Behavioural and electrophysiological responses to visual food cues: Differences in obese, overweight and normal weight women

David John Hume, F M Howells, H G Laurie Rauch, J Kroff and E V Lambert
University of Cape Town, South Africa

Background: Heightened brain-reactivity to food cues, as measured by differences in attentional bias during the early and maintained phases of information processing, may relate to a higher Body Mass Index (BMI). The present study explored differences in the attentional processing of visual food-related versus neutral stimuli in obese, overweight and normal weight women.

Methods: 81 Healthy women were characterized for height, weight, waist and hip circumferences and body composition, and were allocated to a normal weight (BMI ≤24.9 kg/m²), overweight (BMI 25-29.9 kg/m²) or obese group (BMI ≥30 kg/m²). Medical, general health, demographic, weight and reproductive history, physical activity, fat intake, body shape and body image questionnaires were completed. Behavioural (response accuracy and reaction time) and electrophysiological (event related potentials) data were collected while participants completed one stroop task containing food images, and a second task containing neutral (office-related) images.

Results: Food cue-elicited right parietal (P4) ERP P200 amplitude was higher in overweight compared to normal weight women, food cue-elicited right parietal (P4) ERP P300 latency was shorter in obese compared to normal weight women and food-related stroop task accuracy scores were lower in obese compared to overweight women. Food-related attentional bias scores showed significant correlations for measures of eating behaviour, habitual physical activity, body shape dissatisfaction and anthropometry. No differences in office-related attentional bias were found.

Conclusion: Brain reactivity to food cues is greater among those with a higher BMI. Heightened food-elicited ERP P200 amplitude in overweight women indicates increased attentional bias to food-related versus neutral visual stimuli during the initial phases of information processing. A shorter ERP P300 latency and increased number of food-related stroop task mistakes in obese women indicate increased attentional bias to food cues during the conscious, maintained phases of information processing. Finally, measures of heightened food cue-reactivity show associations with increased fat intake, increased levels of habitual physical activity, increased dissatisfaction for body shape and measures of leanness.

Biography
David John Hume, aged 25, is a final year PhD student (University of Cape Town, South Africa) aspiring to enroll for post-doctoral study in 2015. Obesity research has always been his main interest with his work primarily focusing on the factors which predispose individuals to weight regain (or “weight loss relapse”) after successful weight reduction. His publications include work on resting and activity-related thermogenesis in formerly overweight women; the socio-cultural, environmental and behavioural determinants of obesity in black South African Women; the role of adipose tissue in insulin resistance in women of African ancestry; the metabolic effects of African bird’s eye chilli in overweight individuals; and electrophysiological (EEG) response to visual food cues in obese and overweight women.

davidjohnhume@gmail.com