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Editorial

Special Issue: Social Neurobiology of Eating

The social neuroscience of eating: an introduction to the special issue

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The arrival of a new year is celebrated around the world with tasty food and gatherings of friends, family, neighbors and even like-minded strangers. The fact that New Year celebrations involve these three critical ingredients—tasty food, positive emotions and social contact—is illuminating from several perspectives, not the least of which being the near-universal appreciation of the synergy among the three elements. There are also some specific regularities that appear across many world cultures with respect to the nature of foods used for celebration of the new year and the characteristics of the social environment: (i) the food that is frequently consumed to celebrate the New Year is highly appealing to the senses—the taste-buds for sure, but also foods that carry above average visual, tactile and even auditory appeal (e.g. a satisfying crunch and an audible slurp); (ii) the context almost always involves other people and (iii) pandemics notwithstanding, we seek to engage with others when consuming these tasty foods, and indeed the presence of others and the nature of the foods are often experienced as mutually reinforcing.

Everyday eating tends to involve at least some orientation to the above-mentioned factors as well. Daily feeding is often carried out in the presence of others and includes some emotional context, in terms of antecedents, consequences and correlated states, if not every meal, many meals over the course of a week or month. Likewise, there appear to be reliable tendencies to gravitate toward subjectively appealing foods when available. However, there are indeed other factors that come into play: we also guide our food selections based on health considerations, social consequences, habit and cultural norms; important, but historically overlooked, is the fact that we are also constrained by the environment in our food choices. Indeed, the everyday variability in eating tendencies within and between individuals over the lifespan appears to have important implications for health, wellness and even lifespan.

When considering the role of the brain in eating, it is natural then to consider regions, systems and structures that process the subjective value of foods; those that guide decision-making, emotional processing and interpretation of social context as well as those that guide attention, consciousness, sensory processing and the modulation of behavior within environmental constraints. In this special issue, we have papers that touch on all of these and more, from a diverse range of methodologies for imaging brain structure and function (fMRI, sMRI, fcMRI and fNIRS) and for assessing eating (self-report, real-time ingestion and observed consumption), at many levels of analysis (individual, small group and large population dataset).

Likewise, a number of regions of interest emerge repeatedly through each of these papers, including the orbitofrontal cortex (OFC), the insula, the ventromedial prefrontal cortex, the lateral prefrontal cortex and others.

Rolls (2023) provides an overview of the OFC and its relation with food reward, body weight and body composition, summarizing findings on this key brain region involved in reward value, the rewards for eating and emotion. Following this, two research groups present findings from large population-level datasets supporting the role of the OFC in eating habits and body composition (Rolls *et al.*, 2023; Hall *et al.*, 2023b). Next, Sadler *et al.* (2023) studied brain responses to repeated food cue exposures; their findings suggest that caudate and a posterior cingulate cortex response increase with repeated cue exposure for healthy weight individuals, and somatosensory and insula activation increase with repeated taste exposure. The magnitude of the posterior cingulate cortex changes increased with (more) body mass and (less) dietary restraint. Yokum *et al.* (2023) then examine the findings of six datasets and provide evidence that a striatal response (in three studies) predicts adiposity changes, but that lateral OFC activations do not.

With reference to cognitive control networks, Maier and Hare (2023) found that an increased blood oxygen level dependent response during successful emotional reappraisal tasks—involving both positive and negative stimuli—in fMRI predicted successful self-control in the dietary domain. These cross-task effects were evident in the medial and lateral prefrontal cortex (PFC), as well as in the striatum. Using population-level data from the Adolescent Brain Cognitive Development (ABCD) Study, Hall *et al.* (2023a) examined the association between lateral prefrontal brain morphology and body composition; the findings revealed that greater gray matter volume and surface area of the lateral PFC predict lower body mass index. Wilson and colleagues,

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however, provide evidence suggesting that recruitment of the dorsolateral prefrontal cortex (dlPFC) during eating behavior may manifest at the moment of food choice, but with only transient effects on preferences.

Cosme and Lopez (2023) present evidence that measures of reward and valuation are associated with individual differences in body composition and regulation of food cravings. A meta-analysis by Morys *et al.* (2023, this issue) explored this issue across studies via a pre-registered meta-analysis of 13 studies and found no overall differences comparing obese and lean individuals; however, they found that neural response to food cues in the left insula and fusiform gyrus was a possible differentiating factor.

Two experimental studies employed neuromodulation techniques in order to examine causal effects of cortical structures and regions on food cravings and eating behavior. Fatakdawala *et al.* (2023) examined the effects of excitatory neurostimulation of medial and lateral PFC subregions on task performance and eating behavior in healthy men and women. The findings revealed expected impacts of stimulation on cognitive task performance and functional activation patterns within the PFC, but paradoxical effects on consumption, with females in the dorsomedial prefrontal cortex stimulation group eating more in response to stimulation. Yang *et al.* (2023) found that go–no-go training for 51 overweight participants (divided into training and control groups) resulted in reductions in high-calorie food evaluation and lower activations in inhibitory and reward regions of the brain in response to high-calorie food images, despite no intervention effects on body weight per se.

Finally, examining neural correlates of implicit attitudes and eating behavior, Gallucci *et al.* (2023) found that implicit attitudes predict eating behavior in normal and disordered eating groups, but that neuroimaging and neural stimulation studies are relatively rare and represent an open area of implicit attitudes research.

The papers in this Special Issue thus provide insight into social and other factors involved in eating and set the stage for future research. Some of the most promising directions are at the interface between traditional eating behavior research and emerging methods and adjacent fields. Neuroimaging is one such method, but papers in this Special Issue also connect to results in the animal literature, neuromodulation and addiction. Uncovering these connections in turn presents new directions in eating research. For example, early-stage interventions to alter eating behavior might be inspired by the use of psychedelics to treat substance use. The interdisciplinary work featured in *Social Cognitive and Affective Neuroscience*, including but not limited to this special issue, continues to be an engine for innovation in basic and translational work on eating.

Conflict of interest

The authors declared that they had no conflict of interest with respect to their authorship or the publication of this article.

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