

Institution: Queen Margaret University, Edinburgh		
Unit of Assessment: UoA 4, Psychology, Psychiatry and Neuroscience		
Title of case study: Reducing dietary intake of free sugars		
Period when the underpinning research was undertaken: 2006-2009		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Professor Marie Reid	Professor of Health Psychology	2005 – 2011
Dr Maresa Duffy	Research Fellow	2006 – 2008
Period when the claimed impact occurred: 2015-2020		
Is this case study continued from a case study submitted in 2014? N		
1. Summary of the impact QMU's Marie Reid and Maresa Duffy investigated the behavioural consequences of individuals' dietary intake of free sugars (sucrose). Their findings were included in evidence for the Scientific Advisory Committee on Nutrition's 2015 report 'Carbohydrates and Health'. Its recommendations led to the UK Government's (2016) 'Childhood Obesity: A Plan for Action', to Public Health England's 2018 'Change4Life campaign', and to revised Government dietary guidance in Scotland and Wales. Their findings also informed the World Health Organization's (2015) guideline on 'Sugars intake for adults and children'. Reid and Duffy's research has impacted on public policy and services at national and international levels.		
2. Underpinning research Between 2006 and 2009, Marie Reid and Maresa Duffy of QMU conducted studies into the behavioural effects of sucrose on appetite, mood, and dietary behaviour of overweight and obese women. Previous findings had been inconclusive as to whether individuals' consumption of free sugars (sucrose) directly affected diet and led to weight gain: some findings indicated that consumption directly resulted in weight gain, while other findings suggested that weight gain was not inevitable as individuals compensated for free sugars by reducing sugar intake elsewhere in the diet. Reid and Duffy's research was conducted to examine further how individuals responded to the addition of sucrose to their diet. In the 2010 study (#1), Reid and Duffy used a single-blind, between subjects design to examine the dietary behaviour of overweight women (BMI 25–30) in response to the intake of free sugars. They provided two groups of participants with soft drinks, sweetened either with sucrose or aspartame (sweetener-substitute), as a supplement to their usual diet. They measured the dietary intake (via 7 day food diaries), BMI, mood, hunger, and activity levels (via activity diary and pedometer) of the two groups over a four-week period (following baseline). They found that the participants who consumed sucrose-sweetened drinks reduced their daily energy intake (including supplementary drinks) only marginally, by a mean of 0.14 MJ/d as compared to baseline intake. However, participants receiving aspartame-sweetened drinks reduced their daily energy intake to a greater extent, by a mean of 0.67 MJ/d over the five-week period. Thus, over-weight women consuming sucrose-sweetened drinks reduced their voluntary intake elsewhere in the diet, but such reduction only partially compensated for the increased daily intake of free sugars. By contrast, participants consuming aspartame-sweetened drinks showed a markedly greater reduction in daily energy intake.		

In the 2014 study (#2) Reid, Duffy and colleagues used a similar design to examine the dietary behaviours of obese women (BMI 30-35) in response to intake of free sugars, with similar results. In that study, obese women who consumed sucrose-sweetened drinks increased their daily energy intake over a four-week period (following baseline) by a mean of 0.21 MJ/d. This reflected partial compensation for sucrose added (blind) to the diet at the expense of a reduction in reported voluntary intake of carbohydrate and fat. However, participants who consumed aspartame-sweetened drinks reduced their energy intake by a mean of 0.92 MJ/d, indicating greater compensation elsewhere in the diet for the additional consumption of sweetened drinks. Over the course of the study, energy intake in the diet increased for participants consuming sucrose-sweetened drinks but decreased for participants consuming aspartame-sweetened drinks.

Findings from these two studies identified a direct link between individuals' consumption of free sugar in the diet and increase or decrease in daily energy intake. In view of the established link between excessive energy intake and overweight / obesity, the findings point to the attendant risks of excessive dietary intake of free sugars (sucrose).

Throughout the period of conducting this research, Marie Reid was Professor of Health Psychology and Maresa Duffy was Research Fellow at QMU.

3. References to the research

(1) Reid, M., Hammersley, R. & Duffy, M. (2010). Effects of sucrose drinks on macronutrient intake, body weight, and mood state in overweight women over 4 weeks. *Appetite*, 55,130-136. DOI: 10.1016/j.appet.2010.05.001

(2) Reid, M., Hammersley, R., Duffy, M. & Ballantyne, C. (2014). Effects on obese women of the sugar sucrose added to the diet over 28 d: a quasi-randomised, single-blind, controlled trial. *British Journal of Nutrition*, 111, 563-570. DOI: 10.1017/S0007114513002687

4. Details of the impact

Reid and Duffy's research has impacted on public policy and services in the UK and internationally.

Impact on public policy and services in the UK

Findings from the (2010, 2014) studies by Reid, Duffy, and colleagues formed part of the evidence base for a systematic review of high-quality studies that investigated the relationship between consumption of dietary carbohydrates and health. This review was commissioned by The Food Standards Agency and the Department of Health (England) which asked the Scientific Advisory Committee on Nutrition (SACN) to examine the relationship between dietary carbohydrates and health and to produce public health recommendations. From analysis of the evidence, SACN (2015, p.81) concluded that 'the direction of effect demonstrates that greater consumption of sugars is detrimental to health', and that 'the effect is biologically relevant at a population level in free living individuals not subject to energy restriction'. These conclusions led to two SACN dietary recommendations related to sugar (2015, p.184), as follows:

1. The population average intake of free sugars should not exceed 5% of total dietary energy for age groups from 2 years upwards.
2. The consumption of sugars-sweetened beverages should be minimised, in both children and adults.

These SACN recommendations (#1) have

- i. been taken up in the dietary advice provided by all UK health departments;
- ii. been incorporated into the healthy eating advice given to consumers;
- iii. led Public Health England to undertake an appraisal of potential policy responses to implement the recommendations (#2);

- iv. informed debate in the House of Commons Health Committee on measures required to implement them (#3);
- v. resulted in the UK Government producing 'A Plan for Action' designed to take forward the recommendations in practice across the public sector, schools, early years settings, families, and elsewhere to reduce significantly England's rate of childhood obesity over a ten year period (#4; #5);
- vi. led to Public Health England launching on 2 January 2018 its 'Change4Life campaign' that encourages parents to look for '100 calorie snacks, two a day max' to limit their children's daily intake of free sugars (#6).
- vii. led to the Scottish Government producing 'Revised Dietary Goals for Scotland' (#7) and the Welsh Government producing a best practice guideline 'Food & Nutrition for Childcare Settings' (#8), both of which reflect the SACN recommendations.

Reid and Duffy's (2010, 2014) studies comprised two of the 11 high-quality studies that were included in the review for the SACN (2015) report. The respective increases and decreases in daily energy intake that Reid and colleagues identified were included in the final review and informed the dietary recommendations that ensued. Reid and Duffy's research has thereby impacted on (a) the health and wellbeing of people, as evidenced by changes to public health guidelines, and (b) public policy and services, as evidenced by use in policy debates and citation in policy documents.

Impact on international public policy and services

Findings from Reid, Duffy, and colleagues' (2010) study were included in a systematic review commissioned by the World Health Organization (WHO) Department of Nutrition for Health and Development and conducted by Te Morenga and colleagues (2013) (#9). The review was commissioned to 'assess the effects of increasing or decreasing intake of free sugars on excess weight gain' and thereby to inform development of a WHO guideline. The subsequent 2015 guideline (#10), 'Sugars intake for adults and children', makes three recommendations, namely

1. WHO recommends a reduced intake of free sugars throughout the lifecourse.
2. In both adults and children, WHO recommends reducing the intake of free sugars to less than 10% of total energy intake.
3. WHO suggests a further reduction of the intake of free sugars to below 5% of total energy intake.

The WHO envisage that the guideline will inform the development of policy and practice relating to dietary intake across the globe. As they state (p.6), 'the guideline will help Member States and their partners in making informed decisions about nutrition policies, programmes and interventions'.

Reid and Duffy's (2010) study was one of 30 high-quality international studies included in the Te Morenga (2013) review (#9). Both that review and Reid, Duffy and colleagues' 2010 study are cited in the 2015 guideline (#10). Reid and Duffy's research has thereby impacted internationally on the development of public health guidelines, and public policy and services, as evidenced by use in policy debates and citation in policy documents.

5. Sources to corroborate the impact

1. Scientific Advisory Committee on Nutrition (2015). *Carbohydrates and Health*. London: The Stationery Office. Available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/445503/SACN_Carbohydrates_and_Health.pdf
2. Public Health England (2015). *Sugar Reduction: The evidence for action*. Available from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/470179/Sugar_reduction_The_evidence_for_action.pdf

3. House of Commons Health Committee (2015). *Childhood Obesity – brave and bold action: First Report of Session 2015-16*. London: The Stationery Office. Available from <https://publications.parliament.uk/pa/cm201516/cmselect/cmhealth/465/465.pdf>
4. Department of Health (2016). *Government Response to the House of Commons Health Select Committee report on Childhood obesity – brave and bold action, First Report of Session 2015-16*. London: The Stationery Office. Available from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/552056/HSC_response_9_9_16.pdf
5. HM Government (2016). *Childhood Obesity: A Plan for Action*. London: HM Government. Available from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/546588/Childhood_obesity_2016_2_acc.pdf
6. Public Health England (2018). *PHE launches Change4Life campaign around children's snacking*. Available from <https://www.gov.uk/government/news/phe-launches-change4life-campaign-around-childrens-snacking>
7. Scottish Government (2016). *Revised Dietary Goals for Scotland*. Available from <https://www.gov.scot/binaries/content/documents/govscot/publications/factsheet/2016/03/scottish-dietary-goals-march-2016/documents/scottish-dietary-goals-march-2016/govscot%3Adocument/Scottish%2BDietary%2BGoals%252C%2BMarch%2B2016.pdf?forceDownload=true>
8. Welsh Government (2018). *Food & Nutrition for Childcare Settings: Section 4 - Food and nutrition: standards, guidelines and menu planning*. Available from <https://gov.wales/sites/default/files/publications/2019-03/190312-nutrition-guidance-section-4.pdf>
9. Te Morenga, L., Mallard, S., & Mann, J. (2013). [Dietary sugars and body weight: systematic review and meta-analyses of randomised controlled trials and cohort studies](#). *BMJ* 346, e7492. DOI: 10.1136/bmj.e7492
10. World Health Organization (2015). *Guideline: Sugars intake for adults and children*. Geneva: World Health Organization. Available from https://www.who.int/nutrition/publications/guidelines/sugars_intake/en/