Mindful eating is increasingly being promoted as a way to lose weight and eat more healthily. But how much truth is there behind the headlines? Mindfulness-based training programmes have had some success at promoting weight loss but these typically also include non mindfulness-based strategies, which makes it difficult to establish the extent to which the mindfulness components are responsible for any change. More carefully controlled experimental research is needed to help isolate the independent effects of specific mindfulness-based strategies as well as identify underlying mechanisms and relevant moderators. A number of different brief mindful eating strategies are being studied in this way. These brief strategies do not necessarily capture all the features of mindfulness, but they are easier to deliver and implement compared to more intensive training programmes. As such they have the potential for greater reach, especially among those with less time and fewer resources. Encouraging people to attend to the sensory properties of their food as they eat is one such brief strategy. Some studies suggest this could help reduce intake of high calorie foods, but other studies have failed to find such effects. More research is needed to fully understand these types of strategies to enable us to predict when they are and are not likely to be helpful.

Dr. Tapper is a Reader in Psychology at City, University of London. Previously she held positions at Swansea, Cardiff and Bangor Universities. Her main research interests are in health behaviour and behaviour change, with a particular emphasis on healthy eating and weight loss. She has been involved in the development and evaluation of a wide range of health interventions for both adults and children. Recently she has been exploring the use of digital technologies to influence lifestyles and habits. These applied projects are informed by her more experimental work aimed at identifying and understanding variables that influence health-related behaviours. You can follow her on Twitter @katytapper where she tweets about psychology, health and health promotion.
Interactions between metabolic, reward and cognitive processes in appetite control

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Traditional models of appetite control have emphasised the role of independent homeostatic (metabolic) and reward systems. In addition, separate lines of investigation have examined the role of cognitive and social processes in food-related decision making. While progress has been made in all these areas in understanding the factors that influence how much and what we decide to eat, less is known about how these processes are integrated to influence food intake/food choices from moment to moment and the specific mechanisms that underlie such integration. In this presentation I will argue that learning and memory processes, in particular, goal directed behavioural control processes, explain how diverse factors come together to influence food choices via value based computations that are enacted in areas of the brain such as the ventromedial pre-frontal cortex (vmPFC) and dorsolateral pre-frontal cortex (dIPFC). I will present data to suggest that these brain systems implicated in decision-making are influenced by signals from the body that provide information about current metabolic state thus demonstrating that metabolic, cognitive and motivational processes form an integrated system of appetite control.

Professor Higgs is Professor in the Psychobiology of Appetite at the University of Birmingham. Previously she held positions at the University of Oxford and the University of Durham.

Professor Higgs’ research is focused on the role of cognitions such as learning, memory and attention in eating behaviour and the biological mechanisms that underpin these processes. She is the Principal Investigator of the Eating Behaviour Research Group (EBRG), where they assess emotional and cognitive responses to foods in adults and children, using both behavioural and brain imaging techniques. They ask questions about how memory for recently consumed foods affects decisions about future food intake and the factors that determine remembered liking for foods. They are also interested in the role of working memory in appetite processes and how social context influences what we choose to eat. This work has been funded by the ESRC, BBSRC, Leverhulme Trust, MRC and Alcohol Education Research Council. You can follow the EBRG on Twitter @EatingBehaviour.
Oral Presentations

Who should choose children’s mid-afternoon snack: the mothers or their children?

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Children’s mid-afternoon snack is usually characterized by the consumption of fatty and sweetened foods (Anses, 2017). To the best of our knowledge, no study has investigated differences or similarities in terms of nutritional quality of mid-afternoon snack choices made by children or by their mothers. Our first goal was to compare the nutritional quality of children’s mid-afternoon snack choices made by mothers or by themselves. Our second goal was to see whether the potential differences were maintained or not when mothers and children were informed about the product’s nutritional quality. We invited 95 mother-child dyads (children mean age = 9.4±0.10) to choose in the laboratory one beverage (among 6) and two food items (among 9) for the mid-afternoon snack, first for themselves and then for the other dyad’s member. After an explanation of the Nutri-Score label (French nutritional labelling system), we invited participants to choose again one beverage and two food items for themselves and for the other dyad’s member, among products labelled with the Nutri-Score. Participants were informed at the beginning of the experiment that one of the four choices (the two selected by the participant for himself and the two selected by the other dyad’s member for this participant) would be randomly selected to be consumed. To answer our questions, we focused here on the nutritional quality of the children’s snacks. We found that children’s choices for themselves were lower in terms of nutritional quality than mothers’ choices for their child (P < 0.001). The difference between the nutritional quality of choices made by children for themselves and those made by their mothers was not reduced after labelling (P=0.86). Thus, in terms of nutritional quality it seems preferable that mothers choose the mid-afternoon snack of their child.

Healthy Happy Family Eating: A Randomised Controlled Trial

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Unhealthy eating among UK children is a widespread problem, putting them at risk of many long-term health difficulties. Evidence shows that positive eating behaviours encouraged at home can influence children’s food preferences. Studies also indicate that parents may be more likely to employ positive feeding strategies when they are not anxious about mealtimes, suggesting the need for a family-focused intervention to improve eating behaviours that is practical and enjoyable for parents to engage with. The purpose of this study was to evaluate an online intervention, developed by the University of Reading and Netmums, the UK parenting website. The Healthy Happy Family Eating (HHFE) programme aims to improve family eating behaviours and consists of nine emails delivered over 3-weeks. Four hundred and eighty eight parents were randomly allocated to an intervention (HHFE) group or a control (Kids’ Wellbeing, KW) group. Primary outcome measures comprised healthy home environment, child’s enjoyment of food and family meal frequency. Secondary outcome measures related to several other feeding practices, food neophobia and expenditure on food. Data were collected at baseline, immediately after the intervention and 6-months post intervention. Results showed an improvement in healthy environment scores for both groups (p < 0.001 at both time points) but, disappointingly, no effects of time or condition on enjoyment of food or family meal frequency. Sub-group analyses exploring the pattern of results within different demographic groups and evidence of participant engagement will also be presented.
Adapting the spoonful pace to the spoonful weight: a favourable practice linked to the infant caloric compensation ability?

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We recently demonstrated that infants’ caloric compensation ability - reflecting the infants’ responsiveness to their internal satiation cues - decreases between 11 and 15 months (Brugaillères et al., AJCN, in press, doi: 10.1093/ajcn/nqy357). The main feature of mealtime episodes at these ages is that infants are fed by a caregiver, generally the mother. Thus, the kinetics of intake over the course of the meal is strongly linked to the mother-infant interaction. We aimed to explore whether the inter-individual variation in infants’ caloric compensation ability was associated with the mother-infant interaction during the meals.

To describe mother-infant interaction, we recorded feeding in laboratory ad libitum meals when the infants were 11 and 15 months by using a connected weighing scale that continuously recorded the weight of the bowl (Brugailieres et al., Measuring Behavior, 2018). This allowed us to describe the microstructure of the mealtime episode since we extracted the weight of each offered spoonful and the time interval between two spoonfuls. Then, we were able to calculate a variable ‘pace adaptation’ reflecting the extent to which the spoonful pace is linked to the spoonful weight. The caloric compensation score (COMPX) was assessed during the same meals.

Results revealed that at 11 months, when the spoonful weight was positively linked to the time interval between two spoonfuls (i.e., the larger the spoonful weight was, the longer the time interval until the next spoonful), the infants exhibited a better caloric compensation ability (t = -2.1, p = 0.04, n = 38). However, this was not observed at 15 months.

Our result suggests that adapting the feeding pace to the spoonful weight could be a favourable practice associated with caloric compensation ability by the end of the first year. This finding provides new insights for addressing and measuring responsive feeding.

Funding: ANR PUNCH (ANR-15-CE21-0014)

Eating in the absence of hunger in 18-month-old children in a home setting

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A behavioural risk factor for developing overweight is Eating in the Absence of Hunger (EAH), which refers to the susceptibility to eat despite experiencing satiety. It is thought that young children’s energy intake is largely regulated by internal cues of hunger and satiety. This study assessed to what extent 18-month-old children eat in the absence of hunger. An EAH procedure was conducted in a home setting. Children were offered 4 age appropriate finger foods (two savoury, two sweet, total 1150 kJ) for ten minutes after dinner. An EAH score was calculated per child by dividing the energy intake from the finger foods by the intake from dinner. If mothers rated the child’s satiety after dinner as 4 or higher on a 5-point scale the child was considered satiated. In total, 204 mother-child pairs participated in the EAH paradigm. Mean age of the children was 18.4 months (± SD 0.7), and 7.4% of the children was overweight (WFL z ≥ 2). Preliminary results showed that mean (± SD) energy intakes from the evening meal and finger foods were 937 kJ (±437) and 162 kJ (±142;range: 0-670). The average EAH score was 21.0% ± 23.3 (range: 0-172) for all and 18.2% ± 18.8 (range: 0-156) for satiated children (n= 141; P for difference =0.08). In our study, children of 18 months old ate in the absence of hunger when offered palatable finger foods, however there were large individual differences.
The role of consumption and reward simulations in the motivation for sugar-sweetened beverages

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While the motivation for unhealthy food has been researched extensively, the motivation for sugar-sweetened beverages remains understudied, despite their negative health consequences. Here, we examined how people represent sugar-sweetened beverages, and whether these representations explain the motivation to consume them. Based on the grounded cognition theory of desire, we propose that seeing or thinking about a sugary drink spontaneously triggers a simulation (i.e., a re-enactment) of the rewarding sensory experience of drinking it. We suggest that these simulations are based on previous experiences and therefore especially pronounced among habitual consumers, and that they will predict the desire to consume. In an online experiment, participants (N = 218) completed a feature listing task, describing "which features are typically true of" three sugar-sweetened drinks, a diet drink, bottled water, tap water, and three control drinks. They also rated desire and consumption frequency with regard to each drink. All listed features were coded according to a hierarchical coding scheme by two independent coders. In line with our hypotheses, we found that sugar-sweetened beverages were represented more in terms of sensory features (e.g., "cold", "fizzy", "sweet") than water, particularly among high consumers, while bottled and tap water was represented more in terms of long-term positive health consequences. Both types of water were represented more in terms of immediate positive consequences (e.g., "refreshing", "thirst-quenching") than sugar-sweetened beverages. Together, these consumption and reward simulations predicted desire to consume more strongly for sugar-sweetened beverages than for bottled water, and not at all for tap water. These findings largely parallel previous research in the domain of food. We will discuss implications for shifting motivation from sugar-sweetened beverages to water.

The effect of alcohol consumption on food-related episodic memory and subsequent food intake

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Previous research has shown that impaired episodic memory of a previously consumed meal can increase subsequent food intake. Short-term consumption of alcohol is known to disrupt episodic memory, and therefore could potentially increase food intake through an impairment of food-related episodic memory. The present study investigated whether consumption of a moderate dose of alcohol could produce memory impairments of a lunch meal, consumed after an alcohol prime. Using a between-subjects design, 60 social drinkers (30 male; mean age = 24.47y, SD = 10.13y) consumed either an alcoholic drink (0.5g of alcohol per kg of body weight) or an alcohol-free placebo and then a lunch meal consisting of nine different foods. Thirty minutes after the lunch meal, participants completed an ad libitum taste test consisting of cookies and were then asked to recall the foods consumed in the lunch meal. Findings showed that consumption of the alcoholic drink significantly impaired recall of the lunch items, compared to the placebo condition (p = .016, r = .31). However there was no significant difference between the alcohol and placebo conditions in ad libitum intake of calories (p = .196, d = .34). Findings also revealed a nonsignificant correlation between memory performance and ad libitum consumption (p = .890, rs = -.018). These findings suggest that alcohol can impair episodic memory of a previously consumed meal. However, there was no overall effect of alcohol on subsequent food intake and the measure of recall was also unrelated to food intake. It therefore remains unclear as to whether alcohol-induced memory impairments of a meal can contribute to alcohol-induced overeating.
The effect of extrinsic cues on expected liking of beer

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Liking is important for consumer research because it is thought to be a predictor of purchase behaviour (Li et al., Journal of Food Science, 80(5), R901–R909, 2015). Consumer liking can be altered by manipulating extrinsic product cues, such as label information (Ekelund and Fernqvist, Food Quality and Preference, 32, 340–353, 2013). This effect is mediated through expectations (Deliza and MacFie, Journal of Sensory Studies, 11(2), 103–128, 1996). To be able to utilise label information to improve consumer experience through expectations, we have to first understand what aspects of labels can generate or alter expectations. The aim of the present study was to explore the effect of explicit and implicit extrinsic cues (colour, design, alcohol content, sensory descriptor, size of information) on hedonic and sensory expectations in the context of beer. Altogether 166 participants took part in a series of four experiments. Each participant rated their sensory and hedonic expectations in response to a number of fictitious beer labels that varied in the information displayed. Experiment 1 investigated the effects of colour and design, Experiment 2 looked at colour, alcohol content and its size, Experiment 3 examined the effects of colour, descriptor and its size and finally Experiment 4 explored the effects of label colour, descriptor and alcohol content. The results showed that expected liking for beer was significantly affected by sensory descriptor and label colour, but not other label features. Surprisingly, the effect of labelled alcohol content did not significantly influence expected liking. Apart from demonstrating how sensory descriptors and label colour affect expected liking, the findings question the effect of labelled alcohol content on hedonic expectations in this context.

Effect of providing choice on processing of sweet drinks in the brain

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Individuals attribute a higher value to foods they choose themselves as opposed to foods that are imposed onto them (Parizel et al., 2016, Appetite). We conducted an fMRI study on 36 healthy normal-weight volunteers (21 females) to examine neural circuits involved in the effect of choice on reward value of food. Each individual attended one session to select three equally liked drinks among a panel of fruit-flavored drinks sold in France, and one fMRI session on a separate day. During the fMRI session, previously selected drinks were presented to the individual during the scan, using a gustometer, in two conditions: in the Choice condition, individuals could select any drink among three, and in the Non-Choice condition, they received a pre-assigned drink (90 trials in total, balanced for number of occurrences of each drink in each condition). As expected, drinks were rated higher in Choice condition (F(1)=5.69, p=0.02). Neuroimaging data were analyzed using multivariate pattern analysis (MVPA) performed in the 120 anatomic regions of the AAL atlas. Brain activations were significantly different between conditions in 118 regions (p<0.01 after Bonferroni correction), with an accuracy above 30% for 90 regions. Inter-individual variations of accuracy were highly correlated, especially in the regions of occipital, frontal and temporal lobes. Left inferior frontal gyrus, previously highlighted as involved in taste-related value processing (Yeung et al., 2018, NeuroImage), showed particularly high correlation with other regions within this network. Contrary to expectations, gustatory insula did not show significant levels of correlation with other regions. Based on these observations, providing choice increases food liking, plausibly by involving later stages of taste value processing.
Appetite retraining: an individualised model for teaching people to eat in tune with their natural appetite signals

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There is a recognised urgent need to develop individualised ways of implementing research findings on eating and appetite to people who want to lose weight. The major problem with conventional diets is that they offer temporary solutions for non-temporary problems. Poor long-term success rates follow from unsustainable eating programmes. This unsustainability arises because first, diets often disregard the functioning of the human biological appetite system and second, they disregard the psychology of habit formation and habit change. Appetite Retraining was developed in order to help people to re-learn to eat in tune with their body’s hunger and fullness signals: eating with, not against, their body’s biological appetite system. The Appetite Pendulum was developed to facilitate this, with simple rules of waiting to eat until definitely hungry (-3 on the Appetite Pendulum) and stopping eating at just full (+3). Permanent habit change is achieved by the individual identifying which of their specific eating habits involve eating beyond the point of being just full, and which involve eating when not hungry. Specific techniques from cognitive behavioural and other therapies give clear instructions about how to stop eating and how to wait to eat. Five types of non-hungry eating are identified (habitual, opportunistic, insurance-policy, emotional and cravings), and specific techniques for stopping each are provided. Success is achieved by focusing on one manageable stepwise habit change at a time, taking into account limitations on Working Memory. Internal resistance to changing established habits is recognised and four types of “saboteurs” are described (ambivalence, lack of willpower, lack of self-belief, pressure from others). Evidence-based approaches for overcoming each of these is provided.

Dynamics of attentional bias for food in obese people

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Several researchers proposed that an attentional bias (AB) for food is one of the vulnerability factors that contributes to obesity, but empirical evidence for an AB for food in obese is contradictory. It has been suggested that AB for food in obese people might reflect both food-related craving and concerns. Thus, AB for food may be a dynamic process. Recently, a new computational methodology tried to capture this proposed dynamic nature of AB by using a sequence of AB scores and produced promising results (Zvielli, Bernstein, & Koster, CPS, 3(5), 772-788, 2015). In the current study, we adopted this methodology to reanalyze the reaction time (RT) and dwell time of two food-related dot-probe task with eye-tracking studies (Werthmann et al., HP, 34(12), 1123-1132, 2015; Werthmann et al., HP, 30(5), 561-569, 2011). Moreover, the variability of RT on filler trials was also calculated. The critical groups were overweight/obese adults and obese children. To increase the power we aggregated the data of these two studies into one dataset. The results of the reanalysis revealed that both the variability of RT-based AB for food stimuli and the variability of RT on filler could significantly predict the variance in body mass index. When controlling for the variability of RT on filler trials and mean RT-based AB scores, larger variability of RT-based AB for food stimuli still existed. However, the variability of RT-based AB for food stimuli demonstrated no significant correlation with dwell time variability. Conclusions: Overweight/obese individuals are characterized by more variability in attention, and this variability is mainly unspecific. It probably reflects less effective executive control ability.
Chemosensory perception and food preferences in colorectal cancer patients undergoing chemotherapy

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Changes in smell and taste ability as side effect of chemotherapy affect 2 out of 3 cancer patients. These changes can alter dietary habits, as smell and taste play an important role in eating behavior. This study investigated chemosensory perception and food preferences in colorectal cancer patients undergoing chemotherapy. In a prospective cohort, patients undergoing chemotherapy (n=12) were measured before, during and after chemotherapy treatment. A control group of patients undergoing mere surgery (n=20) was measured at similar time points: after surgery, 3 months after diagnosis and 6 months after diagnosis. Furthermore, a retrospective cohort of patients who underwent chemotherapy was included for a single measurement at 6 months (n=19), 12 months (n=17) or 24 months (n=20) after diagnosis. Sniffin’ Sticks and Taste Strips were used to measure smell and taste ability. The Macronutrient and Taste Preference Ranking Task was used to calculate preference for fat, protein, carbohydrates and low-energy products. Both the prospective and retrospective group showed on average normal smell and taste ability at all time points. There were no statistically significant differences between groups in the prospective cohort. Results from the prospective chemotherapy and control patients revealed no statistically significant differences in food preferences between groups and time points. Both the chemotherapy group and the control group showed the highest preference for protein and the lowest preference for carbohydrates at all time points. In the retrospective cohort, patients at 12 and 24 months after diagnosis showed a similar pattern, while patients at 6 months showed the highest preference for low-energy products. These results are to some extent in contrast to other cancer patient populations, which might be due to chemotherapy regimen used in the current population. Further research will include self-reported chemosensory perception and its relation to food preferences in a larger population of colorectal cancer patients.

Weight gain in psychiatric inpatients was unrelated to medication, treatment duration or sociodemographic factors.

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Obesity rates are high among psychiatric populations; inpatients typically gain three to five pounds a month during initial treatment (Wetterling, 2001; Shin et al., 2002) and weight gain in psychiatric patients has been attributed to specific psychotropic medications (Leucht et al., 2013). Apart from medication, inpatient weight gain may also be mediated by sociodemographic and/or other non-specific treatment factors. The current study aimed to explore the extent to which age, sex, psychiatric diagnosis, pharmacological interventions and time of contact with mental health services influenced weight gain amongst patients in a medium-secure psychiatric unit. The analysis found no associations between weight gain and any of the factors (including type of medication) that previous literature suggests should drive weight gain in this group. The null results prompt consideration of general cognitive psychological processes that have been shown to mediate weight gain in people outside of the psychiatric context.
Cognitive control training as a weight loss tool: an online randomised control trial.

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Although cognitive control training (CCT) has been shown to facilitate weight loss by reducing overeating, such findings are not always replicated across studies. This is likely due to a combination of factors, including the variation in CCT paradigms employed and individual differences in responsiveness to training. Here, we plan to explore the suitability of CCT as a weight loss tool by studying the success of numerous paradigms in the largest study of its kind. 36,000 individuals will participate in a 12 week training programme, delivered via a bespoke, open-source, mobile app. Participants will be randomly assigned to one of 6 active (or one of 9 control) CCT groups, designed to reduce the consumption of unhealthy foods while simultaneously promoting the consumption of healthy foods. CCT methods include response inhibition, approach-avoidance, evaluative conditioning and implementation-intention based training. Primary outcome measures include self-report weight loss and changes in diet and exercise. As CCT may not be equally effective in all people we will also assess the role of potential moderators, including body mass index, dietary restraint, diet goals, explicit and implicit attitudes to food, impulsivity and emotion regulation. As such this study will reveal, with high statistical power, what CCT methods and individual differences are most important in producing real-life benefits. With the app launching soon, we hope to discuss preliminary findings.

Body Mass Index negatively predicts memory for both food and non-food stimuli

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High Body Mass Index (BMI) is associated with memory deficits. However, little is known regarding the specificity of this effect, for example if memory for food and non-food items is equally affected. We tested the hypothesis that memory deficits may be less marked for food stimuli, by investigating memory for visual stimuli depicting either food or non-food items in 60 participants, with a range of BMIs (18.7-39.3 kg/m2) (healthy n=40, overweight n=10, obese n=10) (Mean age (SD) = 19.8(2.5). Mean BMI (SD) = 24.8(4.8), 90% female).

Participants completed a “foraging” task for items hidden behind a grid of coloured circles (4 blocks of 40 trials). The colour of the circle rewarded alternated between trials. Participants were required to learn the pattern of rewarded colours, remember which colour was rewarded in the previous trial, and which location they had already searched per trial. A between-subjects design was used; half the participants searched for food, and half for non-food items. Working memory, long term memory, and predictive ability in the task were assessed. The contributions of stimulus type and BMI to memory performance were assessed using hierarchical regression. Covariates were added in the initial step (age, gender, VAS appetite ratings), and stimulus type and then adiposity added in two subsequent steps.

The addition of BMI to the model led to significant change in the fit of the model to explain working memory (β=.34, p=0.03). Addition of stimulus type to the model had no effect. The final model significantly and positively predicted working memory errors (F (8,45) = 2.25, p=0.04, R² = 0.3). These results support existing evidence for working memory deficits associated with high BMI but not the hypothesis that deficits in memory for food stimuli may be less apparent, suggesting that memory deficits may generalise to both food and non-food stimuli.
Do consumers use the representativeness heuristic to evaluate the environmental impact of food products?

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Efforts to reduce environmental impact have meant that sustainable food purchasing choices are becoming increasingly important for both consumers and policy makers. However, it remains unclear how consumers make decisions about the environmental sustainability of food products. Purchasing decisions about supermarket foods are often made in a time- and energy-efficient manner, relying on heuristics rather than rational thinking. The Representativeness Heuristic is one such decision making shortcut that is used to make stereotypic categorisations, even though relevant information may be missing. An online survey (Qualtrics; distributed via Amazon MTurk) with a food categorisation task was used to examine whether consumers indeed use the Representativeness Heuristic when making judgments on the sustainability of food products, and to determine the key product and personal characteristics that might influence this categorisation. The survey was completed by 193 UK participants who were asked to categorise 40 images of food products, from three different food groups: fruits and vegetables, dairy products, mueslis and granolas – totalling 7720 decision outcomes (sustainable vs. not sustainable vs. 'unsure'). A probit regression revealed that product packaging featuring the word ‘British’, a farm reference, or absence of packaging significantly increased consumers’ perceived sustainability, whereas green coloured packaging decreased it. Consumers’ environmental awareness had a significant negative influence on perceived product sustainability. Importantly, these influences varied across different food groups, however, product price had no significant effect on perceived sustainability in any of the food groups. The findings imply that consumers use the representativeness heuristic when purchasing food, and this may lead to erroneous judgments about a product’s sustainability based on irrelevant cues, such as the colour of packaging.

Examining the effect of personalised weight control primes on snack intake in women with weight loss goals

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Exposure to cues associated with weight loss goals can reduce food intake in individuals with relevant weight control goals. However, findings are mixed with some studies reporting no effects of weight control cues on food intake. This study examined the effect of self-selected (personalised) weight control cues on snack intake compared to general weight control and neutral-control cues. Women (n =18; M: 42.0 ± 12.1 years) who were overweight or obese (M: 30.4± 4.0 kg/m²) and indicated strong goals to lose weight were recruited. From six weight control-related images (identified with a pre-study online survey, n = 971; M: 39.4± 14.6 years; 66% females) participants individually selected an image that they most (personalised) and least (general) associated with weight control and education (neutral control). Using a within-subjects design, participants were provided with a fixed-caloric lunch and after 2.5 hours the effect of exposure to personalised, general and control cues on snack energy intake were assessed in the laboratory. Results showed that snack intake (kcal) did not differ between personalised (M: 398.6 ± 190.5 kcal), general (M: 399.6 ± 211.1 kcal) and neutral-control (M: 378.9 ± 205.9 kcal) conditions, p = ns, ŋp² = 0.03. The study findings do not provide any support that personalised, self-selected weight control cues are more effective than general weight control cues for reducing snack intake in women with goals to lose weight. Further research is needed to explore which types of cues and under which conditions weight control cues reduce food intake. Study was funded by Cancer Research UK.
Diet, Wellbeing and Academic Attainment of University Students

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Research has examined the behavioural profiles associated with habitual dietary patterns. Studies have largely focused on negative effects (e.g. stress, anxiety and depression) but more recently there has been an interest in positive wellbeing (e.g. life satisfaction, positive affect and happiness). Not surprisingly, both positive and negative aspects of wellbeing are associated with predictors other than diet. The Student Wellbeing Process Questionnaire has shown that positive personality, social support, stress and negative coping reliably predict wellbeing. This means that these established factors must be co-varied when examining effects of diet. Short dietary questionnaires have been developed and the present research aimed to examine associations between scores on these and wellbeing and academic attainment, while controlling for established predictors. A series of studies were conducted each involving online surveys of approximately 300 university students. The dietary variables reported here were BMI, consumption of fruit/vegetables, breakfast, junk food and emotional eating. A healthy diet (high fruit/vegetables/breakfast and low junk food) was associated with higher positive wellbeing and better academic attainment. In contrast, higher BMIs were associated with reduced wellbeing and lower attainment scores. Both the effects of BMI and a healthy diet remained after controlling for established predictors. Other effects (e.g. emotional eating) were present in univariate analyses but were no longer significant when established predictors were controlled. Specific types of food also had significant effects (e.g. broccoli was associated with better academic attainment) as did general dietary patterns (e.g. vegetarians had higher academic attainment). The next stage in the research is to combine the different effects of diet in the same study to determine whether there are common pathways or independent effects.

The association of diet composition, meal timing and frequency with alertness in nurses during a night shift setting

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Night shift workers are at higher risk for making (medical) errors or having accidents than day shift workers, due to shift work-related fatigue and reduced alertness. This observational study investigated the association of diet composition, meal timing, and meal frequency with alertness in 154 nurses in a night shift setting. During five non-consecutive night shifts objective and subjective alertness was assessed by the Psychomotor Vigilance Test (PVT; reaction time and number of lapses) and Samn Perelli Scale (SPS; score of 1 to 7=exhausted), respectively. Nurses completed three times a 24-hour dietary recall after the night shift. We used multivariate substitution models to analyse the contribution of the relative macronutrient intake 1 to 2 hours and 2 to 3 hours before completing the PVT and SPS to objective and subjective alertness. Nurses had a mean±SD reaction time of 448.3±97.6 ms and 15.0±14.4 lapses on the PVT and scored 3.1±0.7 on the SPS. Nurses consumed on average 0.5 (IQR: 0.3 – 0.7) meals/drinks 1 hour before the PVT and SPS. Preliminary analyses showed an association between fat intake and the number of lapses, but only 2 to 3 hours before the PVT. The number of meals/drinks consumed 1 hour before the PVT were also associated with better alertness levels. These results will be used to set up an intervention study were meal composition is manipulated in order to improve alertness during the night shift, while taking meal frequency and timing into account.
The impact of energy restriction on daily fluctuations in appetite responses and eating behaviour: An ecological momentary assessment study

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Appetite regulation involves the interplay between satiety, inhibitory control (IC), and reward processes, which are all compromised during energy restriction (ER) affecting the ability to maintain a diet. Little is known about these relationships in naturalistic settings, and to our knowledge no studies have implemented cognitive tasks to measure IC and attentional bias (AB) during ER in individuals with overweight and obesity outside the lab, therefore we aimed to investigate how appetite responses fluctuate over a day to inform eating behaviour, and see how ER impacts these relationships. Sixty (age 34 ± 13 years, BMI 29 ± 4 kg/m²) individuals with overweight and obesity completed 3 daily random assessments on smartphones during 1 week of an intermittent fasting diet (5:2) under free-living settings. 7-point Likert scales assessed hunger and cravings; a food Stroop task assessed food-related AB, and a colour Stroop assessed IC. A food diary also recorded time of consumption. Analyses were performed using multilevel modelling. Hunger, craving, and colour Stroop scores displayed a 3-level structure (session within day within individual) (P < 0.001), whereas Food Stroop scores did not. ER was included as a day level predictor, and significantly increased scores for hunger (p < 0.001), intensity (p < 0.001) and frequency of craving (p < 0.001), and decreased Colour Stroop score (p < 0.001). Frequency and intensity of craving scores were significantly higher the day after ER (P < 0.05). Increased hunger and craving intensity scores were predicted by whether eating occurred within 2H after assessment (all P < 0.001). Ecological Momentary Assessment appears feasible for studying restriction-induced changes in appetite, and findings validate previous work using retrospective and lab-based approaches. EMA may provide a platform for the development of in-the-moment interventions which aid in coping with appetite responses that act as barriers to dietary adherence.

Exploring the influence of sensorial cues of fat perception on expected satiety and post-ingestive satiety of a model food matrix varying in fat content

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Reducing fat content in foods can reduce energy intake which helps to reduce obesity risk. However, whilst such foods are developed to retain sensory characteristics of high energy equivalents they may trigger rebound hunger, causing overconsumption at subsequent meals. Individuals vary in oral fat perception, due to differences in taste and mouthfeel sensitivity, and in mouth behaviour. These individual factors may influence appetite response. This study explores the influence of sensory characteristics on satiety.

A mayonnaise-like emulsion was developed using a double-emulsion system (water-oil-water) to create 6 products varying in fat content (12% to 31%) but matched in mouthfeel. 37 volunteers tasted the emulsion with crispbread, in a balanced order, and rated their expected satiety. Post-ingestive satiety following consumption of full sample portion (28g mayonnaise with 7g crispbread) was measured using a crossover preload study design over three further visits. Three samples tested were a high-fat (31%) positive-control (127kCal), a double-emulsion mouthfeel-matched low-fat (12%) sample (75kCal), and a non-mouthfeel-matched low-fat (12%) negative-control (73kCal).

Mouthfeel matching with the emulsion system was successful with no significant difference in fatty (p=0.92), oily (p=0.95), thickness (p=0.77), mouth-coating (p=0.99) perception, nor expected satiety (p=0.99) even when fat reduced from 31% to 12%. As predicted, the results (n=39) from the preload study showed that the ad libitum pasta intake after negative-control (387.9g, 451.9kCal) was significantly higher than after positive-control (359.5g, 418.9kCal) (p=0.044). However, the pasta intake after the mouthfeel-matched low-fat sample (382.4g, 445.5kCal) remained higher than after positive-control, although not significant (p=0.11).
The results indicated that matching the mouthfeel in low-fat products would not change the expected satiety but may still result in higher consumption at subsequent meals. This study is funded by the UK Biotechnology and Biological Sciences Research Council (BBSRC) in collaboration with Unilever, PepsiCo, Arla, Mars Wrigley Confectionery, Mondeléz, Pladis and Premier Foods.

**Impact of herbs and spices on appreciation of legume-based dishes**

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Introduction: Despite the well-documented health benefits of dietary pattern higher in plant-based food such as legumes, their consumption remains low (Mitchell et al., 2009). Knowing that taste is the first factor in consumers’ food choice (Adams et al., 2000), flavoring of legumes using blends of herbs and spices (H&S) is an interesting approach to increase their consumption. This study focuses on the effect of H&S on the appreciation of low salt legume-based dishes.

Material and methods: A 2step pilot testing was designed to determine the most favorable recipe among 4different blends of H&S that can be used for the main study. Firstly, 4recipes were evaluated in a balanced order of presentation using different blends of legumes and H&S by 115 consumers (age 18-35) in an experimental restaurant. Overall liking was measured, followed by an open-ended question for positive and negative attributes and a preference-ranking test. The 2nd step included a perception assessment test with the preferred recipe being divided into 4variants higher or lower in salt and H&S, according to a 2x2 factorial design (2-AFC test). The main study included measures of overall liking, food intake and appetite (VAS).

Results: Consumers significantly preferred the Spinach recipe compared with the Ginger, Paprika and Curcuma recipes and they could easily determined the different levels for salt and spices (high vs low salted and high vs low spiced dish). Preliminary results of the main study conducted by 95consumers in the same experimental restaurant showed no significant differences in overall liking between the different levels of salt and spiciness (student test).

Conclusion: The addition of H&S improved the overall liking of the low-salt based dish implying it as a feasible strategy to increase legume-based product acceptance. Complete analysis will further reveal if this is accompanied by an increased intake of such products and reduced appetite.

**Consumer acceptance of cultured meat**

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Amidst growing concern about the environmental, ethical, and public health issues with conventional animal agriculture, one proposed solution is cultured meat, grown directly from animal cells. Whilst commercial scale production of cultured meat becomes ever closer to feasibility, some research indicates that consumer acceptance of this novel food product is uncertain.

We review the evidence around consumer acceptance of cultured meat, and explore how various framings of the product can influence consumer perceptions. We find that, whilst most consumers recognise benefits to animal welfare and the environment compared to conventional meat, there is less awareness of relevant health issues. We also find that consumers are uncertain about the price tag and the sensory quality of cultured meat, whilst some have concerns about food safety, often rooted in perceptions of unnaturalness.

Consumer willingness to eat cultured meat is higher amongst those high in meat attachment and low in food neophobia. More familiar consumers also have more positive perceptions of cultured meat. Consumer perceptions are sensitive to positive and negative information about cultured meat, levels of technicality in descriptions of cultured meat, and different names for the product such as ‘clean meat’.

We discuss the implications of consumer perceptions of cultured meat and highlight areas for further research.
The social 'precilitation' of eating: Do people plan to eat more with friends than alone?

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Previous research suggests that people eat more when eating with friends relative to when eating alone, but why this is the case remains unclear. One explanation for this social facilitation effect is that people plan to eat more when they will be eating socially and so provide more food (the 'precilitation' of eating). To test this, we examined whether social facilitation of intake occurred both when participants served themselves before and during a meal occasion. Pairs of female friends attended two sessions in a counterbalanced order: on one occasion they attended alone ('alone' condition) and on the other occasion they attended with a friend ('social' condition).

During each session, participants were given a pasta lunch. One group of participant-pairs (n=25) initially served themselves in a separate room (away from their friend if in the social condition) prior to the meal ('before' condition). Another group (n=24) could access and serve themselves pasta throughout the meal ('during condition'). We found a main effect of social condition, whereby participants ate significantly more calories in the 'social' condition relative to the 'alone' condition. Serving condition also influenced intake - participants who served themselves before the meal consumed significantly fewer calories than did those who served themselves during the meal. However, the interaction between social context and serving conditions failed to reach significance. These findings are consistent with evidence for the social facilitation of eating and indicate that this effect is also evident in meal planning, before a meal begins. Furthermore, our findings suggest that preselecting portions may help people to reduce intake, both when eating socially and alone.

The Importance of Context for Food-Specific Inhibition Training

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Children in Britain eat too much sugar. Food-specific inhibition training (FSIT) is a computerised task that trains users to inhibit responses to sugary, energy-dense food stimuli by pairing them with no-go signals. Research has found that children choose and eat fewer of these foods after playing FSIT. We compared a version of FSIT where foods were paired with emotive response signals (Go = happy emoticon, No-Go = sad emoticon) with a version using neutral signals (Go = green signs, No-Go = red signs) to see whether adding an evaluative conditioning component (pairing food with emoticons) would strengthen FSIT effects on food choices. Children aged 4-11 years were randomly assigned to one of emotive training, neutral training, or a non-food control task. Groups of participants were tested simultaneously. In session one, 187 children completed the training, followed by a hypothetical food choice task. One week later, 157 children's food choices were measured in the same way both before and after a second FSIT session. Different food images were presented in each of the three choice tasks. Contrary to past results, we found no significant effect of training on children's food choices at any of the three time points, although session one trends were in the expected direction. Healthy food choices decreased over time regardless of group. These results are discussed in comparison to earlier work where children were tested individually. In particular, we propose that higher FSIT error rates suggest that children were less engaged in this study and may not have learnt stimulus-response associations as effectively. In addition, children may have been influenced by each other during the food choice tasks. Methodological and applied implications are discussed.
Successful dietary restriction: the curious absence of self-control

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Various models of eating behaviour propose that successful dietary restriction depends on self-control. Self-control is characterised as a limited resource, explaining why efforts to limit consumption of highly palatable energy-dense foods often fail. However, it is also suggested that consistent selection of healthier foods, as well as more extreme restrictive eating behaviour, may be governed by habits (automatic processes). The current study probed the association between restrictive eating habits and successful dietary restriction.

Participants were lean, female undergraduate students (n = 37). The Self-Report Habit Index assessed the strength of dietary restriction habits. Intentions to restrict food intake were measured with restraint sub-scales of the Three Factor Eating Questionnaire (TFEQ-R) and Eating Disorder Examination Questionnaire (EDE-Q). Restrictive eating behaviour was indexed with the work to restrict task, a progressive ratio task in which participants can work to avoid consuming an energy-dense milkshake. A binary forced food-choice task established the contribution of perceived healthiness and liking of foods to food-choice. A linear regression analysis assessed the association between strength of dietary restriction habits and performance on the work to restrict task. A multi-level logistic regression analysis established whether restrictive eating habit strength moderated the influence of health and liking ratings on food choice. Dietary restriction habit strength was positively associated with work to restrict (t = 2.24, p = 0.032), and moderated the effect of perceived healthiness and liking on food choice such that these characteristics influenced choice less in individuals with stronger habits (z = -2.78, p = .005 for health interaction term; z = -2.95, p = 0.003 for liking interaction term). Dietary restraint intentions (i.e. TFEQ-R/EDE-Q responses) did not show these same associations with eating behaviour. Findings suggest that individuals who successfully restrict their food intake are supported by mechanisms governing habitual behaviour.

Effects of prefrontal brain stimulation on food craving and food consumption

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Modulation of dorsolateral prefrontal cortex (DLPFC) activity using non-invasive brain stimulation has been shown to reduce food craving as well as food consumption. Using a preregistered design, we examined whether bilateral transcranial direct current stimulation (tDCS) of the DLPFC could reduce food craving and consumption in healthy participants when administered alongside the cognitive target of inhibitory control training. Participants (N = 172) received either active or sham tDCS (2 mA; anode F4, cathode F3) while completing a food-related Go/No-Go task. State food craving, ad-lib food consumption and response inhibition were evaluated. Compared with sham stimulation, we found no evidence for an effect of active tDCS on any of these outcome measures. Our findings raise doubts about the effectiveness of single-session tDCS on food craving and consumption.
Developing a novel model of emotional eating: The inclusion of distress tolerance in understanding the mechanisms between alexithymia and emotional eating

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Difficulty identifying and describing emotions (alexithymia) has been related to emotional eating and body mass index (BMI). However, the precise nature of this relationship remains unclear, with recent research highlighting how affect (depression/anxiety), negative urgency, interoceptive awareness and feeling fat may mediate the relationship. Building on this, it is possible that distress tolerance (the level of discomfort following negative affect that is deemed unbearable), which is highly correlated with both alexithymia and negative urgency, may also play a role. However, this has yet to be explored in the literature. Therefore, the aim of the current study was to expand a previously established model of emotional eating and BMI (Pink, et al., 2019; Appetite, 133, 270-278) by incorporating distress tolerance. It is thought that individuals who have difficulty identifying and describing their emotions may be vulnerable to experiencing greater levels of depression and anxiety, which in turn may lead to a reduced ability to trust their bodily sensations and an increased tendency to feel fat. Individuals with low distress tolerance may then act rashly (negative urgency) in response and engage in emotional eating to alleviate negative feelings. An online study was conducted across males and females aged 18-65 years of age. Participants provided standard demographic information, self-reported their BMI, and completed measures of alexithymia (Toronto Alexithymia Scale), affect (Beck Depression/Anxiety inventories), interoceptive awareness (trusting bodily sensations subscale of the Multidimensional Assessment of Interoceptive Awareness), negative urgency (UPPS-P), distress tolerance (Distress Tolerance Inventory), feeling fat (Body Attitudes Questionnaire) and emotional eating (Emotional Eating Scale). The results will be discussed in terms of preliminary findings of a novel serial mediation model (PROCESS) of emotional eating, exploring the direct and indirect effects of alexithymia and including affect, trusting bodily sensations, feeling fat, distress tolerance and negative urgency as mediating factors.

Exploring the mechanisms of within-meal variety and sensory-specific satiation

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Food variety has been shown to enhance consumption, and it has repeatedly been proposed that this variety effect might operate by delaying the development of sensory-specific satiety (SSS; a relative decrease in pleasantness of a specific food as it is consumed). The exact nature of this presumed connection between SSS and food variety has, however, not yet been elucidated. Therefore, this study aimed to advance our understanding of the presumed relationship between SSS and food variety. Participants (N = 30) received two meals on two separate days, one consisting of only two food items (A and B; low variety), and the other comprising six foods (A, B, C, D, E, and F; high variety). Each meal comprised signalled exposure (look-smell-taste-swallow) to a total of 10 bite-size portions: 5 portions of foods A and B in the low variety condition, and 5 portions of A and a single portion of foods B, C, D, E, and F in the high variety condition. Participants tasted 8 food items before and after each meal (i.e., the 6 foods of both meals plus 2 more unconsumed foods G and H). We hypothesized that SSS for food A would develop irrespective of overall meal variety, but that SSS for food B would be smaller in the high variety session. This is exactly what was found. These results indicate that meal variety does not affect SSS. SSS is strictly determined by degree and timing of sensory exposure to a food. (This research was made possible with the support of the Dutch Province of Limburg.)
How not to reduce food disgust

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We tested the effectiveness of rational educational information as a means to reduce disgust associated with entomophagy (eating insects). Participants (n = 104) attended the lab for two test sessions on separate days. In the first session their ad libitum intake of falafels was measured in order to control for individual differences in meal size. In the second session they were asked to evaluate, and eat, different falafels which some were led to believe contained mealworm flour. There were four conditions which differed according to the information provided: 1) Control – participants informed falafels contain chickpeas. 2) Disgust – participants informed falafels contain mealworm flour. 3) Intervention – participants informed falafels contain mealworm flour and various nutritional and environmental benefits of entomophagy were summarised. 4) Threat – participants informed falafels contain chickpeas and that the experiment would include an experience of mild pain (to control for general negative arousal). Actually, the falafels were the same for all participants and did not contain mealworm flour. Disgust was measured using: tactile sensitivity, liking for and desire to eat the falafels, latency to eat and amount of falafel consumed. Contrary to prediction, participants in the intervention condition showed significantly greater disgust (lower liking, desire to eat and intake) than those in the control condition, whereas these measures did not differ significantly between the control and disgust conditions. These findings could be attributed to the disgust passage normalising the cooking of mealworms thus transforming them into ‘food’, while the rational arguments included in the intervention passage were not enough to reduce the deep-rooted, irrational, disgust response. Results of this study suggest that using rational educational arguments to reduce food disgust associated with entomophagy is not effective.

A new standardized method to classify sweet taste liker phenotypes

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Despite common wisdom on the universality of ‘sweet tooth', individual differences in hedonic responses to sweet taste have repeatedly been reported. To date, four different classification methods have been used to quantify those distinct patterns; if not relying on subjective and arbitrary criteria, they are dependent on complicated protocols with limitations in adoption for large scale studies. In a cross-country design, we aimed to determine the true number of sweet taste liker phenotypes and to develop statistically robust but easy-to-apply classification criteria for use in future studies. Young adults in the UK (N = 148, 29.1% men) and in the US (N = 126, 32.5% men) were recruited for a laboratory-based taste test. Two replicates of eight taste stimuli (0 M to 1 M sucrose) were rated for their hedonic and sensory properties on a visual analogue scale and a generalized labeled magnitude scale, respectively. Hierarchical cluster analysis revealed three response patterns in both cohorts: a sweet liker phenotype (UK: 31.5%; US: 23.1%) characterized by a rise in liking with increasing sucrose concentration, an inverted U-shaped phenotype (UK: 50.0%; US: 51.3%) with a bliss point at either 0.25 M (UK) or 0.5 M (US) sucrose (p > .05 for between-studies and between-samples contrasts), and a sweet disliker phenotype (UK: 18.5%; US: 25.6%) showing a decline in liking as sucrose concentration increased. Sensitivity and specificity analysis and further agreement statistics indicated that the use of 1 M sucrose and -15/+15 liking scores (-50 to +50 scale) ensured the most reliable and replicable discrimination between the three phenotypes in both cohorts. This methodological advance marks a preliminary but substantial contribution to the ongoing debate on taste hedonics and health outcomes, as conflicting prior literature can be partially attributed to reliance on inconsistent classification criteria or methodologically weak phenotyping methods.
Oral lubrication rather than chewing reduces snack intake

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Certain oral processing strategies, such as slow eating rate, high number of chews and hard food textures, have been linked to lowering food intake¹. However, the effects of lubrication during oral processing on food intake remain unclear. This study aimed to determine the distinctive roles of chewing and oral lubrication on subjective appetite ratings and snack intake. Hydrogels with different textural properties were used as preload after characterisation of the instrumental (texture analysis, rheology, tribology) and sensory (descriptive analysis) attributes². Fifty-five participants (26±7 years old, BMI 23±3 kg/m²) participated in a between-subjects design. Participants were asked to consume a standard lunch, followed 3h later by one of four preloads (three hydrogels or mint tea) and an ad libitum salty snack. Appetite measures were rated on 100 mm visual analogue scales (VAS) before and after preload, and again after snack. In addition, oral processing behaviour was evaluated using video recordings (n=28). Our results demonstrated that gel bolus viscosity was directly correlated to early-stage oral processing attributes, such as firm, elastic and chewy. On the other hand, coefficient of friction of the gel bolus fluid at orally relevant speeds (3-50 mm/s) was correlated with later-stage oral processing attributes slippery and salivating and inversely correlated with pasty once the large bolus fragments were filtered out². Based on the satiation study, it was found that oral lubrication rather than chewing resulted in a reduction in snack intake after consuming a hydrogel preload (p<0.05)³. In summary, oral lubrication is a promising new construct in satiety research, but future studies are needed to confirm the present findings beyond a single snack episode to longer term and larger scale meal trials.


Reactions to sweet beverages predict weight loss after bariatric surgery

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Sweet taste responsiveness and motivation for sweets are reduced after bariatric surgery, and pre-operative rating of a sweet tasting beverage predicted 3-month weight loss after bariatric surgery (TOS, 2017). Cluster analysis has been used to classify low and high sweet taste responders (Nutrients 2019, 11, 129). To extend these findings, we evaluated sweet taste responding in patients with severe obesity before either Roux-en-Y (RYGB n=23, 124.4 kg ± 4.4 SE) or sleeve gastrectomy (SG n=43, 120.1 kg ± 2.9 SE) surgery.

Candidates rated liking and wanting of two beverage types: a) unflavored water-based sucrose (SUC) solutions (0%,6.1%, and 34% w/vol) and b) cherry-flavored aspartame-sweetened Kool-Aid (ASP) solutions (0%,10%, and 20% sucrose-intensity-equivalent).

Unsupervised hierarchical clustering was used to classify patients into high and low rating clusters separately for each beverage type. ANOVA was performed with cluster and operation as fixed factors and initial weight, age, and sex, as covariates with weight loss as dependent variable. RYGB patients in the high wanting cluster for SUC lost significantly more weight than SG, at both 3 months (difference = 8.1 kg ± 2.1 SE, p = 0.009) and 12 months (difference = 16.0 kg ± 0.916, p = 0.012), but there was no difference between operations for low wanting SUC. RYGB patients in the high liking cluster for SUC lost significantly more weight than SG, at both 3 months (difference = 5.19 kg ± 1.9, SE, p = .04) and 12 months (difference = 10.38 kg ± 4.2, SE, p = 0.083), but there was no difference between
operations for low wanting SUC. No weight loss differences were found for ASP. Hormonal and anatomical differences between the operations could underlie taste-related weight loss differences between operations. Taste tests before surgery could have clinical prognostic value for relative benefit of surgery type.

Reductions to main meal portions sizes and daily energy intake: a 5 day cross-over laboratory experiment

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Background: Portion size affects energy intake. However, there may be a limit to the magnitude of portion size reductions that can be made before consumers engage in immediate or later compensatory eating and either partially or fully compensate for the effect of reducing portion size. Objectives: We tested the prediction that reductions to portion size would result in a significant reduction to daily energy intake only when the resulting portion was visually perceived as 'normal' in size, but that a reduction resulting in a 'smaller than normal' portion size would cause immediate or later compensatory eating. Design: Over three 5-day periods, we measured daily energy intake of participants (N = 30, 50% women) in a controlled laboratory study using a randomised crossover design. The served portion size of the main meal component of lunch and dinner was manipulated in three conditions: 'large-normal', 'small-normal', and 'smaller than normal'. Each reduction resulted in a decrease in the energy content of all foods provided daily by 7% on average (412kcal) and participants were able to compensate for reductions to portion size across the day (daily energy intake).

Results: The reduction from a 'large-normal' to 'small-normal' portion size resulted in a significant reduction to daily energy intake, m difference kcal = -96.7, p = .03; but contrary to our hypothesis, so did the reduction from 'smaller than normal' to 'smaller than normal', m difference kcal = -209.6, p <.001, as compensatory eating was not consistently greater in the 'smaller than normal' portion size condition than the other conditions.

Conclusions: Reductions to the portion size of single main-meal components resulted in significant decreases in energy intake regardless of the perceived normality of the reduced portion. The findings support public health calls to reduce portion sizes of commercially-available foods.

The influence of context on expected satiety and its relationship with ideal portion size

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Research has shown that the expected satiety of a meal correlates strongly with ideal portion size. However, this relationship, and expected satiety as a standalone measure, has not been explored across contextual manipulations such as mealtimes and food-to-mealtime congruency. We hypothesised that the expected satiety of a food would be similar to the ideal portion size (kcal for kcal) at congruent but not incongruent food-to-mealtime pairings and that expected satiety would decrease for incongruent food-to-mealtime pairings. Participants (N = 40) visited the laboratory once at breakfast (8am) and once at lunch (12 noon), on non-consecutive days in a randomised, cross-over design and were asked to record their hunger and complete measures of liking, desire to eat, expected satiety and ideal portion size for eight test foods. Four typical breakfast foods and four typical lunch foods were chosen based on their mealtime congruency. There was a significant difference between expected satiety and ideal portion size for lunch foods presented at breakfast but no significant difference seen at the other food-to-mealtime pairings. Expected satiety was significantly higher for the incongruent food-to-mealtime pairings, and at breakfast compared to lunchtime. This research indicates that context may play an important role in determining the influence of expected satiety on ideal portion size selection and that the expected satiety of a food can change across contexts. This merits further investigation to better understand the influence of novel foods and contexts on portion size selection.
The influence of plate-clearing tendencies and food waste concerns on food intake from large portions.

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Obesity and food waste are global challenges, but the role that concerns about wasting food have in explaining over-eating is yet to be examined. We hypothesised that food waste concerns may promote a tendency to “plate-clear”, which in turn promotes over-eating when exposed to large portions of energy-dense food. Thus, we predict that individuals with concerns about wasting food will be more likely to have habitual plate-clearing tendencies and therefore consume more of a large portion of food when tested in controlled laboratory settings. Participants (N=127, 42 males, 85 females) completed self-report measures of plate-clearing tendencies and food waste concerns before attending a lunchtime session in an eating laboratory, where they were served a large portion of pasta in tomato sauce. The amount of food consumed was covertly measured. Linear regression analyses revealed that food waste concerns were predictive of plate-clearing tendencies; individuals who reported stronger food waste concerns reported higher plate-clearing tendencies (B= .296, 95% CI = 0.07-0.25, p=.001) and plate-clearing tendencies were predictive of food intake; individuals with higher plate-clearing tendencies consumed significantly more food (B= .198, 95% CI = 0.84-12.65, p=.026). These findings suggest that plate-clearing tendencies and food waste concerns encourage individuals to consume more food, potentially making these individuals more likely to overconsume from larger portion sizes. This highlights the urgent need for ‘downsizing’ – a widespread reduction of portion sizes. The potential for food waste reduction strategies, for example taking home leftover food from restaurant meals, to aid reductions in both wasting and over-consuming food also warrants exploration.

Social and personal consumption norms underlying the effect of portion size on later food intake

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Exposure to portion sizes (PS) has been shown to affect future portion selection and consumption. This has been shown to occur partly because exposure to smaller (versus larger) PS can decrease people’s perceptions of what constitutes a ‘normal’ PS. The present study aims to replicate these findings and elucidate what perceived PS normality exactly entails. We propose that descriptive norms (describing what is done), injunctive norms (prescribing what should be done) and personal norms underlie the effect of exposure to PS on future PS preference. A between-subject design was used in an online study run across two sessions on consecutive days. UK participants were recruited from Prolific Academic. First, participants were visually exposed to images of either a small (N=107) or a large food portion (N=117), or non-food objects (control condition, N=105). The next day, participants indicated their ideal PS, perceptions of PS normality, descriptive norms, injunctive norms and personal norms. There was no significant effect of condition on later PS selection or on any of the proposed norms. Analyses that only included participants who correctly identified the PS they were exposed to (N=204) showed a significant effect of PS exposure on perceptions of PS normality (P<.01), descriptive norms (P=.01), injunctive norms (P<.01) and personal norms (P=.03), all in the predicted direction, but conditions for mediation were not met as there was no effect of condition on PS selection. Therefore, the effect of exposure to PS on later PS selection and norm perceptions was not replicated in the current study. However, exposure to smaller (versus larger) portions did alter PS norms among participants who correctly recalled the PS they were exposed to, suggesting that the PS exposure manipulation may not have been salient enough. This may be overcome with replication in a laboratory setting using actual food.
Explaining the associations between food insecurity, diet quality and BMI: The mediating role of life stress and eating to cope

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Food insecurity refers to a lack of financial resources needed to ensure reliable access to food. In the UK, 8% of the population are estimated to have been food insecure in 2017. Household food insecurity is reliably associated with poor diet and obesity, however the explanation for this remains unclear. One possibility is that unstable access to food results in increased life stress, with individuals engaging in maladaptive behaviours (e.g. consuming alcohol and/or high-calorie foods) as coping mechanisms. This might then result in poorer diets (i.e. more frequent consumption of processed foods, lower consumption of fruit and vegetables) and increased BMI. To explore this possibility, participants (N = 602), from a range of socio-economic backgrounds, completed questionnaire measures of household food insecurity, psychological distress, physical symptoms of stress, eating to cope, drinking to cope, a food frequency questionnaire and self-reported height and weight. Structural equation modelling revealed significant indirect relationships between food insecurity and both diet quality and BMI. As predicted, individuals who experienced household food insecurity were more stressed, and stress was associated with using food as a coping mechanism which, in turn, was associated with higher BMI and poorer quality diet. Interestingly, while stress was also associated with drinking to cope, drinking to cope was not associated with diet but was negatively associated with BMI (i.e. higher drinking to cope was associated with lower BMI). These findings provide novel insight into the psychological experience of being food-insecure and how this might encourage unhealthy food choices and weight gain.

‘Eating to survive’: A qualitative analysis of factors influencing food choice and eating behaviour in a food-insecure population

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The UK has one of the worst levels of food insecurity in Europe, with approximately 8.4 million people estimated to be food-insecure. Food insecurity is associated with poor diet quality, malnutrition and obesity; however, there has been very little UK-based research in this area. This study used a qualitative approach to explore factors that influence food choice and eating behaviour in a food-insecure population in Liverpool, UK. Face-to-face interviews were conducted with foodbank clients (N=24). Interviews were informed by a semi-structured schedule which focussed on access to food, factors influencing food choice, and strategies used to conserve food. Interview transcripts were analysed using inductive thematic analysis. Six themes were identified; ‘Income’, ‘Cost of food’, ‘Accessibility of shops’, ‘Health issues’, ‘Food rationing’ and ‘Worsened health outcomes’. Income was the most salient factor influencing food choices with all participants reporting a constant struggle to afford food. Food decisions were based primarily on cost; the majority of participants valued eating healthily but could not afford to do so. Strategies to ration food included skipping meals, consuming small portions, cooking in bulk, and prioritising children’s food intake. The majority of participants reported pre-existing physical and/or mental health issues but these were exacerbated by poor access to food leading to a vicious cycle of stress and worsening health issues. In conclusion, in this sample of foodbank clients, food choices and eating behaviour were strongly influenced by level of income. Findings also highlight the mental health impact of food insecurity. Initiatives addressing income and the cost of healthy food are required.
Poster Presentations

See and Eat! Using e-books to influence children’s attitudes towards vegetables
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Repeated exposure to vegetables through picture books has been found to positively influence preschool children’s preference and consumption of these foods. In the See and Eat project, we intend to transition from an analog to a digital format by using e-books as a medium of facilitating visual exposure to healthy foods. E-books have the potential for increased interactivity and personalisation by enabling users to add their own photos, text, audio, and video to them. In this project, we will first evaluate the effectiveness of these e-books by measuring children’s willingness to taste, liking, and intake of a target and a non-target vegetable before and after a 2-week exposure period. We expect children to demonstrate more positive attitudes towards vegetables that they received exposure to compared those that they do not. We also aim to compare the effects of e-books with pre-made content (ready-to-read) against e-books that prompt families to complete the story by adding their own content (interactive). We expect that families who receive the interactive e-books will report greater effects than those who receive the ready-to-read e-books. Around 120 families in the UK are expected to participate in the study, as well as a parallel sample of the same size in Italy. Another aim of the study is then to develop these e-books in Italian and to compare the effectiveness of e-book exposure between the UK and Italy.

Teachers’ attitudes to children drinking water in the classroom and strategies for increasing consumption: a pilot study
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Children drink insufficient fluid during the school day and class teachers can play an important role in influencing the amount that children drink. Our pilot study evaluated teachers’ attitudes to children drinking water in the classroom and strategies for increasing drinking. Sixty-six teachers from four London primary schools participated in an online questionnaire. Teachers’ age ranged from 21 to 63 years (mean age 41 years); years of teaching experience ranged from newly qualified to 42 years (mean 9.5 years). The majority of teachers (85%) felt that children should have access to water in the classroom, but there was less consensus about the location of drinks. Some teachers reported that free access to water in the classroom can sometimes be distracting (57%) and may negatively affect some children’s work (66%). This is likely to vary with the age group taught. However, many teachers believed that children are more focused and less irritable when not thirsty (90%). Event-cued strategies for encouraging water consumption in the classroom were frequently reported, for example, after exercise, break times and when changing activities. Strategies for minimising the perceived or actual disruption associated with children drinking water during lessons were also reported, for example, using British Sign Language to indicate desire for a drink. Future work will refine our questionnaire before assessing a large and representative sample of UK schoolteachers in order to provide recommendations for policy and practice.
Eating like an astronaut: An investigation of how children are willing to eat “flying” foods using acoustic levitation

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How food is presented, how we eat food, and the food itself all influence the overall perceived eating experience. Novel gustatory interfaces have opened up new ways of eating at the dining table. Specifically, the most recent development in acoustic technology can enable the transportation of food and drink particles in mid-air directly to user’s tongue (Vi et al., ISS’17, p161-170, 2017). Basic taste particles (i.e., sweet, bitter, and umami) delivered this way have higher perceived intensity (sweet, bitter, and umami) and they are (perceived as) more pleasant (bitter), despite their small size (approx. 20μL or 4mm diameter droplets). However, it is unclear if users are ready to accept this delivery method at the dining table. Sixty-nine children aged 14-16 years (M = 14.94 years, SD = 0.29 year; 44.93% males) did a taste test using the two distinct delivery methods: acoustic levitation vs. traditional eating method (i.e., using knife and fork). Seven types of foods and beverages were tested and rated for their pleasantness and comfort when consumed. Children’s willingness to eat vegetables delivered through acoustic levitation, versus from a plate, was also contrasted. Children were divided into two groups: one group was shown a video demonstrating how levitating foods can be eaten before the main experiment started and the other group was not. Initial results showed no significant differences in liking between the two delivery methods. However, playing the video prior to the taste test significantly increased the liking and willingness to eat vegetables in the levitation method. Evaluative feedback suggested that a bigger portion size of levitating foods, i.e., presenting the same amount of food as that consumers usually pick up when they use a fork or a spoon, could be the game-changing feature to integrate this novel technology into real-life dining.

Sensory sensitivity and eating behaviour in children: what is the role of child anxiety?

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Sensory sensitivity (heightened neurological threshold to sensory information), anxiety and parental feeding practices have all been associated with a number of maladaptive eating behaviours in children; including dietary restraint, fussy eating, emotional and external eating. However, there is very little research to date using child self-report which has explored how sensory sensitivity influences child eating behaviour. In this study we explored the relationships between sensory sensitivity and anxiety in predicting child eating behaviours, and evaluated whether child anxiety mediates the impact of greater sensory sensitivity on more maladaptive eating. Questionnaires were completed by 72 children aged 7-11 years to assess sensory sensitivity, anxiety and eating behaviours. The results indicate that both sensory sensitivity and anxiety in children were positively correlated with more unhealthy eating behaviours. Moreover greater child anxiety significantly mediated the relationship between tactile sensitivity with emotional eating and dietary restraint. These results add to our understanding of how sensory sensitivity may impact upon eating behaviours in children and suggest that greater levels of child anxiety may help to explain why children who are more sensory sensitive may experience greater levels of restrained and emotional eating. The development of interventions which consider the impact of child anxiety in interaction with sensory sensitivity may be beneficial for children in the future.
Infant gut microbiome: a longitudinal study protocol to investigate the relationship with feeding practices, eating behaviour and infant neurodevelopment.

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There is growing interest in the infant gut microbiome (IGM) and the role this plays in both physical and mental health development into adulthood. Current research is expanding knowledge of the mechanism of communication between the gut and brain, known as the gutbrain axis. This is a bi-directional communication route, which is influenced from birth through many factors including birth method and dietary intake. The IGM will undergo many changes throughout the first years of life until reaching maturity at approximately 31 months of life; beginning with the introduction of solid food and cessation of breastfeeding. Current evidence shows that IGM diversity also influences neurodevelopment, with breastfed infants showing increased levels of neurodevelopment and lower risk of ADHD when compared to formula fed infants. Although we have greater awareness that breastfeeding facilitates a healthy IGM, there has been no investigation into the IGM across the first year of life and the relationship between infant brain development and the development of eating behaviours. The proposed study protocol will investigate the IGM from birth to 12 months of age, analysing diversity of faecal samples using 16SrRNA gene sequencing. We will identify the relationship between maternal feeding practices, inclusive of breastfeeding, formula feeding, supplementation and solid food introduction, and the influence upon IGM diversity. Infant development will be assessed through analysis of brain structure using MRI and parent reports of temperament. The results will provide an in-depth understanding of the relationship between maternal feeding practices and IGM development, and how this influences the role of IGM in neurodevelopment.

Differences and similarities in eating behaviour, behavioural problems and sensory hypersensitivity in children with Avoidant/Restrictive Food Intake Disorder, Autistic Spectrum Disorders, picky eating and those defined as typically developing.

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The aim of this study was to assess the similarities and differences in feeding difficulties, eating behaviour, sensory sensitivity and behavioural problems in children with Avoidant/Restrictive Food Intake Disorder (ARFID), Autistic Spectrum Disorders (ASD), picky eating and children with no reported feeding, mental or physical health problems. The study was co-designed by parents engaged in the Parenting Science Gang project and researchers. To achieve the study’s aim, 471 parents of children completed four well established and validated psychometric questionnaires - The Behavioral Pediatric Feeding Assessment Scale (BPFAS), the Child Eating Behaviour Questionnaire (CEBQ), Strengths and Difficulties Questionnaire (SDQ), and the Sensory Experiences Questionnaire (SEQ). The results indicated that there were more similarities than differences between children with picky eating, ARFID and ASD; although these three groups did significantly differ from typically developing children on many of the subscales of all four questionnaires. Children with ARFID differed from all other groups in terms of Food Responsiveness. Children with ASD were reported to have more behavioural problems within the externalising domain. However, children with picky eating, ARFID and ASD all showed more sensory hypersensitivity and internalised behavioural problems than typically developing children. The significant differences in internalised behavioural problems were shown to reside specifically within emotional problems. The results uncovered in the current study confirm, replicate and extend previous research in eating disorders and picky eating. All children with feeding difficulties, whether that is ARFID, feeding difficulties associated with ASD, or picky eating, appear to share similar eating, sensory and behavioural problems.
Parents’ attitudes to drinking water and association with their child’s choice of drink: a pilot study

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Parental attitudes to food and drink influence children’s choices. Water is recommended as the first choice drink for children (alongside milk) as it does not contain free sugars, thus does not contribute extra calories nor harm teeth. Our pilot study evaluated parents’ attitudes to drinking water and their own and their children’s drink choices. 245 parents of children attending seven London primary schools completed an online questionnaire. Respondents were 82% female and highly educated (80% educated to degree level). Their children were age 5-11 years and 47% of children were female. Parents reported that their first choice of drink was water, followed by coffee and tea. They reported that their child’s first choice was water, followed by fruit juice and squash. There were significant associations between parent and child drink choices. The majority of parents had offered their child water to drink in the past two days (98%), with 73% reporting that their child had enjoyed drinking it. In our sample, parents’ attitudes towards drinking water were positive, for example, they enjoy drinking water (84% agree) and think it is a healthy option (95% agree). Many reported family food strategies that prioritised water over other drinks. Future work will refine our questionnaire before assessing a large and representative sample of UK parents in order to provide some recommendations for policy and practice.

Implicit and explicit associations between (un)healthy food and (not) tastiness in primary school-aged children and parents with a lower socioeconomic position.

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Children of families with a lower socioeconomic position consume poorer diets than children of families with a higher socioeconomic position. This is problematic, since food preferences developed in childhood affect food preferences and choices later in life. Literature also suggests associations between healthy food and not tasty. These associations have not yet been investigated specifically in populations with a lower socioeconomic position, nor in children. The present study assessed implicit and explicit associations between (un)healthy food and tastiness in primary school-aged children and parents with a lower socioeconomic position. 37 Parent-child dyads performed two computer-based implicit association tests and three paper-and-pencil questionnaires. Parents’ results of both the implicit and explicit tasks indicate that parents associate healthy food and tastiness with each other. Children’s results are contradictory; implicit tasks indicate an association between healthy food and tastiness, while most of the explicit tasks indicate a preference for unhealthy rather than healthy foods. We elaborate on the extent to which the rather surprising findings may represent participants’ beliefs, the extent to which the findings may be a representation of social norms, and possible shifting of social norms. Potential differences between parents and children are taken into account. Used measurement instruments and their application in the investigated target group are critically reflected upon.
Parental practices around feeding and exercise in children living with and without asthma.

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Asthma is one of the most common chronic illnesses in children. Evidence suggests that children living with asthma have an increased risk of developing obesity. A greater understanding of the different challenges to weight management is of particular importance in a paediatric asthma population as increased weight can exacerbate asthma control. This present study explores the differences in parental practices around feeding and exercise in families of children living with and without asthma. Parents of children aged 10-16 years living with (n=201) and without asthma (n=202) were recruited. Data were collected online through validated questionnaire measures for: parental feeding practises, child eating behaviour and parental attitudes towards child exercise. Data analysis indicated that parents of child living with asthma are significantly more likely to use food to regulate their child’s emotions, restrict their child’s diet for weight control, and be concerned about child overweight. Parents of children living with asthma were also more likely to monitor and control their child’s activity levels and to pressure their child to exercise. In addition, children living with asthma were also significantly more likely to emotionally overeat and to desire to drink compared to their non-asthmatic counterparts. The results suggest that parental practices around eating and exercise may influence an increased obesity risk in paediatric asthma. It is possible that these practices transfer to children, creating additional barriers to weight management.

The halo effect of a descriptive social norm message about energy-dense snacks.

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Exposure to social norm messages suggesting that most people consume plenty of fruit and vegetables, can encourage the consumption of these foods. Recently, we demonstrated that these norms can produce a positive halo effect that extends to other positive health behaviours. However, it is unclear whether similar halo effects are produced when individuals are exposed to social norms that implicitly promote the reduction of a behaviour (i.e. reduced consumption of energy-dense snacks). We examined this in the present study. Male and female students were recruited (n = 201; mean age = 19.2 years) and randomly allocated to a social norm message condition (suggesting that most students consume one, or less than one serving of junk food a day), or to a control message condition. Before and after exposure to one of these messages, participants were asked to estimate the extent to which they thought their student peers engaged in a variety of behaviours, including: the consumption of fruit, vegetables, junk food, caffeine and alcohol; and time spent exercising, studying, sleeping and using social media. The change in these perceptions was calculated (post- minus pre-exposure). Compared to the control group, those in the social norm condition perceived their peers to consume significantly less junk food after exposure to the message (p < 0.001). They also perceived their peers to consume significantly less caffeinated beverages (p < 0.01). These findings show that a social norm message designed to reduce the consumption of energy-dense snack foods produced a reductive halo effect that extended to another ingestive behaviour. Future work should now examine whether these perceptual halo effects translate to behavioural change.
Socioeconomic status and the effect of information-based versus structural nutrition interventions: virtual environments protocol

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A substantial contributor to social inequalities in health is diet; the dietary quality of people of lower socioeconomic status (SES) is poorer and this likely contributes to the development of a larger disease burden. In order to address social inequalities in health, nutrition interventions should benefit all, but be particularly effective in improving the nutritional quality of the diet of people of lower SES. Our project aims to examine how information-based and structural nutrition interventions affect dietary behaviours across participants SES.

Because there are SES differences in dietary motivations and executive function, we hypothesise that information-based interventions may be less beneficial for lower versus higher SES participants and therefore inadvertently widen health inequalities, whereas structural interventions may be similarly beneficial irrespective of SES, leading to more equality across SES. This protocol poster describes three experiments using virtual dietary choice environments: a fast food restaurant, a sit down restaurant and a supermarket. To allow a comparison across the three environments, all the interventions will target a reduction in the total energy purchased (main outcome measure). Executive function, in particular inhibitory control, will be measured to test if the social patterning of executive function could explain SES differences in response to information and structural-based interventions. By using virtual environments to test the effect of a variety of nutrition interventions across a range of controlled food environments this project will help to identify the most promising interventions to then be implemented in the real world.

Exploring consumer understanding of food variety in the UK: A qualitative study

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Consuming a variety of foods – be it within a meal, across meals, or across the whole diet – is known to increase food intake. In contrast, little is known about consumer awareness and understanding of food variety in today’s ‘obesogenic’ environment. Therefore, a series of five focus groups were conducted with the aim of exploring how consumers in the UK understand ‘food variety’. Each group consisted of 2-5 participants, with a total sample of N = 18 (83% female; mean age = 32.3 years, SD = 14.9; mean BMI = 24.4 kg/m², SD = 4.6). When compared and contrasted with a framework of categories of variety identified in the extant literature, preliminary thematic analysis of these data revealed six key themes; 1) indirect recognition of food variety, 2) direct recognition of food variety, 3) justification of food choices in the presence of variety, 4) beliefs about expected liking/fullness of foods in the presence of variety, 5) subjective views of their own awareness of variety, and 6) views on the use of dietary advice for variety. These data suggest that consumers demonstrate a spontaneous awareness of variety when discussing hypothetical food choices, but explicitly discussing the concept of food variety remains challenging. This suggests that variety-aware dietary strategies may be an opportunity but that there is a fundamental need for consumer-education on this topic.
The experiences of normal weight women who binge eat: A qualitative analysis.

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Weight-related stigma is known to prompt binge eating episodes in overweight women, however, many women who binge eat are not overweight. This study aims to investigate the experience of binge eating in normal weight women. Participants were recruited from the National Centre for Mental Health (NCHM) and eight females were interviewed about their experiences of binge eating. All participants had a BMI fell within the normal weight range during their binge eating episodes. Accounts clustered around four main themes; body image, emotional management, choice and acceptance. Food was identified by almost all women as a coping mechanism used to manage emotional distress. Binge eating was a hidden behaviour; those interviewed perceived their binges to be abnormal, misunderstood and viewed by others as attention seeking. Following episodes of binge eating, participants reported feelings of shame and guilt. For these women, overeating contradicted their attempts to portray their femininity. Despite never reporting experiencing prejudiced attitudes from others, the women internalised their fears and perceived themselves as likely to experience stigma.

The effect of calorie labeling, motivation and habits on the calorie content of items selected from a university coffee shop menu

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This study explored the effects of calorie labeling, motivation and habits on the calorie content of items selected from a university coffee shop menu. Labeling was expected to lead to the selection of lower calorie items, with stronger effects among those with (a) weaker habits and (b) greater motivation to eat healthily/watch their weight. Participants (n = 70) were presented with a calorie labeled or non-calorie labeled menu and asked to select the item(s) they would like to purchase. Coffee shop drinking habits and motivation for eating healthily/watching weight were also measured. Contrary to predictions, those who saw the labeled menu selected items with a higher calorie content compared to those who saw the non-labeled menu (502 versus 473 kcal respectively). Whilst this overall difference was not statistically significant, for those with weaker habits there was a trend toward calorie content being higher among those who viewed the labeled menu (p = .065). Those with greater motivation for eating healthily/watching weight showed a trend toward selecting items with a lower calorie content (p = .061) but there was no interaction with the labeling condition. Participants may have been using calorie labels as markers of taste value and/or the extent to which items were likely to satisfy hunger. These results suggest that calorie labeling could lead to a higher calorie intake among certain population groups. However, further research with a larger sample would be needed to establish whether the current findings are robust.
Do perceived norms about Facebook users' eating habits and preferences predict food consumption and BMI?

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In laboratory studies, exposure to social norm messages conveying the typical eating behaviour of others has influenced participants’ own consumption of food. Given the widespread use of social media, it is now plausible that we are implicitly exposed to norms in our wider social circles, and that these influence our eating behaviour, and consequently, BMI. This study examined whether four perceived norms (perceived descriptive, injunctive, liking and frequency norms) about Facebook users’ eating habits and preferences, predicted food consumption and BMI. In a cross-sectional survey, male and female university students (n = 369; mean age = 22.1 years; mean BMI = 23.7) were asked to report their perceptions about Facebook users’ consumption of, and preferences for, fruit, vegetables, energy-dense snacks and sugar sweetened beverages (SSBs), their own consumption of and preferences for these foods, and their BMI. Linear regression showed that perceived descriptive norms and perceived frequency norms about Facebook users’ fruit and vegetable consumption were significant predictors of participants’ own fruit and vegetable consumption (both ps < .01). Conversely, perceived injunctive norms about Facebook users’ energy-dense snack and SSB consumption were significant predictors of participants’ own snack and SSB consumption (p < .05). These findings suggest that perceived norms concerning actual consumption (descriptive and frequency) may guide consumption of low-energy dense foods (fruit and vegetables), whereas norms related to approval (injunctive norms) may guide consumption of high energy-dense foods and beverages. Further work is required to establish whether these perceived norms also affect dietary behaviour over time.

Body image perception and satisfaction among Indian women residing in UK and Singapore.

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Women from the same ethnic background should not differ much regarding body shape. Nonetheless, living in a different country may contribute to differences in body image perception and satisfaction. Hence, the aim of this study is to contrast views on perceived and ideal body shapes of Indian women residing in UK and Singapore (SG) by using the Swami et al. (2008) photographic figure rating scale. Women from both countries reported age, height, weight, perceived and ideal body shapes. This sample was composed by 98 UK aged 18-30 years (mean=21.8y, SD=2.96) and 90 SG women aged 21-48years (mean=28.1y, SD=7.91). Mann-Whitney test assessed country differences regarding continuous variables. SG participants were in average older though, SG and UK women did not significantly differ in BMI, which in average was within normal values. Both groups perceived their shape as Overweight and wished for a slimmer figure within the Normal BMI category. There were no country significant differences for perceived shape and shape discrepancy. On the other hand, British women (mean=3.66) indicated a slimmer ideal shape in contrast with Singaporeans (mean=4.10; p<.05). This preference for a slimmer figure by UK women was no longer evident when contrasting with a SG sub-sample aged up to 30 years (n=61). In conclusion, in this small comparative study and regardless of BMI, UK Indian women ideally favoured a slimmer figure in contrast with Indian women living in SG. However, body image perception and satisfaction were similar among younger Indian women living in two culturally divergent countries.
A field study on the effect of food logo primes on snack choice

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Over the last few decades, food and drink companies have become ever more willing to pay substantial amounts of money to be associated with various sports teams, governing bodies and competitions. This collaboration often gives food and drink companies the opportunity to present their logos during promotional and competitive events which are frequently viewed by large audiences.

Consequently, this pre-registered study examines the effect of brief exposure to healthy and unhealthy food logos on subsequent snack choice. A total of 205 participants were randomly allocated to either a no prime condition, a healthy prime condition, or an unhealthy prime condition. All participants completed a 2018 World Cup Quiz showing an image of Gareth Southgate, the present England manager, with an advertising board displaying logos in the background. The logos on the advertising board were modified so that the no prime condition had no food-related primes, the healthy prime condition included the M&S logo, and the unhealthy prime condition included the Mars logo. On completion of the quiz all participants were offered a snack as a thank you for taking part; participants were asked to select either an M&S fruit and nut assortment or a Mars bar before completing a funnelled debrief. Finally, all participants completed a questionnaire to check for any allergies, specific dietary needs and potential moderators such as dieting status. Multinomial regression analysis showed no main effect of condition on snack choice. In conclusion, there was no evidence for any immediate effect of brief exposure to food logos on snack choice although the effects of repeated exposure have yet to be explored.

Measuring the key defining features of internally regulated eating

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The concept of internally regulated eating has been studied along several, distinct research lines. The most prominent are those on intuitive eating, eating competence, and mindful eating, but there are also several independent intervention programs that promote eating by physiological signals of hunger and satiety. After a synthesis of the various literatures on internally regulated eating, we extracted and conceptualized the key features of this eating style; namely, 1. sensitivity to physiological signals of hunger and satiety, 2. self-efficacy in using those signals to decide when and how much to eat, 3. self-trusting attitude, 4. relaxed relationship with food, and 5. food enjoyment. We hereby present the elaborate procedure that we followed for the systematic development and validation of the Multidimensional Internally Regulated Eating Scale (MIRES); a new self-report instrument that assesses the individual-difference characteristics that underpin internally regulated eating. Specifically, we report on several psychometric properties of the scale (internal structure and consistency, temporal stability, content, construct, criterion, and incremental validity) and describe how these were tested in a series of studies with college and community samples from the Netherlands, UK, and US.
A Randomized, Double-Blinded, Placebo-Controlled, Dose-Response Study of the Acute Effects of Wild Blueberry Extract on Cognition, Mood and Blood Pressure in Older Adults.
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Research has shown the benefits of flavonoid intake on mood (i.e. Khalid et al. 2017) and cognitive performance in healthy populations across age groups (i.e. Scholey et al. 2010; Field et al. 2011; Whyte et al. 2016). These cognitive effects have been attributed to improved cerebral blood flow resulting from enhanced vascular endothelial function (Monahan et al. 2011). Recently, supplementation with a flavonoid-rich wild blueberry extract (WBE) improved episodic memory performance in older adults after three months' daily administration (Whyte et al. 2018). In this follow-up double-blind, cross-over, placebo-controlled study, we used a range of WBE doses containing 70mg, 140mg, 240mg and 580mg polyphenols to investigate the effect of a WBE on cognition, mood and blood pressure. Over the course of a single day in healthy older adults. Twenty-eight healthy participants aged 68-75 years completed the study with measures of cognition (episodic memory, executive function, working memory), mood and blood pressure recorded at baseline, 2 hours, 4 hours and 6 hours post-administration. Beneficial effects on cognitive function were seen with quicker word recognition on an auditory verbal learning paradigm following the 240mg dose compared with placebo (p = 0.001), and quicker reaction times on a switching task following the 70mg dose compared with placebo (p = 0.018). Importantly, treatment with WBE alleviated the significant decline in executive function performance seen at 4 hours post-administration with placebo (4h vs. 2h: p = 0.004; 4h vs. 6h: p = 0.042). Compared to placebo, the 140mg dose elicited significantly lower diastolic and systolic blood pressure (p = 0.027 and p = 0.038 respectively).

These findings provide evidence for improvement in cognitive performance and reductions in blood pressure acutely after supplementation with WBE in a healthy older adult population.

The effects of blueberry on cognitive performance as we age: a systematic review

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The effect of flavonoid-rich foods, such as blueberries, on cognitive function has been subject to increasing interest in recent years. Epidemiological, prospective, pre-clinical and randomised controlled intervention trials have revealed cognitive benefits from flavonoid interventions in a number of different age groups. Here, in a systematic review, we consider the cognitive effects of acute (2-6 hours post consumption) and chronic (up to 6 months daily consumption) blueberry interventions on human subjects. Our inclusion criteria included randomised controlled trials with cognitive function as a primary outcome, healthy participants of all ages, ageing participants with mild cognitive impairment (MCI), cognition measured using appropriate cognitive tasks, appropriate experimental controls, and all forms of blueberry treatment including juice, fresh, and powder extracts. Exclusion criteria included epidemiological studies, participants with neurodegenerative diseases including Alzheimer's, animal studies, and studies using a mixed berry intervention. In total, eleven studies fulfilled our inclusion and exclusion criteria which included four studies examining blueberry intervention in children, four in healthy older adults, and three studies considering the impact of blueberries in older adults suffering from MCI. Findings from these studies indicated that blueberries may have beneficial effects for cognition with specific improvements seen within the executive function and episodic memory domains for children and, predominately, episodic memory domain improvements for older adults and those with MCI. Importantly, blueberry benefits were found where the task was cognitively demanding, or the individual was cognitively compromised. Overall, the evidence suggests blueberry supplementation may benefit cognitive outcomes in different age groups, however, further research is required to strengthen these observations. Therefore, this review will also propose recommendations for future
research including dosage, method of administration, age groups, and the importance of utilising
tasks sensitive to the cognitive effects of blueberry intervention.

**Food intake and satiety response after medium-chain triglycerides (MCT) ingested
as solid or liquid.**

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Consumption of medium-chain triglycerides (MCT) have been shown to promote satiety and
decrease subsequent intake compared to long-chain triglycerides (LCT). However, this is not a
universal finding, with studies also reporting no effect of MCT on satiety or energy intake. Whilst
the cause for these disparate findings has not been discussed, it is possible that the form in which
MCT is consumed may interfere with any enhanced satiety effect. To examine this, 29 unrestrained,
non-obese participants (M: 13, F: 16; Age: 26 ± 6 y; BMI: 24.0 ± 2.9 kg.m⁻², Body fat: 23.6 ± 8.1
%) completed four experimental trials on separate days in a random order after a 24 h
standardisation period and an overnight fast. Participants consumed a meal of a brownie, ice
cream and milk in either solid or liquid (milk shake) form which contained either LCT (LCT-Solid
and LCT-Liquid, respectively) or MCT (MCT-Solid and MCT-Liquid, respectively). Appetite was
measured via visual analogue scales for four hours, after which participants consumed an ad
libitum lunch.

There was no difference in appetite ratings between any of the breakfasts (all P > 0.05). Energy
intake was significantly higher after LCT-liquid compared to LCT-solid (4113 ± 1275 kJ vs. 3333 ±
1196 kJ; P = 0.001, d = 0.63), and MCT-liquid was significantly lower than LCT-Liquid (3268 ±
1347 kJ vs. 4113 ± 1275 kJ; P = 0.003, d = 0.64). There was no difference between LCT-Solid and
MCT-Solid (3333 ± 1196 kJ vs. 3527 ± 1056 kJ; P = 0.521). These findings suggest that
consumption of MCT do decrease subsequent intake, albeit only when consumed in liquid form.

**The influence of eating-related psychopathology on autobiographical memory
specificity after priming with healthy and unhealthy food images**

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Clinical and subclinical disordered eating are associated with impaired autobiographical memory
specificity (AMS). This deficit is most evident for cues relating to participants' psychopathology or
corns relevant to those who habitually restrict their food intake. Using food and neutral cue
words, our previous work (Wallis & Ridout, Appetite, 123, 459, 2018) found significant negative
relationships between the proportion of specific food-related memories retrieved and both BMI and
restraint score. Based on the CaR-FA-X model of
AMS (Williams et al., Psychol Bull, 133, 122-148, 2007) it might be expected that priming with food
images would promote capture and rumination, and thus influence AMS. The present study
examined the impact of priming with images of healthy versus unhealthy foods on AMS. Twenty-six
females were randomly assigned to one of the two priming conditions and were asked to recall
specific memories in response to cue words (six positive and six negative). Prior to each cue,
participants were presented with either a healthy (e.g. orange) or an unhealthy (e.g. pizza) food
image. They also completed measures of restraint, disinhibition and eating-related
psychopathology.

Participants in the unhealthy priming condition recalled a significantly greater number of specific
memories than those in the healthy priming group, but this was not influenced by cue word
valence. A significant positive correlation was also observed between body dissatisfaction and
proportion of specific memories retrieved in response to negative cue words. Using a novel priming
paradigm, these findings provide further evidence of the role of eating-related psychopathology in
AMS.
Rigid and flexible restraint moderates a relationship between a future eating prime and food intake

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Individuals often try to limit their intake of indulgent foods to avoid weight gain. One possibility is that anticipating a future eating occasion is protective when an unexpected eating opportunity arises. This study investigated the effect of future thinking on food intake with a potential moderating role for tendency to plan indulgences. Participants (N = 131) were randomised into one of two priming groups, either focussed on thinking about a future eating episode or a non-food related activity (control). Participants had to write down the 'what, when, how much and with whom' related to their assigned prime. Following this, participants were given ad libitum access to snack foods as part of a bogus taste test task. They also completed a range of individual difference questionnaires. Our groups were matched at baseline, except for test food liking which was then included as a covariate. Inconsistent with our hypothesis, confirmatory analysis showed that tendency to plan indulgence was not a significant moderator of a difference in amount eaten between our prime groups. However, an exploratory analysis showed that restraint eating was a significant moderator of a difference in amount eaten dependent on prime. Amount eaten was higher in the group primed with a future eating occasion compared with a future activity but only for those who were low in rigid or flexible restraint. These results highlight a potential role for future thinking around an eating occasion as a useful temptation management tool for those who are low in restraint. Future studies might explore this possibility in a more real world context.

Beyond organised forms of attachment orientation: a novel investigation of disorganised attachment in the context of eating behaviour and BMI.

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Previous research has demonstrated relationships between attachment orientations (expectations of ourselves and others in interpersonal relationships), eating behaviours and obesity. However, such research has been limited to investigations of ‘organised’ forms of attachment orientation (reflecting coherent and predictable patterns of behaviour). Theoretically, aberrant eating behaviours and body mass index, should also be related to ‘disorganised attachment.’ Here we test these relationships for the first time in a general population. Secondary data analyses of a pre-existing dataset were conducted (N = 537). Questionnaire measures of organised (avoidant and anxious) and disorganised attachment were included alongside eating behaviour measures (emotional eating, uncontrolled eating and cognitive restraint) and body mass index (BMI). Parallel multiple mediation analysis (PROCESS) showed that uncontrolled eating (but not emotional eating or cognitive restraint) significantly mediated a relationship between disorganised attachment and body mass index (significant indirect relationship; LLCI = .02 ULCI = .16) when both attachment anxiety and avoidance were included as covariates. We suggest that the mechanism underpinning this indirect relationship is a form of maladaptive affect regulation, but that the behavioural motivators differ from those observed in attachment anxious individuals. Rather than eating being a premeditated strategy used by individuals high in disorganised attachment to manage emotion, opportunities to eat are simply taken as they present themselves.
Memory-Food Intake Effect: Do Guilty Feelings Have An Influence? A preliminary study.

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Research has demonstrated a reliable effect of memory for a recently eaten (reference) meal to reduce subsequent food intake. However, since those studies generally use an energy dense meal as the reference meal, it is uncertain whether using a healthier lunch would yield the same effect. Linked to this, could the memory-intake effect be influenced by perceptions of guilt for the previously consumed meal. The present study aimed to examine this issue. In this study, participants (N=16) were given a ‘healthy’ lunch and returned to the lab in the afternoon where they were randomly allocated to either a Lunch Cue or No Cue condition and then proceeded to a standard snack intake test where along with snack ratings, they also completed ratings of ‘guilt’. Findings revealed that snack intake was lower in the Lunch Cue versus No Cue condition. We also found that snack liking was lower but guilt higher in the Lunch Cue versus No Cue condition. These results demonstrate that the memory-intake effect is unaffected by the healthiness of the reference meal and offers preliminary evidence for the influence of guilt.

A novel inhibitory control training paradigm for altering food evaluations and cravings.

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In a pre-registered study, we examined the efficacy of a novel inhibitory control training (ICT) paradigm for altering food cravings and evaluations. In one experimental group, participants had to inhibit responses to unhealthy foods (‘stop’ group). In the novel paradigm, individuals were required to cancel their prepotent response targeted at an unhealthy food and execute another response towards a healthy food (‘stop-change’ group). This paradigm was developed to reflect real-world eating behaviours, where self-control is often accompanied by an effort to replace an unhealthy choice with a healthier one, such as choosing fruit over candy. Tasks were also designed to involve continuous motor responses and we tested whether training effects are influenced by whether food stimuli are selected by the participants or not. We found strong evidence for a decrease in ‘tastiness’ and ‘desire to eat’ ratings for selected unhealthy foods in the stop-change group (N=87) compared to the control (N=134). However, stop-change training did not have an effect on ratings for healthy foods compared to the control group. Cravings for selected unhealthy foods were reduced from the stop group (N=87) to the control group, but there was no evidence for a devaluation effect. Results showed that training effects are greatly enhanced when food stimuli are tailored to individual preferences. Overall, the novel ICT paradigm was effective in altering food evaluations and cravings for unhealthy foods and future research should advance its methodological development and applications.
Sex differences in the relationships between disordered eating and mood, alexithymia, and facial emotion recognition

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Disordered eating is associated with high levels of negative affect (depression and anxiety) and alexithymia, and also impaired facial emotion recognition (FER). However, these findings have been limited to female samples. Therefore, the aim of the current study was to explore sex differences in the relationships between disordered eating and mood, alexithymia and FER. Fifty-two females and 33 males were asked to identify the emotion portrayed in a series of facial expressions. They also completed the Hospital Anxiety and Depression scale (HADS), the Toronto Alexithymia Scale (TAS-20) and Eating Disorders Inventory (EDI-II). Results revealed no group differences in depression, alexithymia, or FER. However, females scored significantly higher on anxiety and on the drive-for-thinness (DFT) and body dissatisfaction (BD) subscales of the EDI, but not bulimia. Interestingly, eating disorder symptoms (DFT and BD) were associated with facets of alexithymia (difficulty identifying feelings and difficulty describing feelings), but only in females. Body dissatisfaction in males was related to greater anxiety and depression, whereas DFT in females was positively related to depression. Higher levels of depression and alexithymia in females were related to poorer recognition of facial expressions of happiness and disgust. On the other hand, anger recognition in males was positively related to anxiety, and sadness recognition was positively related to depression. In conclusion, there is clear evidence of sex differences in the relationships between disordered eating and mood, alexithymia and FER. These differences are important, as they have potential implications for the treatment of disordered eating in both males and females.

Cognition mediates the relationship between dietary intake and psychological health.

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Previous research suggests that diet is associated with psychological wellbeing and mental health. Although the mechanisms underpinning this relationship are unclear, an association with cognitive processes has been suggested. This cross-sectional study explored cognition as a mediator of the relationship between eating behaviour and psychological health, in an adult community-based sample (n = 443, 53% women; mean age = 39.4 years old (SD = 12.9); mean Body Mass Index = 26.0 (SD = 5.8). Data were collected online using validated questionnaires and tasks measuring: cognitive failures, inhibitory control, stress, depression, anxiety, psychological wellbeing, and habitual food consumption. Mediation analyses revealed that cognitive failures mediated the relationship between frequency of energy-dense sweet and savoury snacking, on depression, stress, anxiety and psychological wellbeing (all ps < .05). Or in other words, high consumption of these foods increased cognitive failures, which increased depression, stress and anxiety, and reduced psychological wellbeing. Results also revealed that portions and frequency of fruit consumption directly positively predicted psychological wellbeing scores (both ps < .01), and that portions of vegetables and frequency of fruit consumed directly negatively predicted depression scores (both ps < 0.05), however, there was no mediation of any of these effects. All other models were not significant (p > 0.05). These findings suggest that frequent consumption of energy-dense snacks has an adverse effect on psychological wellbeing and mental health, and is mediated via an increase in cognitive failures. In addition, the consumption of fruit and vegetables enhances psychological wellbeing and mental health. These data provide new insights on the potential mechanisms that underpin the relationship between dietary intake and psychological health.
Effects of simple verbal instructions on eating rate, fullness, meal enjoyment and meal satisfaction

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Eating slowly can increase satiety and thereby might be an effective strategy for weight management. However, eating slowly has also been found to reduce eating enjoyment and generate low mood. The present study investigated whether savouring a food could be an alternative strategy to slow eating to increase fullness, whilst at least maintaining meal enjoyment. We tested the effectiveness of simple verbal instructions, since clinicians rely on them in real life settings (e.g., chew for 30 seconds, or use a teaspoon to eat your food). Participants (n = 100) were randomly assigned to one of three conditions (‘slow’, ‘savour’ and ‘usual’). The savour condition instruction was ‘Make sure to make the most of your meal. Be a gourmet: focus on how the food tastes and savour every mouthful’. Participants completed baseline measures of hunger and fullness, were then invited to eat a 431kcal fixed lunch meal (cheese and tomato sandwich and sweet dessert items), after which they completed post-meal ratings of fullness, meal enjoyment and satisfaction. The intervention had a significant effect on meal duration (p < 0.001): participants in slow eating condition took longer to eat the meal than did the savour and usual condition participants (11.3, 6.9, and 6.5 minutes, respectively). There were no differences in fullness, meal enjoyment and meal satisfaction across conditions. This study indicates that eating speed can be altered by a simple instruction, however reduction in eating speed may not increase fullness, and savouring might not be an effective method to increase meal enjoyment and satisfaction.

Funding: Turkish Ministry of National Education and BBSRC BB/L02554X/1.

Food-to-mealtime congruency influences eating rate and oral processing behaviours.

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Research has shown eating rate to negatively correlate with the satiety delivered by a food. With our previous work showing that expected satiety is influenced by food-to-mealtime congruency, and other research showing that eating rate is not determined solely by the structural properties of food, this study looked to explore the impact of food-to-mealtime congruency on eating rate. Participants (N = 40) consumed cheese and tomato pasta ad libitum, once at breakfast (8am; incongruent food-to-mealtime pairing) and once at lunch (12pm; congruent food-to-mealtime pairing), on non-consecutive days in a randomised, cross-over design. We hypothesised that eating rate would be slower for the incongruent food-to-mealtime pairing. Participants were screened to ensure they liked the test meal. At each visit, participants recorded their hunger and measures of liking, food familiarity and food-to-mealtime appropriateness on 100-mm visual analogue scales. Measurements of eating rate were recorded via a concealed balance scale (SIPM) and video recordings. Participants were asked to consume as much food as they would like knowing they could not eat for 3 hours afterwards. Our results showed a significant increase in eating rate (25%), bite size (11%) and energy intake (35%), and a decrease in bite interval (17%) at breakfast compared to lunch. Participants liked the test foods similarly at both meals, rated it as very familiar (x̄ = 91 mm; habitually consumed 1-2 times per week) and significantly more appropriate to consume at lunch (x̄ = 91 mm) compared to breakfast (x̄ = 29 mm). This study suggests that eating rate is influenced by food-to-mealtime congruency and perceived food-to-mealtime appropriateness. Further investigation is necessary to better understand implications for weight management.
How thinking about food can decrease eating: the role of guidance, memory ability and mode of recall.

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My work investigates the ‘meal-recall effect’, a phenomenon of reduced consumption following recall of a recent meal-memory (e.g. Collins & Stafford, 2015; Higgs, 2002; Higgs, Williamson, & Attwood, 2008). It has been noted that remembering what one ate during a previous meal a few hours earlier can reduce the number of snacks eaten subsequently, but to date all experiments concerning this effect asked participants to write the meal-memory down. Therefore, it has not yet been tested what effect the mode of recall might have on the meal-recall effect. Similarly, it has not yet been investigated how the quality of the meal-memory might affect the magnitude of the meal-recall effect. Memory quality might be affected by how detailed the meal-memory is, or by individual differences in episodic memory ability. The present experiment attempted to test all of these research questions, by recruiting participants with a low or high memory ability and by allocating them to either an unguided or a guided meal-recall. In the unguided-group, participants were simply asked to recall their previous meal, whereas those in the guided group were prompted for additional detail about their memory. The mode of recall was also varied, as participants were allocated to either a verbal or a written group. Snacking behaviour was assessed after a recent and a distant meal-memory recall in order to establish whether recent meal-memories could suppress eating and whether varying the quality of the memory affected the magnitude of the meal-recall effect.

“That’s too small for me”: Evidence for a ‘conceptual boundary’ in the acceptability of smaller portion sizes

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Reducing the portion size of an already familiar food is likely to compromise consumer acceptability. However, the relationship between acceptability and portion size remains unclear. One possibility is that the relationship between portion size and acceptability is governed by psychological ‘conceptual boundary’ - portions above will be regarded as acceptable, whereas those below will be rejected. To explore this idea, we assessed evidence for a linear relationship between portion size and consumer acceptability. Participants (N=29) assessed 10 portions (ranging from 100% to 10% of a typical commercially available size) of a familiar chocolate bar and equivalent portions presented in bite-size chunks. The bite size pieces were included as a control to determine if changes in ratings are due to a specific response to the chocolate bar as a food or a general response to a reduction of materials. Ratings (VAS) comprised measures of perceived satisfaction, appropriateness, and willingness to pay. To determine non-linearity of data, several statistical methods were used. First, linear regression modelling was conducted with the assumption that a smaller R-squared value would indicate non-linearity in the relationship with portion size. Secondly, the largest increase in a rating between two successive portion sizes for each participant was calculated – it was expected that a large positive change in the score would indicate non-linearity. Results indicated that R-squared values for the bar were higher than the bite-size pieces for several measures which does not provide evidence for a categorical boundary. Regarding the largest-change-scores, there was a greater correspondence across measures in the bar condition than the control suggesting some level of non-linearity. This research has provided some evidence of a ‘conceptual boundary’ regarding acceptable portion size reduction.
Exploring the role of visual salience within the proximity effect

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Recent work has explored the effectiveness of nudging in reducing snack consumption. One simple intervention exploits the Proximity Effect, where increasing the physical distance between consumer and snack reduces consumption. Similarly, visually salient, attractive foods are consumed more than less visually appealing foods. Visual salience is suggested as a mechanism for the proximity effect, but no prior studies have directly manipulated food appearance within the proximity effect. Eighty participants were presented with either 250g of multi-coloured, visually stimulating M&M's or single-coloured, plain brown M&M's, positioned at either 20cm or 70cm from the participant. Likelihood of Consumption (Yes/No) and Actual Consumption (grams) were measured, along with potential moderating variables such as perceived effort and visual salience. Binary logistic regression and 2x2 ANCOVA were used to assess each measure of consumption respectively. Likelihood of consumption was predicted by visual salience (B = 2.00, p

Food neophobia and physical disadvantage in older adults

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Food neophobia is defined as “the reluctance to eat and/or avoidance of novel foods”, and there are indications that food neophobia in adults may increase with age. As people get older, their nutritional requirements change, and this may require a change in eating behaviour. Dietary intake often does not change accordingly, which could lead to malnutrition. Introducing new food products to manage the risk of malnutrition (e.g. oral nutritional supplements and fortified foods) may be more challenging if the older adults in need are more food neophobic. This cross-sectional analysis aimed to explore associations between food neophobia and physical disadvantage (measured using self-reported: denture wearing; help with food shopping and/or preparing; and risk of sarcopenia) in 377 adults over 55 years old, controlling for age group, gender, living status, education, and employment level. Higher food neophobia scores were associated with denture wearing in initial analyses (Beta = 0.186, p = 0.001). However, when controlling for demographic characteristics, food neophobia scores were no longer related to denture wearing (Beta = 0.069, p = 0.226), but instead were related to a higher age, living alone, and a shorter education (smallest Beta = −0.104, p = 0.048). These findings suggest that food neophobia may be a barrier to the consumption of novel foods in older adults who are of higher age, living alone, and shorter education. Thus, treatments for age-related conditions, such as malnutrition, should focus on familiar foods or, novel food products need to be carefully designed and may benefit from close resemblance to familiar foods.
Foraging minds in modern environments: High-calorie and savory-taste biases in odor-cued food spatial memory

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In order to survive erratic food habitats of the past, our hunter-gatherer ancestors needed to efficiently locate high-quality resources, using input from various sensory modalities. We previously demonstrated the existence of high-calorie and savory-taste biases in human food spatial memory using visual food cues. We now investigated whether these biases would likewise manifest with the sense of olfaction, given its evolutionary significance to the process of spatial navigation and food decision making. To this end, we carried out a controlled computer-based experiment which required 88 normosmic Dutch participants (78% female, Mage = 21.93 ± 1.99) to learn and recall (randomized) locations of (sweet/savory) high- and low-calorie food odors on a map of a food market. Consistent with what was found using visual food cues, individuals displayed a greater overall accuracy in odor-cued food spatial memory for high-calorie food odors compared to low-calorie alternatives [Average distance between true and guessed locations [D] of 118.27 versus 152.72 pixels, F(1,1240) = 18.43, p < .001]. Furthermore, savory food odor locations were more accurately recalled than sweet counterparts [D of 121.73 versus 149.25 pixels, F(1,1309) = 23.00, p < .001]. These effects were not contingent upon an individual’s hedonic evaluations of odors, recognition memory for odors, or the time taken to encode and recall odor locations. Findings further support an adaptive account of human memory and suggest that spatial processing tendencies optimized for fluctuating ancestral food habitats may be preserved. Knowledge of these biases could inform new strategies to promote healthier eating behavior within the evolutionary novel “obesogenic” food landscape.

Mindful Construal Diaries: Exploring the effect of mindful eating on later food consumption

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Research suggests that memory processes play a major role in appetite control and eating behaviour (Higgs, 2016). Some studies have found that enhancing meal memory decreases subsequent food consumption (Higgs, 2002; Higgs & Donohoe, 2011; Robinson, Kersbergen & Higgs, 2014). The present study explored whether using the Mindful Construal Diary (MCD: a mindful eating tool which promotes attentional awareness to food consumption), would influence future food-related decisions, in comparison to eating with no particular focus. A between-subjects design similar to Robinson, Kersbergen and Higgs (2014) was employed. Forty-nine male and female participants were given a fixed lunchtime meal while either using the MCD (experimental) or reading a neutral newspaper article (control). Two to three hours later on the same day participants were invited back to the laboratory, where ad-libitum intake of highenergy snacks (a variation of cookies and biscuits) were monitored. In order to examine whether using the MCD enhanced meal memory, memory vividness for the lunch time meal was measured. The results indicate that the control condition ate approximately 15% less than the experimental condition in the ad-libitum intake session, however this difference was non-significant. There appeared to be no significant differences in memory vividness between both conditions, and memory vividness was not associated with energy consumption. These results are consistent with more recent findings which found no effect of focused attention on later food intake or memory vividness (Whitelock et al., 2018), and also suggest the medium of mindful eating may not be as effective as anticipated in increasing meal memory. Future research may benefit from larger and more representative samples. Limitations and possible explanations are discussed.
The effect of mindful eating on calorie intake and diet over a three-day period

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This study examined the effect of focusing on the sensory properties of food whilst eating amongst 99 females of a healthy weight, over a three-day period. Participants were either asked to focus on the sensory properties of their food (mindfulness condition), eat their food without distractions (no distractions condition) or they were not provided with any strategy (no strategy control condition). All participants had an app downloaded onto their mobile phone and for a period of three days the app sent them an end-of-day reminder to complete an online food recall measure. All participants also received end-of-day messages asking them to rate how well they remembered the food they had eaten during the day. Participants in the mindfulness and no distractions conditions were given messages to read at particular times of the day and also had access to an audio recording. These messages and audio recordings reminded them to focus on the sensory properties of their food (mindfulness condition) or to eat without distractions (no distractions condition). Additionally, these participants received end-of-day messages asking them to rate the extent to which they had adhered to their given strategy. After three days all participants completed a questionnaire assessing sensitivity to reward and a feedback questionnaire about the app, messages received, and the food recall measure. The main outcomes are total calorie intake and intake of sugars, saturated fats, fruits, vegetables, and fiber over the three-day period.

Mindful Construal Diaries: Reducing the portion size effect.

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When people are provided with a larger portion, they often consume more food, this phenomenon is known as the portion size effect. In the present research, it was hypothesised that the use of a mindful eating intervention, namely Mindful Construal Diary (MCD), would reduce the effect of portion size on calorie intake when compared to a control condition. One-hundred and seven participants (MAge = 20.80 ± 4.47; MBMI = 24.89 ± 5.96) were served a small or large portion of peanut M&Ms whilst engaging in the MCD or a newspaper article. The results found that participants in the large portion – control condition consumed significantly more M&Ms than participants in the small portion – control condition (+94 calories); however, the use of MCD significantly reduced the effect of portion size on participants’ calorie intake, with results showing that there were no significant differences found in calorie intake between the small portion – mindfulness condition and large portion- mindfulness condition. Findings suggest mindful eating interventions propose an effective mean of facilitating adoption of healthier eating behaviours.

Mindfulness and reactivity to food: Preliminary findings on the role of domain specificity in a brief decentering induction

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This study examined the effects of general and domain-specific decentering inductions on reactivity to food cues. Decentering is a component of mindfulness that can be defined as the metacognitive insight that one’s thoughts, feelings and reactions are transient mental events, thus experiencing them as less subjectively real. An important, currently unanswered question is whether decentering inductions work best when they refer to experiences in a particular domain (e.g. food cravings), or when they are taught independent of specific domains. Here, we report preliminary findings from an ongoing study that assesses whether participants benefit more from
learning decentering through domain-specific or general instructions when exposed to foods. Participants (N = 85, female = 68, predominantly meditation-naïve) received brief instructions for general decentering, food-specific decentering or relaxation (control). Participants then viewed a bowl of crisps (attractive food) and rice cakes (neutral food), in counterbalanced order. We assessed salivation, self-reported desire, consumption simulations, and thoughts reflecting decentering from the food. Our results suggest that across conditions, participants experienced more reactivity (i.e. salivation, thoughts about eating the food and desire) toward the attractive food compared to the neutral food. These effects did not differ between the three conditions. Exploratory analysis, however, suggested that both decentering manipulations reduced the link between consumption simulations and salivation. These effects will be re-examined after further data collection, until maximum N = 156. Overall, understanding the ideal level of specificity for mindfulness instructions has theoretical significance, and it might inform the development of effective training programs that target reward-related processes involved in overeating.

Knocking, tapping, chirping flavour: The effect of MRI acoustic noise on taste identification, and food evaluation

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Ambient sounds affect flavour perception. For example, loud background noises (e.g., music, or white noise at sound pressure levels of around 80 dB) have been found to influence perceived taste intensity. This effect has been explained in terms of loud noise directly stimulating the chorda tympani, a cranial nerve innervating two thirds of the tongue that transfers the taste signal from taste receptor cells to the solitary tract in the brain stem. We recently examined whether ~80 dB magnetic resonance imaging (MRI) acoustic noise can also affect taste perception. Participants (N = 27) came to the lab twice. Each time their basic taste and smell identification was tested. Further, participants rated liking and wanting for several sweet and savoury food items. The only difference was that in one of the sessions the participants were continually exposed to a variety of loud MRI acoustic scanning noises. In line with prior research, we hypothesized that exposure to these loud noises would impair taste identification, and that it would decrease liking for the taste of particularly sweet foods. However, neither taste nor smell identification was affected by exposure to MRI acoustic noise. Further, we found that MRI acoustic noise decreased liking for savoury foods, but not for sweet foods. Loud MRI acoustic noise does not seem to impact taste and smell perception much (if at all). MRI acoustic noise may affect food evaluation, but this effect is small and likely due to being annoyed by the loud knocking, tapping, and chirping. (This research was made possible with support of the Dutch Province of Limburg.)

The development of the ‘Coping Strategies Assessment Tool’ (C-SAT): A focus on eating to cope.

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Bariatric surgery is currently viewed as the most effective and enduring response to severe obesity. Nevertheless, weight loss outcomes remain variable. One reason for this is the continued use of food to manage emotion following surgery. This ‘coping behaviour’ may also explain observed increases in substance use (drugs/ alcohol/ smoking). However, a tool to map, monitor, predict and manage these coping strategies, is currently lacking. The C-SAT is a theoretically-based bulls-eye style diagram onto which respondents are asked to place their coping strategies; strategies placed closer to the centre (labelled ‘stressed me’) are more frequently used. Qualitative methods (interviews, focus groups and textual data) were employed to collate feedback from patients of bariatric surgery (N = 10), the public (N = 10) and a multidisciplinary expert panel (N = 10); data saturation was reached. Feedback highlighted that the tool was acceptable, users
liked the concept and believed they would benefit from using it. Usability concerns were raised and, in response to this, the clarity of the guidance was amended to improve users’ understanding. Likewise, the bulls-eye diagram was modified and colour-gradient is now presented to help make the tool easier to use. Expert feedback ensured (1) fidelity to theoretical constructs and (2) that the tool was feasible in a healthcare setting. Digital and paper versions of the tool were produced, each with guidance tailored for clinical, non-clinical and research purposes. Future research should focus on convergent and divergent validity and test-retest reliability of the tool. Ultimately, the aim is for the C-SAT to be used to objectively and consistently quantify personalised coping strategies.

Giving pork the chop: Response inhibition training to reduce meat intake.

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Meat consumption is damaging to the environment, human health and animal welfare. Despite a growing interest in reducing meat intake, many people eat too much. This is partly due to the pleasure people associate with eating meat. Previous research has used go/no-go inhibition training to reduce the reward value (subjective liking) of snack foods and decrease intake. However, inhibition training has not yet been applied to meat. We investigated whether an internet-delivered go/no-go training task using meat pictures (active condition) could reduce meat intake relative to an inhibition training task with non-food pictures (control condition). Participants (N=81) were meat eaters who had some desire to reduce their meat intake. They completed four 10-minute training sessions in one week. Active participants inhibited responses to meat and responded to fruits and vegetables and non-food filler pictures. Meat intake was measured via self-report using food frequency questionnaires at pre- and one month post-training, and using a daily meat diary for one week during training. We also measured training effects on evaluation (liking) of meat and other food images. Results showed a reduction in the frequency of meat intake over one month in both groups, with the active group showing a significantly larger decrease. Both groups also showed a devaluation of meat, with active participants showing a significantly larger devaluation of food overall. Reduced frequency of meat intake was associated with greater devaluation of meat in active but not control participants. Groups did not differ in meat intake during the training week. These findings suggest that meat go/no-go training may help to reduce meat intake. Future research should conduct larger randomised controlled trials with longer-term outcome measures.

Categorisation of novel fruits and vegetables in adults: associations with food neophobia, sensory processing and disgust sensitivity.

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Food neophobia, or the reluctance to eat novel foods, has been repeatedly associated with lower fruit and vegetable consumption in both children and adults. Researchers have found that children who have higher food rejection scores show poorer categorisation of fruits and vegetables (Rioux et al., 2016) however no research has examined cognitive evaluation of novel foods in adults. The aim of the current study was to examine how adults describe and evaluate images of novel fruits and vegetables. One hundred and seventy five participants were recruited through opportunity sampling in Leicester, UK (81% female, mean age 20.38 years ±3.80, 51% White European). Participants completed measures of disgust sensitivity, food neophobia, tactile processing, and fruit and vegetable consumption (portions and range). They were also shown eight photographs of novels foods; five vegetables (okra, karela, plantain, gourd, and cassava) and three fruit (custard fruit, guava, Sharon fruit). Each photograph was rated according to the following criteria; familiarity, categorisation as a fruit or vegetable, visual appearance, expected pleasantness of taste, any other foods that the novel item could be likened/generalised to, liking of the generalised food, and expected texture. In this sample, food neophobia was associated with higher disgust sensitivity and
with low threshold tactile sensitivity. Food neophobia was further found to be associated with rating of the novel fruits and vegetables. Specifically, individuals high in food neophobia had a high expected disliking of the food, and generalised the appearance of novel foods to other disliked. This was observed across all novel fruits and vegetables except Sharon fruit, which showed the highest self-reported familiarity (60%), but also the highest rate of mistaken identity (38.6%) suggesting that perceived recognition may be more important than accurate identification. Further research needs to examine evaluation of novel fruits and vegetables in relation to actual tasting behaviour.