, 2014; Pickles, 2016; Spill, Birch, Roe, & Rolls, 2010; Zeinstra, Renes, Koelen, Kok, & de Graaf, 2010). In part, this is presumably because of the bitter taste of many cruciferous vegetables and leafy greens (Simonne, Simonne, Eitenmiller, & Coker, 2002), although individual differences in taster status likely play an important role here too (e.g., Bartoshuk, 2000; Dinehart, Hayes, Bartoshuk, Lanier, & Duffy, 2006; Garneau, Nuessle, Sloan, Santorico, Coughlin, & Hayes, 2014; Tepper, Keller, & Ullrich, 2003; Turnbull & Matisoo-Smith, 2002). That said, the expected relationship between taster status and reduced consumption of bitter-tasting cruciferous vegetables has not always been found (Baranowski,

Baranowski, Watson, Jago, Islam, Beltran, Martin, Nguyen, & Tepper, 2011). Here it is worth noting that from a very young age, we learn to associate specific colours with particular tastes/flavours (Fernandez & Bahrick, 1994; Saluja & Stevenson, 2018; see Spence, 2012, for a review), such as linking the generally-disliked (bitter) taste (Steiner, Glaser, Hawilo, & Berridge, 2001) with green, be it in a drink (where the colour may be associated with lime) and or as an abstract patch of colour (see Maga, 1974; Saluja & Stevenson, 2018; Spence, Wan, Woods, Velasco, Deng, Youssef, & Deroy, 2015). That said, in the context of lettuce, Lee, Lee, Lee, and Song (2013a) have reported that more vivid (chromatic) green color was preferred in green foods like lettuce. Intriguingly, they also found that green colouring was not preferred in red foods because, in the latter case, think apples or strawberries, it was associated with unripeness. However, in salads, there can be no such association between green and unripeness. This despite the fact that green is one of the most popular colours (along with blue) in a general (i.e., non-food) context (Spence, 2019a). However, when it comes to food, neither colour would appear to be particularly appealing (Spence, 2018b).

Yet, despite their importance in helping the consumer to maintain a healthy diet (and apparently supporting general happiness, according to a recent 'big data' analysis, see Quercia, 2019), there has been relatively little research on leafy (salad) greens, at least not from a psychology/gastrophysics perspective (see Spence, 2017). In fact, the lack of academic research on the product-intrinsic or product-extrinsic factors affecting the consumer's perception of, not to mention their behaviour toward, fruit and vegetables more generally has also been noted in a recent review by Symmank (2019). This is, in part, presumably because natural produce is inherently more variable (e.g., in size, shape, taste, texture, and flavour, etc.) than many processed foods, hence making it harder to standardize one's experimental stimuli (and so come to replicable conclusions). At the same time, however, it is also worth highlighting the fact that, to date, there has been little work to brand leafy (salad) greens. Notice here how it is often the big brands who tend to fund much of the underpinning food-related sensory research in the first place. Intriguingly, however, the situation concerning leafy (salad) greens may well be about to change, as indoor farming continues its rapid growth (see Anon., 2019; Peters, 2019, for journalistic coverage).

Importantly, several large North American start-ups have emerged in this space over the last five years or so, including *Aerofarm*, *Plenty*, *FarmedHere* (though this company is no longer operational), and *Bowery* (funded, in part, by *Alphabet*, the parent company behind *Google*).

Several of these companies have already attracted hundreds of millions of dollars of funding for research and development (Peters, 2019). And while the majority of that funding has so far been directed at improving and scaling the new technologies needed to make indoor farming more cost-efficient (and hence competitive financially with traditional farming methods), the question of branding, and the consumer response to what is a wholly new method of production of produce can't be far behind (Anon., 2019). Furthermore, while the indoor (and increasingly automated) approach to farming can be applied to various different fruits and vegetables, it is the leafy (salad) greens where much of the most intensive development has been focused thus far. This is, in part, because leafy (salad) greens tend to be a more fragile product to transport over long distances, and potentially more profitable (or at the very least more commercially viable) to grow using the latest new farming techniques/technologies. What is more, leafy (salad) greens also have a much more rapid growing cycle than for many other products such as firm fruits, say. Such controlled farming methods are increasingly allowing for the expression of a better taste/flavour profile in the leaves too (Maxwell, 2018).

Given their importance to maintaining a healthy and balanced diet, more research is urgently needed into leafy (salad) greens, and what can be done, from a sensory/psychological perspective to maximize their multisensory appeal amongst consumers (see also Schifferstein, 2010; and see Naylor, 2017, on the opprobrium salad sometimes attracts from food critics in the press). It can be argued that this is one of the few viable strategies that might effectively nudge the latter toward a healthier / more balanced diet (see Deroy, Reade, & Spence, 2015, for a similar argument with respect to promoting insects as an alternative source of food). Note here the implicit suggestion that enhancing the multisensory appeal of a food product may well be more likely to succeed in changing consumer behaviour that mere instruction or information about what is good / healthy (Hansen, Skov, & Skov, 2016; Kantor, 1999; Quigley, 2013), be it for the individual or for the planet (e.g., in terms of sustainability, or the use of pesticides; see Ames, 1989; Peters, 2019; Springmann, Godfray, Rayner, & Scarborough, 2016). The primary aims of the present review, then, are: 1) To identify the current limited (multi-)sensory appeal of leafy (salad) greens; and 2) To explore/highlight a number of potential means of enhancing the multisensory desirability of leafy (salad) greens amongst consumers at the various stages of the consume journey, from in-store to on plate.

Leafy greens: A sensorial analysis

While bright green colour, both light and dark, as in iceberg lettuce and kale/spinach, respectively, tends to be the typical colour of leafy greens, one might consider this to be of limited appeal to consumers, at least when considering the oft-noted association between green and bitterness (though see Lee et al., 2013a, as mentioned earlier). At the same time, however, it is also worth stressing the fact that previously this colour-taste association has primarily been assessed in the context of coloured drinks and abstract colour patches (or words; cf. Amsteus, Al-Shaaban, Wallin, & Sjöqvist, 2015). The colour variety of leafy greens can easily be increased by incorporating red leaves, such as the dark red (one might almost say purple) of Lollo Rosso. This the more colourful version of the pale green Lollo Bionda (Sublett, Barickman, & Sams, 2018). There are, in fact, a number of popular red lettuce cultivars, including "New Red Fire Lettuce", "Red Sails Lettuce", "Redina Lettuce", "Galactic Lettuce", and the "Benito Lettuce". The colourful (red, orange, and yellow) stems of Swiss chard, and the purple stems of Baby Beet Greens (Sung, 2018), can also make for a colourful addition to any salad mix. One might consider, therefore, that eye appeal (meaning how visually desirable/interesting/varied they are) plays an important role in determining the attractiveness of leafy (salad) greens (Paakki, Sandell, & Hopia, 2019; see also Spence Okajima, Cheok, Petit, & Michel, 2016). However, one finds little explicit mention of the importance of colour variety as far as the attractiveness of leafy greens are concerned. It is interesting to note here how the 'ugly fruit' movement (e.g., see Ledwith, 2014, for newspaper coverage; and de Hooge, Oostindjer, Aschemann-Witzel, Normann, Loose, & Almli, 2017; Royte, 2016) seems not to make reference to promoting the sale, and hopefully the subsequent consumption, of ugly leafy greens.

Leafy (salad) greens come in a variety of shapes that one might consider more or less pointy (from lamb's lettuce/Mâche, or Tatsoi, at one end to frisée at the other; Sung, 2018). Generally-speaking, it has been shown that people tend to associate roundness with sweetness, and angularity with bitterness, sourness, and saltiness (see Spence & Deroy, 2012, 2013, for reviews). However, I am not aware of any research having demonstrated such shape-taste correspondences in the case of leafy greens (see **Figure 1** for a few representative examples). Similarly, there is extensive evidence in support of the existence of a number of robust colour-taste/flavour correspondences (see Spence, 2019a; Spence et al., 2015). As such, one might have expected that such dramatic differences in hue, as demonstrated by leafy greens (as, for example, shown in the salad leaves displayed in **Figure 1**), to lead to very different taste/flavour expectations. In this regard, just consider the completely different taste/flavour expectations

that are elicited by the sight of white vs. red wine, say (see Spence, 2010a, b). Though see also Zellner, Greene, Jimenez, Calderon, Diaz, and Sheraton (2018) for one situation (colourful sweetie wrappers) where colour, in this case in some sense product-extrinsic, is not taken as a meaningful predictor of taste/flavour. However, once again, I have been unable to find any evidence concerning taste/flavour qualities that correlate with the specific colours of various leafy greens (though see Urbányi, 1982). It might be interesting to conduct a blindfolded tasting of various different leafy greens in order to ascertain whether consumers can discern the likely colour of the produce that they happen to be tasting (note that such knowledge might be stored implicitly; cf. Ngo, Velasco, Salgado, Boehm, O'Neill, & Spence, 2013; Wan, Zhou, Mu, Du, Velasco, Michel, & Spence, 2014). At the same time, however, it might be argued that perhaps there are simply too many different varieties of leafy greens to draw any simple conclusions.

INSERT FIGURE 1 ABOUT HERE

Leafy greens (with the exception of pot herbs) tend to be low on orthonasal aroma (though see also Bell, Spadafora, Müller, Wagstaff, & Rogers, 2016; Goff & Klee, 2006), and often low on retronasal aroma, or flavour, too (see Spence, 2015a). Note that unlike ripening fruits, vegetables tend to produce most of the volatiles that are sensed by the consumer as flavours only after their cells have been disrupted (e.g., as during consumption; Reineccius, 1999). In terms of the range of taste/flavour attributes that one finds amongst leafy (salad) greens, there is a broad range extending all the way from the bland/bordering on tasteless (think iceberg lettuce; Hartford, 2010) through to the powerful pepperiness of salad rocket (arugula; Bell, Methven, Signore, Oruna-Concha, & Wagstaff, 2017), the burning sensation associated with watercress (resulting from the presence of glucosinolates; Freeman & Mossadegffi, 1972), and mustard leaves (the latter, a member of the brassica family, and a rich source of anti-oxidants; Frazie, Kim, & Ku, 2017; also referred to as Mizuna). According to research by Bell, Methven, Signore, Oruna-Concha, and Wagstaff (2017, p. 181), their Principal Components Analysis (PCA) *"revealed strong, positive correlations between glucosinolates, isothiocyanates and sulfur compounds with bitterness, mustard, peppery, warming and initial heat mouthfeel traits."* The bitterness of rocket is caused by the presence of thiouril (see also Pasini, Verardo, Cerretani, Caboni, & D'Antuono, 2011). The irony here, of course, being that many of the phytonutrients that give leafy greens such as rocket their protective properties (such as helping to lower the risk of cancer and cardiovascular disease) have been selectively bred out over the generations because these bioactive compounds tend to taste, bitter, acrid, and/or astringent

(Drewnowski & Gomez-Carneros, 2000; see also Bartoshuk & Klee, 2013). There is undoubtedly a sense in which the flavour expectations concerning the pepperiness of rocket, say, are hard to ascertain accurately based on visual cues (e.g., concerning the colour and/or shape and size of the leaves). Hence, it often comes as a surprise, or more often a disappointment (at least here in the UK, in your author's experience; see Anon., 2013, for similar opinions expressed in a blogpost), to find out how little flavour the leaves that you have just bought actually have once added to a salad or dish (see Piqueras-Fiszman & Spence, 2015, on disconfirmed flavour expectations; though see also Paylor, 2015, for a different perspective appearing in a press report).

In terms of texture, juicy is a descriptor that is sometimes applied, but again it feels that leafy greens are not all that distinctive/desirable here either. Certainly there is none of the appealing mouthfeel associated with fatty foods, say, such as chocolate, ice-cream, or salad dressing (see Spence & Piqueras-Fiszman, 2016, for a review). Some, but not all varieties of leafy greens are capable of adding sonic interest – think only of the crunch of the slice of Batavia lettuce (also known as French crisp lettuce) or perhaps iceberg lettuce in your burger bun (see Agency, 2015, for a press report; and see Spence, 2015c, for a review of sonic contributions to multisensory flavour perception). The suggestion in fresh produce is that noisier fruits and vegetables (when eaten) may signify a fresher product which, in turn, will likely contain, or rather retain, more of its nutrients/vitamins (see Allman, 2012; Spence, 2017). Interestingly, however, while one can often tell a great deal about the freshness of fruit and veg. by feeling their firmness in the hand (Gamble, Harker, Jaeger, White, Bava, Beresford, et al., 2010), or sounding them by knocking them (e.g., in the case of watermelons; Wang & Spence, 2019), there is little to be ascertained by feeling leafy greens. What is more, the packaging in which such produce is often transported to market and sold, are designed to protect the fragile contents from physical damage and direct contact (see below).

Given the above sensory analysis, it can certainly be argued that leafy greens constitute one class of food that challenges the sensory hierarchy first reported by Delwiche (2003). Delwiche questioned 140 researchers working in diverse fields including agriculture/horticulture, food science, sensory evaluation and the chemical senses regarding the relative importance of the different senses to flavour perception. According to Delwiche (2003, p. 348): *"In this survey, participants were asked to rate which of seven attributes (taste, smell, temperature, appearance, color, texture, and sound) were (1) important to flavor, (2) essential to flavor, and*

(3) could be changed without impacting flavor. They were also asked to rank the importance of these seven attributes to flavor from highest to lowest without using ties." (see **Table 1** for a summary of the results). The dominance of taste, smell, and temperature over visual and auditory cues would seem to be quite different from how one might be tempted to rank the importance of the senses to the appreciation of leafy greens, where orthonasal olfactory cues (with the exception of pot herbs) tend to be minimal, and temperature cues play little role. Of course, that said, cultural differences in the preparation and presentation of leafy greens means that temperature may play a role in some regions. After all, think only of how spinach, chard, bok choi, or fennel is sometimes served raw in salad while, at other times, it is cooked or else served 'wilted'.

INSERT TABLE 1 ABOUT HERE

At this point, it is also worth noting that textural cues play a more important role in helping us to identify vegetables than most people realize (see Van Stockkom, Blok, van Kooten, de Graaf, & Stieger, 2018). Furthermore, as has been mentioned already, the crunchy/crispy texture/sound associated with certain varieties of leafy greens would also seem to be an important part of their sensory appeal (perhaps the only appealing sensory feature in the case of iceberg lettuce; cf. Govindarajan, 1985). It might be argued that the very absence of taste in iceberg lettuce would be attractive to some to some consumers (i.e., because of the fact that there is no bad taste). It could also be imagined that a bright green colour might also be visually appealing because it may prime notions of freshness and/or healthiness in the mind of the consumer. The sonic element is certainly more important than hinted at by the responses of Delwiche's respondents (see also Spence, 2015c on sound as the forgotten flavour sense, and Spence, 2017, on the uncertainty between languages as to whether noisy lettuce should be described as crispy or crunchy). Delwiche (2003, p. 351) summarized her results as showing that: *"All results indicate that taste and smell are considered to be the most important sensations involved in the perception of flavor, and sound is considered the least important."* The only work on the desirable sonic qualities of fresh produce seems to have been focused on assessing and enhancing the perceived crispness of apples (De Belie, De Smedt, & De Baerdemaeker, 2000; Demattè, Pojer, Endrizzi, Corollaro, Betta, Aprea, Charles, Biasioli, Zampini, & Gasperi, 2014; Péneau, Hoehn, Roth, Escher, & Nuessli, 2006; though see also Abbott, Bachman, Childers, Fitzgerald, & Matusik, 1968).

Here, one might consider whether mixed leaf packs of salad should therefore deliberately try to include mixtures of leaves that provide stimulation to more of a consumer's senses than any single variety likely can – e.g., include mixed leaves to deliver a variety of colour (see also König & Renner, 2018, 2019), some leaves to deliver sonic interest, and some potted herbs to deliver an orthonasal hit. That said, some individuals (especially children), who have an aversion to specific varieties of leafy greens, may not prefer to mixtures of various leafy salad on their plate or in the pack (for press report, see Samuel, Musa-Veloso, Ho, Venditti, & Shahkhalili-Dulloo, 2018; Traig, 2019; see also Kauer, Pelchat, Rozin, & Zickgraf, 2015, for picky eating amongst adults). Additionally, it should be noted that mixtures of various leafy salad in a pre-packaged format, think "Spring Mix" may sometimes be associated with low quality (for one such opinion, see Orchant, 2014).

Packaging to enhance the appeal of leafy (salad) greens

In the absence of strong brands in the leafy greens aisle, the question becomes one of what other sensory cues are, or might be used by the consumer when doing their shopping (in a bricks-and-mortar store). While there has been some attempt to return to loose-leaf distribution (see **Figure 2**) – this tends to be more of a high-end, and hence limited, sales approach. Though, interestingly, it has recently been proposed as an effective means of cutting food waste (see Searle, 2019, for one opinion piece on this theme). These days, the majority of leafy greens are sold pre-packaged. Hence, in the absence of strong branding at the product level (note that one might argue store chains, such as Whole Foods, represent strong brands), it might be expected that the sensory aspects of the packaging would play an important role in helping the consumer to decide between one product/brand and another (Velasco & Spence, 2019). Packaging colour is by far the most important cue to the shopper, since it is processed much more rapidly than any other cue (Sacharow, 1970; see Spence & Velasco, 2018, for a review). That said, it would seem that there are no common packaging colour codes used in the leafy (salad) greens category at present. Contrast this with the way in which different colours are systematically used in the meat (to indicate lamb, beef, or pork, say) and milk category (for normal, low-fat, and no-fat milk; see Simmonds & Spence, 2019).

INSERT FIGURE 2 ABOUT HERE

Plastic bags, clamshells, and bagged plastic trays are the norm in the supermarket aisle for packaging leafy (salad) greens. However, there is little evidence of strong packaging 'image molds' having being established in this category. By contrast, think only of the distinctive, yet arbitrary, bottle shape associated with Wishbone salad dressing (see Spence & Piqueras-Fiszman, 2012). It is interesting to note how transparency is widespread. Indeed, fresh produce would seem to be one of the categories where the consumer demands to see the quality/freshness of that which they are buying (Simmonds & Spence, 2017, 2019; Simmonds, Woods, & Spence, 2018). This, ironically, despite the fact that, as noted above, visual cues do not seem to be all that revealing about the multisensory flavour experience that will be delivered by the product on tasting (see also Wadhera & Capaldi-Phillips, 2014).

While the taste/flavour may not be ascertainable visually, what the consumer can perhaps evaluate is the freshness, of the produce, all the while acknowledging that this is a concept that is difficult to define. Nevertheless, it would appear to be an important attribute for consumers in this category. Relevant here, though, Kumpulainen, Sandell, Junell, and Hopia (2016) have demonstrated that consumers respond to differences in the freshness of lettuce based only on sensory properties. Meanwhile, Schifferstein, Wehrle, and Carbon, (2019) have recently shown that people's judgments of freshness of carrots are influenced by visual appearance properties (Dinnella, Torri, Caporale, & Monteleone, 2014; though note that visual appearance of leafy greens is likely also to be affected by post-harvest storage conditions; see Ferrante, Incrocci, Maggini, Serra, & Tognoni, 2004). Interestingly, research has been published recently showing that the environment in which salad tomato and wild rocket is presented, virtual farmer's dining table or sensory lab, can positively influence perceived freshness, while at the same time reducing the consumer's ability to discriminate this attribute accurately (Sinesio, Saba, Peparaio, Saggia Civitelli, Paoletti, & Moneta, 2018). Healthiness also resonates with many consumer (Mai, Symmank, & Seeberg-Elverfeldt, 2016). Hence, when considering the design of packaging for leafy (salad) greens, it may well be advantageous to use those designs that help to enhance/optimize the perceived freshness and healthiness of the product, however these attributes are defined operationally,

One of the problems with the marketing of leafy (salad) greens is that the consumers' visual attention tends to be drawn to energy dense (i.e., high-fat) foods (Harrar, Toepel, Murray, & Spence, 2011; Sawada, Sato, Toichi, & Fushiki, 2017). Hence, leafy greens (not to mention the majority of other fruits and vegetables, with the exception of the avocado) are unlikely to attract

the customer's visual attention in store (e.g., see Spence, 2019b; Spence et al., 2016). That said, unusually-coloured foods (think of a blue potato or purple carrot) are presumably more attention-capturing than conventionally-coloured produce (e.g., a brown potato or orange carrot), regardless of energy density (see Macrae, 2011, for a press piece; and Spence, 2018b, for a review of blue foods). What is more, in the context of the produce aisle, leafy greens also stand little chance of capturing the shopper's attention because of their smell (which, as has already been noted, is mostly non-existent). Note here that food-related olfactory cues have been shown both to direct our attention to matching colours (Chen, Zhou, Chen, He, & Zhou, 2013; Seigneuric, Durand, Jiang, Baudouin, & Schaal, 2010), as well as biasing our grasping behaviour toward similarly-sized objects (Castiello, Zucco, Parma, Ansuini, & Tirindelli, 2006). This is problematic in that capturing the consumer's attention when the product is on the shelf is considered by many to be the key First Moment of Truth (see Louw & Kimber, 2011).

In terms of the haptic/sonic attributes of the packaging, given the importance of the sonic element of certain crunchy/crispy leafy (salad greens; see also Fillion & Kilcast, 2002), one might consider whether there is (or should be) a congruency between the noise made by the product, when consumed, and the noise made by the packaging when the consumer interacts with it (e.g., equivalent to what one sees in the potato chips/crisps category; see Spence, Shankar, & Blumenthal, 2011; Wang & Spence, 2019). However, although I am not aware of anyone having done the relevant analysis, iceberg/romaine lettuce would seem intuitively to be one of the noisier leafy greens (Sung, 2018) and yet its packaging doesn't currently appear to be any noisier than that of rocket, say, which rarely makes much noise when eaten. Only future research will determine whether this represents a lost marketing opportunity in terms of multisensory packaging design (see Velasco & Spence, 2019).

Some producers are returning to paper bags, or rather with treated plastics/packaging materials designed to give the artisanal/traditional feel/look for their leafy (salad) greens (see Spence & Piqueras-Fiszman, 2012, for a review). Importantly, the evidence suggests that people's feeling about the feel of product packaging very often transfers over to their ratings of the product itself (Spence & Gallace, 2011). Hence, if the packaging feels natural, at either a perceptual level or because of any semantic associations, then consumers will probably rate the contents of the packaging as higher with respect to those attributes as well. What is more, a large body of research shows that if one can get the consumer to touch the product then the likelihood of

purchase goes up (see Gallace & Spence, 2014; Pramudya & Seo, 2019; Spence & Gallace, 2011). That said, one also needs to be aware of the problem of 'tactile contamination', whereby people do not want to purchase those products that have already been touched/handled by other shoppers (Argo, Dahl, & Morales, 2006). This problem is likely all the more pronounced in the leafy (salad) greens category where virtually all the produce is potentially edible (cf. Hurst, 2018, for a press report; Sacharow, 1982). Taken together, there would certainly seem to be grounds for considering the nudging potential of the visual and other sensory aspects of product packaging design in the case of leafy greens (Huang & Lu, 2013, 2015; Mastropietro von Rautenkrantz, 2016; Purnhagen, van Herpen, & van Kleef, 2016; Velasco & Spence, 2019; see also Petit, Velasco, & Spence, 2018; Romero & Biswas, 2016).

Labelling to enhancing the appeal of leafy (salad) greens

The packaging of pre-packaged leafy greens is typically the place where one finds any product-related claims, be they organic credentials, pesticide-free, grown on Farmer John's farm, etc. (see Ames, 1989; and Macrae, 2013; Peters, 2019, for online and press report). Here it should be noted that some supermarkets have in recent years been criticized for using fake 'local' farm names on their product packaging (see Anon., 2016). The belief that a product is organic has repeatedly been shown to influence people's ratings, even if the difference between organically-grown and conventionally farmed generally turns out not to be discernible when tested under blind testing conditions (e.g., Bourn & Prescott, 2002; Lee, Shimizu, Kniffin, & Wansink, 2013b; Schutz & Lorenz, 1976; Zhao, Chambers, Matta, Loughin, & Carey, 2007). Nevertheless, organic continues be a desirable quality for consumers across various product categories (e.g., Linder, Uhl, Fliessbach, Trautner, Elger, & Weber, 2010; Sörqvist, Hedblom, Holmgren, Haga, Langeborg, Nöstl, et al., 2013). While many consumers tend to assume that organic is somehow healthier, that is by no means necessarily the case (see Ames, 1989; Bourn & Prescott, 2002). What is more, it is worth bearing in mind the periodic outbreaks of illness induced by eating conventionally-farmed leafy greens, as, for instance, when several hundred consumers were made ill by batches of romaine lettuce with E. coli (May, 2018). The culprit in this case, the water for growing that was contaminated by animal waste. The presence of listeria on leafy greens supplied to WholeFoods and CostCo was also reported recently (see Hines, 2019, for a press report). This, one of the appeals of factory-grown, vertical/hydroponic agriculture, where sterile and closed nature of growing environment eliminates the need for

pesticides, and/or of the bleach-washing that is often used to eliminate bugs prior to the packaging of conventionally-farmed produce (see Peters, 2019, for one online report).

Perhaps linked to the difficulty associated with visually discerning the taste/flavour intensity associated with leafy greens (e.g., rocket / arugula), it is noticeable how a number of producers have recently started to add sensory-descriptive labels, such as a pepperiness rating to their product packaging (i.e., suggesting those desirable taste properties that cannot be reliably ascertained prior to tasting). There is, though, something of a difficult path to tread between setting positive/desirable product taste/flavour expectations that are subsequently experienced (when the flavour expectation anchors the subsequent tasting experience), versus triggering a typically negatively-valenced disconfirmation of expectation response should the product not live up to the taste/flavour description found on the packaging (see Piqueras-Fiszman & Spence, 2015; Spence, 2016). One of the key challenges here is likely to be around the very different taste experience of bitterness potentially experienced by non-tasters vs. supertasters (Tepper et al., 2003; Turnbull & Matisoo-Smith, 2002). Another relevant issue may be the fact that consumers do not generally consume leafy (salad) greens direct from the packaging, and hence might not be exposed to the positive claims in the way they are when eating/drinking other products direct from the packaging. The situation, note, is somewhat different in the case of leafy (salad) greens that are dispensed by vending machines (e.g., see Farmer's Fridge in The States, https://www.farmersfridge.com/; and Khazan, 2014; Scipioni & Bogdonoff, 2018, for press reports). It is intriguing here to see the attempt to reposition leafy (salad) greens as a potential snack food.

Research by Turnwald, Boles, and Crum (2017) from one of the canteens at Stanford University suggests that the use of indulgent descriptions provides an effective means of increasing the sale/consumption of vegetables: So think labels such as 'twisted carrots' and 'dynamite beets', rather than necessarily labels that focus on healthy or good-for-you (cf. Wansink, Just, Payne, & Klinger, 2012). It would be interesting to know whether a similar approach would also increase sales of leafy greens, should such sensory-descriptive claims be included on the product packaging (see also Kozup, Creyer, & Burton, 2003; Pires & Agante, 2011). Of course, the distinction between those packaging labels that may work to encourage purchase in store, versus those that may enhance the experience on consumption should be born in mind here.

Enhancing the appeal of leafy (salad) greens in-store & online

Fruit, veg., and leafy greens often tend to be arranged near entrance of many supermarkets. The conventional belief would seem to be that this conveys notions of freshness, and that this atmosphere then carries over to colour the rest of the customer's in-store purchases. One could, I suppose, also consider this as a kind of nudge (cf. Thaler & Sunstein, 2008). However, according to in-store research that has investigated the impact of displaying fresh fruit by the check-out in-store, while such positional nudges did increase the number of consumers who came away with fruit, it had no impact on the sales of confectionary – that are typically displayed near the check-out (Kroese, Marchiori, & de Ridder, 2016; cf. Kothe, Mullan, & Butow, (2012). As such, these results imply that the customers were nudged toward purchasing more, rather than necessarily purchasing better/healthier. Notice that this observation may also be relevant when considering the introduction of vending machines of fresh salads in deprived areas (see Khazan, 2014).

Colours and illuminance levels of lighting in in-store displays, or in a salad bar, may also serve as a nudge in encouraging consumers to purchase leafy greens (Barbut, 2003; Berčik, Horská, Wang, & Chen, 2016; Horská & Berčík, 2014; Shih, Wu, & Wang, 2017; Suk, Park, & Kim, 2012; Yang, Cho, & Seo, 2016; Reynolds-McIlnay, Morrin, & Nordfält, 2017; and see McKie, 2017, for a recent press report briefly detailing a recent initiative by Sainsburys along these lines). Barbut, for instance, reporting that incandescent light sources helped to make green bell peppers look more acceptable to consumers that metal halide lighting. Meanwhile, the colour of red peppers was preferred under incandescent as compared to either fluorescent or metal halide lighting. Yellow bell peppers were not affected by the lighting given that all three sources emitted a strong yellow component. Meanwhile, Berčik et al. reported that purple and to a lesser extent green lighting were more effective than red or yellow in triggering positive emotions in a fruit and veg. display. Yang et al. reported that people wanted to eat samples of apples and red bell peppers more when presented under white or yellow light rather than blue light. While it is hard to draw any general recommendations from these diverse studies, what all the researchers would seem to agree on is the fact that light colour affects people's willingness to eat and their hedonic impressions of fruit and veg. The same is presumably likely to be true for leafy greens as well.

Separately, there is growing interest in in-store sensory activations involving scent or sound (see Biswas & Szocs, 2019; de Wijk Maaskant, Kremer, Holthuysen, & Stijnen, 2018;

Leenders, Smidts, & El Haji, 2019; Vida, Obadia, & Kunz, 2007; see Spence, Puccinelli, Grewal, & Roggeveen, 2014, for a review). For instance, Leenders et al. reported on the results of a study showing that releasing the scent of melon in a Dutch supermarket increased sales by 14%. That said, here it is important to note that there appears to be a marked difference between claimed effectiveness of olfactory cues (at driving sales) from those companies with a vested interest in selling the scent-producing technologies, and the findings that have typically been reported in those studies conducted by independent researchers (see Spence, 2015b). The results documented in the latter studies tend to be much more modest.

Anecdotally, playing the sounds of the seaside by the seafood counter has been shown to increase sales of fish in the supermarket (e.g., see Spence, 2011). Is there an equivalent soundscape that would increase the purchase of leafy greens? One possibility here would be to think about playing the sounds of nature, think birds, sounds of countryside. It is an open question as to whether this would increase sales of leafy greens, but regardless it might be expected to trigger the beneficial effects of the nature effect. Potentially relevant here, in one marketing-led intervention, the British Fruit Confederation commissioned research showing that strawberries tasted while listening to the sound of the English summer were rated as tasting sweeter (see Macrae, 2014, for press coverage of this marketing intervention). What is more, Sinesio et al.'s (2018) recent demonstration that virtually simulating a farm-related multisensory environment (the farmer's table) positively influenced people's ratings of the perceived freshness of wild rocket and salad tomato would seem to be a positive indicator for the likely success of this kind of atmospheric/environmental approach moving forward (see also Spence, 2017).

While the crunch would appear to be a desirable attribute of various salad greens (e.g., iceberg and romaine/cos lettuce; see Sung, 2018, for a discussion in an online food website), the product makes no sound until it is consumed. Potentially relevant here, Knoferle et al. (2016) were able to demonstrate that various distinctive product-usage sounds were capable of biasing people's visual search toward the matching visual elements/products in cluttered shelf/online displays that were associated with such a sound (e.g., the sound of a striking match draw participants' attention to the box of matches, while the popping of a cork drew people's visual attention to the bottles of sparkling wine that were present in the display). In this context, it would be interesting to investigate whether the sound of crunchy lettuce would similarly draw people's attention to the lettuce, or other leafy greens, in a display. At the same time, though,

one might need to be careful not to trigger misophonia, an extreme negative emotional response to sounds, very often eating sounds (see Spence, in press, for a review).

Taken together, there are undoubtedly challenges surrounding the display of leafy (salad) greens in store. This is, in part, attributable to the limited sensory cues provided prior to consumption by the product itself, paired with the fact that packaging often prevents direct contact with the product itself. The challenges associated with tactile contamination (see Argo et al., 2006) are also likely to be more pronounced in the case of leafy (salad) greens than elsewhere, given that the consumer eats the product itself (i.e., there is no intermediate packaging). Another relevant marketing challenge that has been identified here relates the fact that the low fat content and low aroma associated with salad (leafy) greens, means that they are unlikely to capture the shopper's attention in the same way that other energy-dense foods can.

Enhancing the appeal of leafy (salad) greens on the plate

Once the consumer has purchased the leafy (salad) greens, there are various ways in which the produce can be made to look more visually appealing. Everything from the use of colour variety on the plate itself (see Macrae, 2011, for a press report; Paakki, Aaltojarvi, Sandell, & Hopia, in press; Paakki, Sandell, & Hopia, 2019) through to optimizing the colour contrast between the colour of the leafy (salad) greens and the background colour of the plate or bowl. Note also that seasonally-coloured foods can be used to promote seasonality in a dish (see Lightner & Rand, 2014). However, given that leafy greens tend to be available all-year round, the traditional seasonal connection with this colour of produce has presumably been broken. Several chefs and culinary artists have also been experimenting with the presentation of leafy (salad) greens in ways that the consumer might be tempted to copy at home.

Paakki et al. (2019) conducted a study on a sample of 93 consumers in Finland who were shown a range of plates of salad varying in terms both of their colourfulness and colour contrast. In total, photos of 10 mixed salads were shown to the participants (see **Figure 3**). The results revealed that the portions of salad with high colour contrast between the elements of the salad were rated as looking more attractive than pale-coloured salads displaying little colour contrast. In particular, colour contrasts with the complementary colours green and red and with dark and light colours were preferred along with those photos of salad exhibiting a high total colour

difference. Intriguingly, the colourfulness and colour contrast of the salads were associated with freshness, variability, and complexity, and hence with perceived attractiveness. As the authors themselves conclude, such research is important because: *"The improvement of visual attractiveness in food using intensive colors and stimulating color combinations is one potential way to tempt consumers to choose and consume more vegetables."* (Paakki et al., 2019, p. 81).

INSERT FIGURE 3 ABOUT HERE

When considering how to make leafy (salad) greens look more appealing on the plate, one recommendation is to consider colour contrast (see Spence, 2018c, for a review). This is because certain plate colours will likely help to make leafy (salad) greens look more vibrant. According to Lyman (1989, p. 112): "*Simultaneous color contrast suggests that foods can be arranged in combinations so that their colors are subtly enhanced, subdued, or otherwise modified… A green salad will look less green on a green plate than on a plate that has no green in it."* More recently, Schifferstein, Howell, and Pont (2016) provided empirical support for the claim that the visual attractiveness of vegetables depends on the colour of the background against which they are placed. These researchers conducted a study in which 44 participants (mostly North American university students) had to rate the attractiveness of five differently-coloured vegetables (tomato, carrot, yellow bell pepper, cucumber, and eggplant) when presented against one of four different background colours (either light or dark orange or light or dark blue). Intriguingly, while the colour of the background did not affect the perceived colours of the vegetables themselves (as shown by the results of a colour matching task), the perceived attractiveness of the vegetables was significantly affected by the choice of background colour (see also Howell & Schifferstein, 2019, for a follow-up study highlighting the impact of variations in the blackness of the background against which five vegetables were displayed on ratings of their attractiveness and expensiveness).

However, in terms of making the vegetables look most attractive, the optimal background depended on the colour of the vegetable itself. In particular, Schifferstein et al. (2016, p. 178) described the complex pattern of results they obtained as follows: *"we did find differences in the perceived attractiveness of the various vegetables. Each vegetable seems to have its own optimal background color(s), which typically involves a contrast in hue, blackness, and/or chromaticness. The optimal color is light orange for the cucumber (strong hue and blackness contrast), light blue for the eggplant (strong blackness contrast), light or dark blue for the*

yellow bell pepper (strong hue and chromaticness contrast), light or dark orange for the carrot (strong chromaticness contrast for both backgrounds and a strong blackness contrast for the dark orange background), and dark blue or dark orange for the tomato (strong hue, blackness and chromaticness contrasts).”

Given the chromatic similarity between the visual appearance of cucumber and dark leafy (salad) greens, it is easy to imagine how *Plenty*’s (one of the indoor producers of leafy greens mentioned earlier; https://www.plenty.ag/) use of a bright orange background for one of their product shots (see **Figure 4**) makes perfect sense. That said, Schifferstein et al.’s (2016) results for the carrot, argue against any simple colour contrast account (given that the orange carrot apparently looked best against an orange background), as once apparently suggested by Lyman (1989). On the other hand, it is perhaps worth noting that some have argued against blue as a foreground, or background, colour, as far as food or plateware are concerned (see Spence, 2017, Spence, 2018b). Nevertheless, to summarize, those companies packaging their leafy (salad) greens would be well advised to check which background colour makes the transparent packaging of their greens look their best, as the evidence that has been published to date clearly suggests that it makes a difference. There is even evidence to suggest that certain background colour schemes might be more appropriate for a salad (vs. say a steak) restaurant (Kontukoski, Paakki, Thureson, Uimonen, & Hopia, 2016). Perhaps unsurprisingly, the participants quizzed in this particular study suggested a green colour scheme for a salad restaurant while instead going for red for a steak restaurant instead.

INSERT FIGURE 4 ABOUT HERE

In terms of more chef/culinary artist inspired means of making leafy (salad) greens more appealing, Michel, Velasco, Gatti, and Spence (2014) conducted a study in which a 30+ element salad was arranged to make the salad look like one of Kandinsky’s paintings, specifically “Painting 201” (which hangs in the MOMA in New York). The results of laboratory-based research demonstrated that the artistic plating of the salad led to significantly increased willingness to pay than for exactly the same ingredients/elements when served as a tossed salad, or when the elements were arranged in rows (i.e., an effortful but not especially aesthetically pleasing plating). In follow-up research conducted with around 150 people served a lunch at Somerville College dining hall in Oxford (Michel, Velasco, Fraemohs, & Spence, 2015), those served the Kandinsky-inspired salad were shown to be willing to pay more than twice as much for exactly the same food (see **Figure 5**).

INSERT FIGURE 5 ABOUT HERE

Following up on this general approach, Maiz, Urkia, Bereciartu, Urdaneta, and Allirot (2019) recently reported on a study demonstrating the benefits for artistic presentation of novel fruits and vegetables amongst children. Meanwhile, along somewhat similar lines, the supermarket chain Tesco here in the UK launched a new range of vegetables sculpted into various shapes, like stars and faces in order to try and get children to eat more of their five-a-day in 2017 (see Knox, 2017, for a press report). I have, though, been unable to determine how successful the latter scheme was. Nevertheless, a number of researchers have suggested the benefits of enhancing the visual appearance in terms of encouraging children to try new foods (Kildegaard, Olsen, Gabrielsen, Møller, & Thybo, 2011). In other research, we have been able to demonstrate that plating a salad (of tomato, mozzarella, and aubergine) so that it covers more of the plate (i.e., presents a larger surface area) also influenced people's preference and willingness to pay, when compared to a stacked presentation of the same elements (see Rowley & Spence, 2018). In other words, any of the latest findings concerning the benefits of the aesthetic plating of food can presumably also be applied to help make leafy greens more desirable to diners/consumers.

A couple of other intriguing salad presentations are perhaps worth mentioning here, both playing on the theme of complexity (see Spence, 2018). In one, UK chef Ben Spalding created an intriguing leafy (salad) greens dish at the short-lasting John Salt restaurant in Islington, North London (http://john-salt.com, see Masters, 2012; O'Loughlin, 2012, for press reports). In particular, the chef made a salad consisting of a wide variety of different leaves/herbs. The dish was served to diners together with a London Tube Map on which the various stations had been replaced by the names of the leaves/herbs that the diner might, depending of the season/availability, find in the salad. Elsewhere, chef Andoni created a complex multi-element salad at his Michelin-starred restaurant Mugaritz in San Sebastian, Spain. Aduriz (2014, p. 42) describes the thinking behind the dish as follows: *"The dish 'Roasted and raw vegetables, wild and cultivated shoots and leaves' ... consists of hundreds of vegetables, leaves and herbs – something nobody would think of trying at home. One hundred ingredients make it impossible for the person preparing the dish to plate any two in the same way. It also makes it almost impossible for two diners to eat it in exactly the same way. This is one of the evocative powers of this recipe."* Note here that there is some evidence from conventional studies to suggest that

consumers may appreciate complexity in fruit/vegetable mixes (Mielby, Kildegaard, Gabrielsen, Edelenbos, & Thybo, 2012).

Going one stage further, one artist has turned the making of salad into a communal art practice (see Brooks, 2008; Morais, 2012, for press reports; and Goldberg, 1979; Smith, 2013, pp. 66-75). Tossing a salad with hundreds of audience members before serving it to those who are present. This art piece has now been performed in multiple venues over the last five decades or so. In analogous, if rather less prosaic research, many others have been investigating ways in which to get children to eat more fruit and veg in the context of school meals (Hakim & Meissen, 2013; Zellner & Cobuzzi, 2016, 2017). And here, there is research to suggest that adopting a more playful approach to the consumption of fruit and veg., and presumably also leafy (salad) greens, may prove to be an effective strategy towards increasing children's consumption (see Coulthard & Sealy, 2017). That said, there is already a fairly extensive literature concerning the various approaches that have been investigated over the years when trying to get children to consume more fruit and vegetables. Reviewing this specific branch of the literature does however, fall well beyond the scope of the present review. The interested reader is directed to the excellent review by DeCosta, Møller, Bom Frøst, and Olsen (2017) for more on this theme.

Conclusions

As the research that has been reviewed in this manuscript hopefully makes clear, encouraging (or nudging) the consumer toward increased consumption of leafy (salad) greens will likely need a concerted multisensory approach at all stages of the consumer journey between purchase and consumption. According to international guidelines, the consumption of leafy greens constitutes an important element in maintaining a healthy balanced diet. At the same time, however, it is worth reiterating that these foods do not have an especially attractive sensorial profile – green the dominant colour tends to be associated with bitterness, a generally-disliked taste (Saluja & Stevenson, 2018; Spence et al., 2015), at least when green has been presented in the form of a drink or as an abstract colour patch or word. It is possible though that the associations that consumers have with green in the context of salad leaves might be more with 'fresh' and 'healthy' than necessarily with bitter. At the same time, however, it is worth noting that there might simply be too much variability in the range of colours and shapes in which

leafy salad greens present for any simple conclusion to be drawn (Cardello, 1996; Clydesdale, 1993). What is more, the majority of leafy greens tend not to have an especially prominent, or appealing, orthonasal aroma. The low energy-density associated with leafy (salad) greens also means that the consumer's visual attention is unlikely to be drawn toward them (Harrar et al., 2011; Sawada et al., 2017). It is perhaps, in part, for these reasons that people's consumption of leafy (salad) greens tends to fall below recommendations (GBD 2017 Diet Collaborators, 2019), leading to one dramatic CNN press headline *"What we aren't eating is killing us, global study finds"* (LaMotte, 2019).

In this review, I have attempted to highlight/review a number of multisensory approaches that could potentially be used to help increase the multisensory appeal of leafy (salad) greens from initial purchase (be it in-store, online, or from a vending machine) through to eventual consumption. However, it is important to note that for the reasons outlined at the start of this piece, leafy (salad) greens simply haven't attracted anything like as much scientific research interest, at least in terms of the psychology/gastrophysics (Spence, 2017) of this most healthy component of any balanced diet. That said, the various suggestions outlined here should undoubtedly be seen as operating within the broader context of changing food trends and fashions (e.g., see Ko, 2016; McClelland, 2015, for press reports). Finally, here, it is important to bear in mind the cultural differences in terms of cooking and eating leafy greens as well as in favourite (or popular) types of leafy greens. Such cross-cultural differences may, in turn, lead to variations with regards to the effects of multisensory nudges on consuming or purchasing leafy greens.

Looking to the future, it remains to be seen quite how the consumer of tomorrow will react/respond to the emergence of branded leafy (salad) greens that have been grown under indoor, and increasingly automated, farming conditions. Nevertheless, despite the obvious challenges, it is clearly important that we do everything we can, from a sensory perspective (both product-intrinsic and product-extrinsic), to try and increase the multisensory appeal of leafy (salad) greens to both adults and children and so hopefully help to nudge the population toward a more healthy and sustainable food future (cf. Friis, Skov, Olsen, Appleton, Saulais, Dinnella, et al., 2017). Some of the key suggestions that have emerged from the literature reviewed here include: Use of colour variety in mixed leaf salads; Combination of different leaves with the aim of engaging different senses (taste, sound, olfaction, etc); Use of packaging colours so as to optimize visual appearance, especially in terms of trying to promote appearance

of freshness; Give careful consideration to optimal lighting conditions; Potential use of noisy packaging for noisy leaves; Encourage playful approach to consumption of leafy greens.

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Table 1. Summary of results from a study reported by Delwiche (2003) documenting the importance of different senses to flavour. The hierarchy / relative importance of the different sensory cues outlined here would seem to be very different in the case of leafy (salad) greens.

TABLE 1.
SUMMARY OF OPINIONS ON ATTRIBUTES

	Taste	Smell	Chemesthesis	Temperature	Texture	Color	Appearance	Sound
% Important	97[a]	94[a]	-	78[b]	64[c]	40[d]	37[d]	21[e]
% Essential	96[a]	90[a]	-	37[b]	34[b]	12[cd]	16[c]	6[d]
% Changeable	0[a]	2[a]	-	19[b]	41[c]	68[d]	68[d]	82[e]
Mean Rank	1.5	1.7	-	4	4.1	5	4.8	6.6
% Mentioned	87	61	14	4	9	0	5	2

Within a row, percents with same superscript are not significantly different

FIGURE LEGENDS

Figure 1. A selection of leafy greens (albeit with some dark red, almost purple, leaves shown). Notice the differences in colour and shape of the leaves. Is there any useful information about the taste/flavour of the leaves signalled by the shape of the leaves?

Figure 2. Loose salad/vegetables in store display (from Searle, 2019). According to some commentators, this may be one way to tackle food waste.

Figure 3. The photographs of the salad portions. In the consumer study, the photographs of the mixed salads (pale-coloured salads upper row; colourful salads (lower row) shown to the participants (N = 93) in Paakki et al.'s (2019) study of the visual appeal of colourful salads shown to Finnish consumers. In general, the results showed that people preferred those salads displaying more colour contrast, as well as preferring salads having a mix of light and dark leaves.

Figure 4. Given research by Schifferstein et al. (2016) demonstrating that the background colour (orange vs. blue) against which fruits and vegetables are displayed influence the perceived attractiveness of vegetables, one might wonder what the bright orange background of this promotional shot for Plenty's leafy greens does to the attractiveness of the product that is displayed. (Figure courtesy of Plenty Farms, as reproduced in Peters, 2019).

Figure 5. Difference in the Willingness-to-pay for a salad served either as inspired by one of Kandinsky's paintings (A) or the same ingredients as a regular tossed salad (B) in a between-participants naturalistic study conducted with 150 people when served a three course meal at Somerville College dining hall, Oxford. Figure modified and reprinted from Michel et al. (2015).

Figure 1.

Figure 2.

Figure 3.

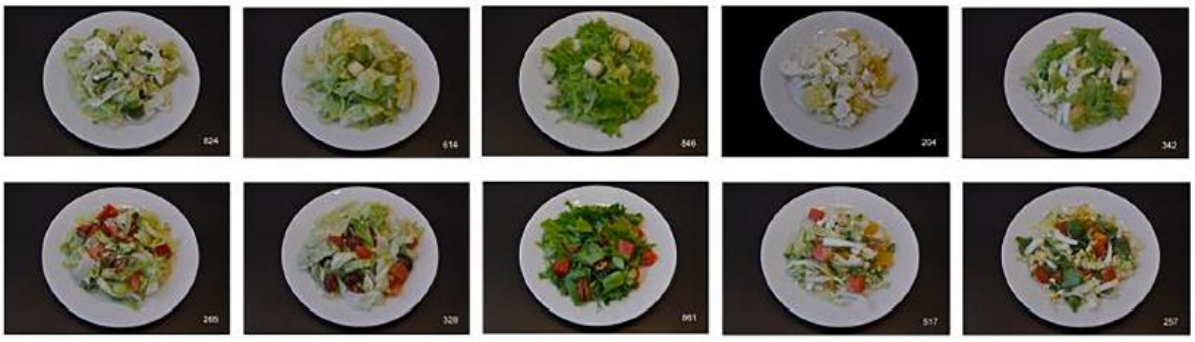

Figure 4.

Figure 5.