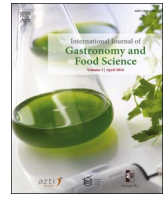




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Review Article

Comfort food: A review

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ABSTRACT

Everyone has heard of comfort foods, but what exactly are they, and what influence, if any, do they actually have over our mood? In this review, I summarize the literature on this important topic, highlighting the role that comfort foods play in alleviating loneliness by priming positive thoughts of previous social interactions, at least amongst those who are securely attached. The evidence concerning individual differences in the kinds of food that are likely to constitute comfort food for different sections of the population is also highlighted. Intriguingly, while most people believe that comfort foods elevate their mood, robust empirical findings in support of such claims are somewhat harder to come by. Such results have led to some influential headlines suggesting that the very notion of comfort food is nothing more than a myth. While this may be overstating matters somewhat, it is clear that many uncertainties still surround if, when, and for whom, the consumption of comfort food really does provide some sort of psychological benefit. This represents something of a challenge for all those marketers out there waiting to associate their products with the appealing notion of comfort food.

What is comfort food?

The term *comfort food* refers to those foods whose consumption provides consolation or a feeling of well-being. Foods, in other words, that offer some sort of psychological, specifically emotional, comfort.¹ It is often suggested that comfort foods have a high calorie content (that they are high in sugar and/or carbohydrates; e.g., Fearnley-Whittingstall, 2012; Wagner et al., 2014),² and that they tend to be associated with childhood and/or home cooking. Indeed, comfort foods are often prepared in a simple or traditional style and may have a nostalgic or sentimental appeal, perhaps reminding us of home, family, and/or friends (Locher et al., 2005).³ Nostalgia being an important aspect of many celebratory meals such as Thanksgiving in The States (Goldstein, 2016; Hirsch, 1992; Spence, 2017; Sutton, 2001; Tweedy, 2015).

Comfort foods tend to be the favourite foods from one's childhood, or else linked to a specific person, place or time with which the food has a positive association, as in: "Grandma always made the best mashed potatoes and gravy, they've become a comfort food for me."⁴ Or "We always got ice cream after we won at football as kids." (see London, 2015; Wansink and Sangerman, 2000). The suggestion is that those who are alone tend to eat more comfort foods than those who are not.

According to the results of one recent North American survey, the majority (81%) of those asked either agreed, or else strongly agreed, that eating their preferred comfort food would make them feel better (see Wagner et al., 2014). On the downside, though, many females, when questioned, report that consuming comfort food results in their feeling less healthy as well as quite possibly guilty (Dubé et al., 2005; Kandiah et al., 2006; though see also Adriaanse et al., 2016).

Although the Oxford English Dictionary traces the origins of the term comfort food back to a 1977 article that appeared in *The Washington Post*, Cari Romm (2015) recently suggested that: "The phrase 'comfort food' has been around at least as early as 1966, when the *Palm Beach Post* used it in a story on obesity: 'Adults, when under severe emotional stress, turn to what could be called 'comfort food'—food associated with the security of childhood, like mother's poached egg or famous chicken soup'." Given that regular (healthy) eating also results in a feeling of well-being, it is perhaps important here to distinguish what is special about comfort eating. The latter would seem to be different in terms of its emotional/affective associations and/or perhaps also the relatively narrow range of foods that are involved.

These days, there is growing interest in the therapeutic use of comfort foods for those older patients who may well not be consuming enough to maintain their health and/or quality of life (e.g., Stein, 2008;

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¹ Or as Geneen Roth put it in Hughes and Hughes (2007): "When people turn to food and they're not physically hungry, it means that they're using food for something else besides satisfying the needs of the body. They're using it for a different kind of hunger—an emotional hunger, a psychological hunger, or a spiritual hunger."

² Though, as we will see later, this assertion is certainly not, in fact, always correct. As Shira Gabriel, one of the researchers in the area puts it recently: "to equate 'comfort food' with 'caloric' is to misunderstand where the comfort actually comes from." (cited in Romm, 2015).

³ Neither nouvelle cuisine nor modernist cuisine would likely qualify as comfort food.

⁴ Meatloaf and mashed potato, the comfort food that comes to many people's minds (e.g., see Freedman, 2016, p. 77; Rufus, 2011).

Wood and Vogen, 1998; see also Spence, 2017, for a review). In this group, comfort foods can also serve an important role in terms of triggering nostalgia. Given the above, it should come as little surprise, to find that many of the food companies are interested in trying to engineer new “comfort foods” (e.g., Stein, 2008). However, the relatively idiosyncratic way in which foodstuffs take on their role as comfort foods means that it is probably going to be quite a challenge for the food companies to achieve this goal (see Wansink and Sangerman, 2000). That said, restaurateurs have certainly been known to put more comfort foods on the menu (e.g., Mac-and-cheese) when times are hard (Rufus, 2011; Stein, 2008). NASA, too, have become interested in the topic (see Hoffman, 2014), given the planned space mission to Mars. Comfort food probably being just what the astronauts will likely need on their undoubtedly stressful ultra-long-haul flights.

Where do our comfort food preferences come from?

Given that many comfort foods are associated with what our parents or grandparents may have given us to eat when we were ill as children,⁵ there tends to be a lot of variation across both individuals and cultures in terms of the foods that people think of as comforting (e.g., see Brown, 2016; Doré, 2015; Telegraph Food, 2015; https://en.wikipedia.org/wiki/Comfort_food for a list of comfort foods by country). That said, chicken soup often comes top-of-mind (e.g., coming in 1st place, and mentioned by 44% of the respondents in one study of older North Americans born between 1897 and 1949; Wood and Vogen, 1998; see also Troisi and Gabriel, 2011; Wansink and Sangerman, 2000).⁶

According to a survey of more than 1,000 North Americans reported by Brian Wansink and Cynthia Sangerman (2000), the top comfort foods were potato chips (24%), ice cream (14%), cookies (12%), pizza and pasta (11%), beef/steak burgers (9%), fruits/vegetables (7%), soup (4%), and other (9%). Intriguingly, however, these averages hide some striking gender differences. When asked to agree or disagree on whether particular foods were comfort foods to them, the top choices amongst females were ice cream (74%), chocolate (69%), and cookies (66%). By contrast, the top three comfort foods for men were ice cream (77%), soup (73%), and pizza/pasta (72%). Notice the place of hot main meals as comfort food for men, or as one newspaper headline put it: “*Women like sugar, men like meat*” (see Anon., 2005).

Importantly, it was not just the foods that differed by gender, differences were also identified in those situations that were likely to elicit comfort eating (see Wansink, Cheney, & Chan, 2003). Based on the results of a web-based survey of 277 participants (196 female and 81 male), loneliness, depression, and guilt were all found to be key drivers of comfort eating for women, whereas the men questioned typically reported that they ate comfort food as a reward for success (e.g., when they were feeling upbeat; see also Dubé et al., 2005). So, while the clichéd view may well be that people reach for comfort food when their mood is low, the evidence reported by Wansink and Sangerman (2000) suggests instead that comfort foods are consumed when people find themselves in a jubilant mood (86%), or else when they want to celebrate or reward themselves for something (74%). Only 39% of those questioned in this study chose to eat comfort foods when they had the blues or were feeling lonely (see Cardí et al., 2015, for a recent review).

Wansink and Sangerman (2000) also identified some interesting differences in what constitutes comfort food amongst the different age groups they polled: So, for example, while 18–34 year-olds preferred ice cream (77%) and cookies (70%), those aged 35–54 preferred soup (68%) and pasta (67%), and those aged 55 and over tended to prefer

soup (76%) and mashed potatoes (74%) instead. Wansink et al. (2003) also found that older people were more likely to report positive emotions after having eaten their favourite comfort food (than were women and younger adults). Here it is perhaps worth adding that people tend to remember/focus more on positive emotions/situations as they age (see Addis et al., 2010). But, in all cases, it was the past associations that an individual had with the foods that turned out to be key!

What exactly makes a comfort food comforting?

Here, the question is whether there are any specific sensory cues can be identified that are especially strongly associated with those foods that are typically considered as comfort foods? Are there particular tastes, textures, smells, etc., for instance, that tend to be overrepresented in the most commonly-mentioned comfort foods? Now, as we have just seen, the fact that *different* people identify *different* foods as comforting hints at the difficulty of identifying any common feature(s) across such a disparate range of foodstuffs. And while it may be true to say that many comfort foods are calorie dense that is certainly not always the case.

So, does one sense dominate over the others as far as comfort foods are concerned? Well, a large body of psychological research has shown that we are, generally-speaking, visually-dominant creatures (e.g., Posner et al., 1976; Spence et al., 2001). That is, no matter whether we want to know what something is, or where it is located, it is the input from our eyes that dominates over that from the other senses (e.g., hearing, touch, taste, and smell). It is also clear from the many studies that have been conducted over recent years that the visual appearance of food is very important to us. Indeed, as the Roman gourmand Apicius (1936) once put it: “*We eat first with our eyes.*” (see also Spence et al., 2016). So, the natural question to ask here is whether visual cues also dominate when it comes to defining those foods that we consider as comforting? I would, however, wish to argue that the answer is probably not. (Though, that said, I do struggle to identify any green comfort foods.)

One might also think that comfort food ought not to make any noise. Or, as Rufus (2011) put it: “*My comfort food must never draw attention to itself.*” However, the fact that potato chips came top of Wansink and Sangerman’s (2000) survey of comfort foods would seem to nix that idea, as the latter are amongst the noisiest of foods (see Spence, 2015, for a review). That said, across the whole range of comfort foods, I would dare to suggest that noisy foods are perhaps underrepresented as compared to what one might expect, if one had people list, say, their most preferred foods. The latter would, I guess, on average, make more noise when consumed.

Instead, in order to understand what, if anything, is special about comfort foods, one really needs to consider the role of the more emotional senses (specifically, touch, smell, and taste). In fact, it can be argued that what is common about those foods that we come to think of as comforting relates to their oral-somatosensory qualities; that is, what they feel like in the mouth (see Spence and Piqueras-Fiszman, 2016, for a review). As Rufus (2011) puts it: “*most of us are soothed by the soft, sweet, smooth, salty and unctuous.*” Spence and Piqueras-Fiszman note that comfort foods typically have a soft texture (just think, for instance, of mashed potatoes, apple sauce, and many puddings). Dornenburg and Page (1996, p. 31) suggest that those foods having this texture are seen as both comforting and nurturing.⁷ Social psychologists have reported that warmth in the hand makes other people seem warmer – that is, there appears to be a link between physical and social warmth (Williams and Bargh, 2008). As such, one

⁵ See also Birch et al. (1980) for the early development of food preferences based on their having been paired with parental attention.

⁶ Toast (33%) and milk toast (29%) were up there in 2nd and 3rd places, respectively.

⁷ In fact, more generally, it turns out that touch is an especially good sense for conveying emotional well-being – be it the warmth and pressure of a cuddle from a caregiver, or the satisfaction of a massage or hot bath (see Gallace and Spence, 2014, for a review).

could imagine that those who are feeling lonely might well benefit, psychologically-speaking, from holding something warm in their hands (think only of a warming mug of chicken soup, or a comforting cup of tea). Similarly, olfactory cues can also deliver a powerful emotional lift, having been shown to help aid relaxation (see Spence, 2003, for a review of the literature on aromatherapy). Here, it is interesting to note that various essential oils make an appearance both as relaxing aromas in the field of aromatherapy practice but also, on occasion, in food – think here only of lavender, lemongrass, or rosemary. The point here, as far as the link between aromatherapy and eating/drinking is concerned, is just to stress the overlap in terms of the key aromatherapy oils that are also edible. Whether such aromatic compounds are overrepresented in comfort foods is an open question, though introspection does not seem to support the idea.

In terms of basic tastes, sweet and salty (and, I guess, umami) would seem to be much more prevalent amongst a wide range of comfort foods than sour or bitter tastes. Remember here that the foods we are drawn to as kids tend to differ from those that taste most appealing as adults (Spence, 2012). And given that children do not tend to like bitter tastes, nor cruciferous vegetables much, this might also help to explain why it is so hard to think of a green comfort food. In summary, though, there is little clear evidence to support a particular sensory profile across a range of common comfort foods other than, perhaps, that on average they tend to be soft, smooth, sweet, and possibly have a salty/umami taste.

When, and why, do people consume comfort food?

According to the research, one important trigger leading to the consumption of comfort foods occurs when people experience negative emotions (e.g., Dubé et al., 2005), or else try to regulate their emotions (Evers et al., 2010). That is, people appear to comfort eat as a means of getting themselves into a more positive emotional state (Wansink et al., 2003), or, at least, that is the effect that they wish to achieve. As we will see later, though, some have questioned whether, in fact, eating comfort food achieves this objective.

Both our sensory-discriminative and hedonic responses to different basic tastes, food aromas, flavours, and possibly also food textures, change somewhat as a function of our mood/anxiety/stress levels (e.g., Dess and Edelhelt, 1998; Heath et al., 2006; Pollatos et al., 2007). So, for example, under stressful conditions, the hedonic appeal of sweetness has been shown to increase, as has the perceived bitterness of saccharin. Indeed, over the years, a number of studies have reported that people consume more sweet foods when stressed (e.g., Grunberg and Straub, 1992; Kandiah et al., 2006; Oliver, and Wardle, 1999; Oliver et al., 2000). The evolutionary story here being that the energy signalled by sweetness might be just what an organism needs in order to deal with whatever is causing the stress in the first place, or else may act as what is known as a ‘displacement activity’ (Kupfermann, 1964). Such changes could perhaps provide one physiological explanation for why it is that people might find sweeter comfort foods more appealing when they are stressed or depressed than when they are not. Indeed, Kandiah et al. (2006) reported that stress influenced North American college women’s (N=272) preferences in terms of the specific foods that they find most comforting. A number of the women questioned also reported eating more, on average, when stressed. Stress often leads to more sweet foods, desserts, chocolate, candy, ice-cream being eaten.

Researchers have also addressed the question of whether individual differences, specifically in terms of attachment style (that is, an individual’s ability to establish strong, healthy emotional bonds with others), influence the extent to which people reach for comfort food. In one study (N=77) reported by Troisi et al. (2015), those individuals who classified themselves as securely attached were found to rate potato chips as tasting better (i.e., more delicious) after they had been encouraged to describe a fight that they had recently had with someone close to them. By contrast, no such effect was observed in those

individuals who diagnosed themselves as having an insecure attachment style.

Meanwhile, in a second study, Troisi et al. (2015) had 86 US students keep daily diaries over a two-week period. In this case, analysis of what the participants had written revealed that those with a secure attachment style consumed more comfort food in response to naturalistic feelings of social isolation (loneliness, in other words). Taken together, then, the results of these two studies can be taken to suggest that the emotional benefits of comfort food are more likely to be experienced amongst those for whom consumption brings back positive associations of early social interaction (e.g., of a time where a care-giver may have provided food when an individual was sick as a child).

Consistent with this view, Troisi and Gabriel (2011) had already reported that the stronger an individual’s emotional relationships, the more satisfying they tended to find chicken soup (a prototypical exemplar of comfort food, at least here in the west). The suggestion emerging from the latter research was that the “comfort” element of comfort foods comes from its affective associations with social relationships rather than anything else (e.g., such as the calorie count, taste, or any other nutritional properties; see also LeBel et al., 2008). Put simply, the claim is that comfort foods help alleviate loneliness.⁸ Indeed, Troisi and Gabriel were able to demonstrate that the consumption of comfort foods automatically leads to the activation of relationship-related concepts.

That said, Ong et al. (2015) subsequently documented there to be some important cross-cultural differences here. For, while the latter researchers were able to replicate Troisi and Gabriel’s (2011; Experiment 2) findings in a North American cohort, no such link between writing about comfort food and reduced feelings of loneliness were found amongst securely attached individuals after a belongingness threat in those from either Singapore or Holland. The latter null results would therefore appear to hint at an important cross-cultural component to the role/meaning of comfort food. Unpacking such cross-cultural differences, though, will likely require a good deal more research. It would, for example, be a good idea to repeat the study across a much wider range of cultures in order to determine how widespread the two response patterns identified by Ong et al. actually are.

Do comfort foods really provide comfort?

There may also be a neuropsychopharmacological angle here to comfort foods. It has, after all, been reported that eating palatable foods can lead to the release of trace amounts of mood-enhancing opiates (Le Magnen, 1986). Similarly, the consumption of sweet, high-calorie foods (think ice-cream, cookies, or chocolate) has been linked to the release of opiates and serotonin, which, once again, may help to elevate (or prevent a decline in) mood in certain populations (e.g., Drewnowski et al., 1992; Gibson, 2006; Markus et al., 1998). The direct infusion of a fatty acid solution to the gut can help to reduce the negative emotional impact of watching a sad film clip too (Van Oudenhove et al., 2011). Finally, there is evidence that drinking black tea (which is often considered a comforting drink here in the UK), can also reduce stress (Hall, 2006). In one double-blind UK study, it led to a significant reduction in cortisol (Steptoe et al., 2007).

That being said, researchers have, in recent years, turned to the question of whether comfort foods really do, in any meaningful sense, provide a psychological benefit to those who consume them. For instance, Wagner et al. (2014) had their participants (N=100, split across 3 experiments) watch upsetting movie scenes for 18 minutes in

⁸ There is also the caricatured jilted lover consoling herself with ice-cream and/or chocolate, or better still, chocolate ice-cream (Wansink and Sangerman, 2000). In this case, while it is undoubtedly true that the person concerned is feeling low, what may, in fact, be more salient is that they are likely feeling very lonely.

order to induce a bad mood, assessed via a mood questionnaire.⁹ Next, the participants ate their own preferred comfort food (with triple the recommended portion size being offered), another equally-liked food (such as popcorn), a neutral snack (something like a granola bar), or else were given nothing to eat. Three minutes later they were given another mood questionnaire. The surprising result to emerge from this study (comprising a total of 4 related experiments) was that the mood of the participants improved equally in all four of the conditions. That is, no specific evidence was garnered to support the claim that consuming comfort food conveyed any special emotional benefit over the other foods.¹⁰

So, should it be concluded from Wagner et al.'s (2014) research that consuming comfort food doesn't provide any kind of emotional benefit, as suggested by some of the newspaper headlines covering the story (e.g., see Hoffman, 2014)? I would like to argue instead that one might want to nuance the claim: At this stage, at least, perhaps it is safer to say that comfort food (or any other kind of food for that matter) might simply not be all that effective at alleviating the short-lasting negative mood induced by watching depressing movie clips (selected to induce anger, fear, anxiety, and/or sadness). It should, after all, be kept in mind here that the relatively mild mood induction procedure used by Wagner et al. is unlikely to have tapped the extremes of stress that may serve as the trigger for many everyday examples of comfort, or for that matter other forms of emotional, eating (e.g., see Dallman et al., 2003; Dallman et al., 2005; though see also Bongers and Jansen, 2016; Westermann et al., 1996). Furthermore, it should also be remembered that the second mood questionnaire was given just 3 min after the participants had been offered the food.¹¹ The possibility must therefore remain that the beneficial effects of consuming comfort food (be they psychological or physiological in nature) emerge rather more slowly. For the sake of comparison here, it is worth bearing in mind that many neuropsychopharmacological effects take 1–2 h to kick in (e.g., Markus et al., 1998).

Alternatively, however, based on the research reported by Troisi, Gabriel, and their colleagues (Troisi and Gabriel, 2011; Troisi et al., 2015), it could also be argued that comfort foods actually work by alleviating social isolation (what they call 'belongingness threat') – i.e., rather than by improving mood per se. The movie clips chosen by Wagner et al. (2014) presumably did not induce any kind of social isolation, and so may not have been especially relevant to assessing this particular claim. As is so often the case, then, it is a matter of more research being needed in order to know if, under what conditions, and for which specific populations, the consumption of comfort food really does provide some sort of measurable psychological benefit.

Conclusions

The concept of comfort food is one that is familiar to most people. That said, what constitutes comfort food differs widely from one individual to the next (e.g., LeBel et al., 2008; Troisi and Gabriel, 2011; Wansink et al., 2003), and from one culture to another (e.g., see also https://en.wikipedia.org/wiki/Comfort_food). Questionnaire-based research suggests that men and women tend to reach for somewhat different comfort foods (Wansink et al., 2003; see also Anon., 2005). Furthermore, what constitutes comfort food for younger

people differs from the foods that are typically chosen by older individuals (Dubé et al., 2005; Wansink and Sangerman, 2000). Certainly, the clichéd notion that comfort foods tend to be calorie-dense is not always correct. Or as Romm (2015) puts it: "*certain foods promise solace as much as fuel.*" That said, generally-speaking, comfort foods are not characterized as tasting especially good, nor are they characterized by their 'healthfulness'. And nor, for that matter, do there appear to be any specific sensory characteristics that help to distinguish comfort from other classes of food.

Indeed, given the wide variety of different foods that people describe as comforting to them, it would seem unlikely that there are going to be any particular components (i.e., specific nutrients or tastes) that one can point to as having a physiological impact on whoever is consuming them. Rather, it would seem that certain foods take on their role as comfort food through association with positive social encounters in an individual's past.¹² So, to the extent that comfort foods work (i.e., that they provide some kind of neuropsychopharmacological benefit or boost, at least to a certain sub-section of the population), it is not so much a matter of elevating people from out of a bad mood as priming thoughts of prior positive social encounters, when exposed to a belongingness threat.¹³ In other words, one important reason why people reach for the comfort foods is because they feel lonely. That said, anything else could perhaps be swapped in the place of food for, according to Shiri Gabriel: "*anything else that brings the same soothing sense of familiarity, like re-reading a beloved book or watching a favorite TV show.*" (cited in Romm, 2015). Consistent with this view, the participants in one study were shown to feel less lonely after simply writing about comfort foods (i.e., without consuming anything; Troisi and Gabriel, 2011, Experiment 2; though see Ong et al., 2015).

Finally, it should be remembered that comfort foods are actually consumed under a relatively heterogeneous range of environmental conditions in order to achieve a variety of different psychological outcomes (see Wansink and Sangerman, 2000) – of which, alleviating loneliness, may be but one. And, as we have seen in this review, it is just that simple mood elevation, when we are in an (experimentally-induced) bad mood (while in the laboratory), may not be one of them. It remains for future research to demonstrate whether comfort foods can induce some form of robust mood enhancement under other, more ecologically-valid, conditions and who amongst us, might benefit most.

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None.

List of abbreviations

Not applicable.

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Ethics approval and consent to participate

As a review paper, no participants were tested in this paper.

Consent for publication

Approval to publish has been given where required.

Availability of data and material

There is no data or material to make available

Competing interests

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Authors' contributions

CS wrote all parts of this review.

⁹ The video clips were taken from films such as "The Hurt Locker", "Sophie's Choice", and "Armageddon."

¹⁰ Nor, it should be noted, was eating something found to be beneficial as compared to those who ate nothing.

¹¹ Bear in mind also that elsewhere it has been shown that eating chocolate can positively impact people's mood following negative mood induction (see Macht and Mueller, 2007). The latter study highlighted an improvement in experimentally-induced negative mood three minutes after the consumption of a small 5g piece of chocolate (hence why the final mood questionnaire was administered 3min after the food was presented in Wagner et al.'s, 2014, study). Meanwhile, Kassab et al. (2012) have demonstrated that a sweet taste also has a calming influence in 2-month-old infants.

¹² As Rufus (2011) puts it: "*The brain associates good experiences with specific flavors, fragrances and textures, coding them as harbingers of happiness.*"

¹³ Gardner et al. (2014) have put forward the intriguing suggestion that when people are in a good mood they may focus on longer-term goals, such as eating healthily, whereas when they are in a negative mood, they may focus more on the attainment of immediate goals.

Authors' information

Charles Spence is an experimental psychologist and gastrophysicist working out of Oxford University, who is fascinated by the design of multisensory dining experiences. In 2014, he published the prize-winning *The perfect meal: The multisensory science of food and dining* (Oxford, UK: Wiley-Blackwell) together with Dr. Betina Piqueras-Fiszman. He has just (in 2017) published his new book *Gastrophysics: the new science of eating* with Penguin Viking.

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