

Impact case study (REF3b)

Institution: 10007857 – Bangor University
Unit of Assessment: UoA 04
Title of case study: Encouraging Healthy Eating in Children with the Food Dudes Programme
1. Summary of the impact (indicative maximum 100 words)
<p>The Food Dudes scheme devised by the Bangor Food and Activity Research Unit has produced large and lasting increases in children’s consumption of fruit and vegetables. More than 500,000 4- to 11-year-old children have participated, in European countries and the US, with funding of more than £20m for research, evaluation, and rollout. Given the major public health challenge of increasing children’s consumption of fruit and vegetables (often their least-liked foods), in order to reduce potential risk of future obesity or illnesses including diabetes, cardiovascular disease and some cancers, our unique combination of behaviour change principles -- including Role Modelling, Rewards, and Repeated Tasting -- has achieved significant success.</p>
2. Underpinning research (indicative maximum 500 words)
<p>School-based, health nutrition interventions that inform children <i>why</i> they should eat more fruit and vegetables have often failed to produce any lasting increases in consumption of these foods. To investigate whether a behaviour-change approach might be more successful, Professors Lowe and Horne (at Bangor since the 1980s) launched a strand of translational research, funded initially by the ESRC (Nation’s Diet Initiative) and Unilever, in the first half of the 1990s. Whereas the research literature on food preferences suggested that repeated tasting could increase children’s liking of some novel foods, there was no reliable means of establishing the crucial taste exposures to fruit and vegetables.</p> <p>Lowe and Horne first conducted a systematic investigation of the separate and combined effects of Rewards and Role Modelling on consumption of fruit and vegetables in 5-7-year-old “fussy eaters” at home. Role modelling was provided by a video, created by the Bangor team, showing four fictional child characters, the Food Dudes, happily eating fruit and vegetables, “the source of special energy they needed to defeat the forces of evil”. The combination of Rewards and Role Modelling produced large and lasting increases in children’s consumption of targeted fruit and vegetables, effects that generalised to other foods in those categories. Rewards alone had some effect, but mainly for fruit consumption; Role Modelling on its own had no effect. This research identified a unique and powerful synergy -- the combination of Rewards and Role Modelling had effects that far exceeded those of either variable on its own [3.1]. This is because Rewards “from the Food Dudes” signify to the children that they have achieved approval from, and membership of, a successful and inspirational group of peers. The symbolic context of the Rewards determines both their potency and durability as incentives for behaviour change. The Food Dudes intervention enables children to repeatedly taste novel foods, discover their <i>intrinsically rewarding properties</i>, and develop a lasting liking for them, thereby maintaining the change in eating behaviour over time.</p> <p>In the late 1990s, this new behavioural intervention was taken to scale over a series of studies, first with classes of 5-7 year olds in local primary schools. From 2000, with funding from Industry, a whole-school intervention was developed and trialled successfully in UK primary schools [3.2, 3.3]. This “Full Force” Programme was then modified for countries such as Ireland, where schools do not provide food at lunchtime, and to influence parents to provide fruit and vegetables in their children’s lunchboxes. In autumn 2007, following a successful controlled trial [3.4], and a World Health Organisation Award (2006), the Irish Government decided to roll out the Programme to all primary schools in Ireland. UK regional rollouts followed in 2009, and trials are on-going in Italy [5.4] and the US [5.5].</p> <p>A range of new principles from cognitive psychology and behavioural economics have been incorporated into the research, and new programmes have been trialled that: (i) maintain the school healthy eating culture year-on-year, with an increased focus on catering (“Food Dudes Forever”); (ii) increase children’s fruit and vegetable consumption in Special Schools [5.6] and</p>

Nursery Schools [3.5]; and (iii) raise levels of physical activity [3.6].

3. References to the research (indicative maximum of six references)

Note: For each publication listed below, authors other than Lowe and Horne were either postgraduate students or research assistants in the Bangor Food and Activity Unit at the School of Psychology, Bangor University, at the time the research was conducted. * indicates outputs that were returned in RAE 2008. Citation counts (October 2013) are from ISI Web of Knowledge unless otherwise indicated.

3.1. Horne, P. J., Lowe, C.F., Bowdery, M., & Egerton, C. (1998). The way to healthy eating in children. *British Food Journal*, 100, 133-140. (34 citations in Google Scholar). DOI:10.1108/00070709810207496

3.2*. Horne, P. J., Tapper, K., Lowe, C. F., Hardman, C. A., Jackson, M. C., & Woolner, J. (2004). Increasing children’s fruit and vegetable consumption: a peer-modelling and rewards-based intervention. *European Journal of Clinical Nutrition*, 58, 1649–1660. (56 citations). DOI:10.1038/sj.ejcn.1602024

3.3*. Lowe, C. F., Horne, P. J., Tapper, K., Bowdery, M., & Egerton, C. (2004). Effects of a peer modelling and rewards-based intervention to increase fruit and vegetable consumption in children. *European Journal of Clinical Nutrition*, 58, 510-522. (62 citations). DOI:10.1038/sj.ejcn.1601838

3.4. Horne, P.J., Hardman, C.A., Lowe, C.F., Tapper, K., Le Noury, J., Madden, P., Patel, P., & Doody, M. (2008). Increasing parental provision and children’s consumption of lunchbox fruit and vegetables in Ireland: the Food Dudes intervention. *European Journal of Clinical Nutrition*, 63, 613-618. (19 citations). DOI: 10.1038/ejcn.2008.34 (submitted to REF2014 ID 0425).

3.5. Horne, P.J., Greenhalgh, J., Erjavec, M., Lowe, C.F., Viktor, S.; & Whitaker, C.J. (2011). Increasing pre-school children’s consumption of fruit and vegetables. A modelling and rewards intervention. *Appetite*, 56, 375-385. (8 citations). DOI: 10.1016/j.appet.2010.11.146

3.6. Horne, P.J., Hardman, C.A., Lowe, C.F., & Rowlands, A.V. (2007). Increasing children’s physical activity: a peer modelling, rewards, and pedometer-based intervention. *European Journal of Clinical Nutrition*, 63, 191-198. (12 citations). DOI: 10.1038/sj.ejcn.1602915

Overall funding specifically for research on the Food Dudes scheme 1995-2013: Total ~£4.5m from multiple sources e.g. UK Government, NHS, local authorities, and private and third-sector industry.

4. Details of the impact (indicative maximum 750 words)

Impacts on eating habits of children and parents

Internationally, over half a million children from diverse social, economic, and ethnic, backgrounds have taken part in Food Dudes since 2008, with full evaluation in 25%. As in our proof-of-principle research [3.2, 3.3, 3.4], the rollout Programme produced large and significant increases in fruit and vegetable consumption [5.1, 5.2, 5.6, 5.7]. Effects were even bigger in children who ate the least before the intervention, showing that inequalities in children’s diets were addressed [5.7].

Twelve months after the Programme in the Ireland study [3.4], parents were still *providing* 93% more fruit and vegetables and children’s *consumption* had increased by 90%, relative to baseline, adding two child-sized portions of fruit and vegetables to their daily diets. Following this successful study, from October 2007 the Irish Government began a *7-year Food Dudes rollout* to their primary schools: 419,000 children have participated so far, and *independent evaluations* report reliable increases in consumption following the Programme [5.1].

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Impacts extend to the home. Parents report that their children asked them to *buy* more fruit and vegetables following the Programme; parents also increased their own daily intake of fruit and vegetables [3.2, 3.3, 3.4, 5.6, 5.7]. A 20% decrease in children's consumption of calorie-dense snacks was also reported in UK regional rollouts [5.6, 5.7], and Italy trials [5.5]. Parents and teachers also reported this impact on their own diets [5.6, 5.7].

Children with learning difficulties are particularly susceptible to poor dietary habits and obesity. In our 2012 Special Schools trial (N=248), fruit and vegetable consumption increased and unhealthy snack consumption decreased [5.6].

Rollouts of the Food Dudes programme

The Ireland national-rollout team serve as international ambassador and mentor for the Programme. In 2009/2010, Wolverhampton Primary Care Trust and Italian researchers visited Irish schools to observe the Programme's impact on children's fruit and vegetable consumption and to learn the logistics of *large-scale implementation* -- knowledge that was shared with other UK commissioners [5.6, 5.7].

Recognising the potential impacts of increased fruit and vegetable consumption at the population level, the UK fruit and vegetable industry, including 7 major UK supermarkets, multinational companies [5.3], and government agencies, have provided funding and on-going (2008-present) support for the Programme.

The Food Dudes in England Collaborative Group was formed in 2008. With representatives from the Bangor Food and Activity Research Unit, the School Food Trust, and the Horticultural Development Council, its objective is to promote rollout of the Programme in England. Our researchers have presented the Programme's extensive evidence-base to Industry and Government departments in many other European countries, and in the US.

Companies in Ireland have accrued substantial economic benefits over the roll-out duration. Increases in turnover are: Real Events Solutions [Programme delivery] = €6,366,648; Giraffe [Programme materials] = €5,307,215; Pallas Foods [Fruit and Vegetable supply] = €7,181,614; Video Company [Food Dudes DVDs] = €166,223; jobs created = 13 full-time and 40 part-time posts, maintained annually to deliver the rollout.

The Irish Government has spent €19.3 million on their Food Dudes Programme, demonstrating a strong impact on national public policy and services [5.1]. Extensive take-up by UK NHS Trusts and Local Authorities (investments of £1.9m, £1m respectively) demonstrates a policy shift towards behaviour change interventions, away from health education approaches.

The UK Conservative Party Policy Green Paper, "A Healthier Nation", highlights Food Dudes as "a good example of how many of the characteristics of successful behaviour change programmes can be incorporated in a single highly specific initiative" [5.9]. DEFRA's First Report from the Council of Food Policy Advisors (2009; p13) recommends that "If evaluation shows long term benefits, extend the 'Food Dudes' healthy eating programme for children".

Lowe and Horne were advisors in 2007 to the EU's €90 million European School Fruit Scheme; Lowe subsequently became the current Deputy Chair of the Scheme's *Scientific Expert Panel*. The Scheme now promotes take-up by Member States of recommended evidence-based interventions, including the Food Dudes. This provides an excellent opportunity to extend the Programme throughout Europe. Since 2008 the EU (DG AGRI and DG SANCO) features Food Dudes within their healthy eating policy.

In 2012, responding to a rapid escalation in demand for the Programme, Lowe and Horne – in partnership with Bangor University – established Food Dudes Health Limited, a spinout company with a new corporate website. In doing so, 20 new jobs were created. This Social Enterprise has developed new Food Dudes programmes and, by attracting further research funding from a variety of sources, scaled-up their delivery to improve children's health and wellbeing globally.

Media and Awards

Food Dudes has attracted increasing media attention: ITV's Tonight programme "Obesity the Time Bomb" (23/2/2012) received 30,000 more views than their average (17% of the viewing population watched). And a Guardian article (9/8/2010) argues for Food Dudes in every UK school.

The Programme's health impacts have been recognized by 8 prestigious awards, among them: Social Marketing Showcase Award (2009), UK Chief Medical Officer's Gold Medal Award (2010), Society for the Advancement of Behavior Analysis (ABAI) Award for Translational Research (2012; 5.10), and Local Authorities Research Intelligence Association (2013).

5. Sources to corroborate the impact (indicative maximum of 10 references)

5.1 Testimonial 1: Head of Division, Department of Agriculture, Food and Marine, Ireland, responsible for Food Dudes national rollout to Irish primary schools (target = 500,000 children).

5.2 Testimonial 2: Health Improvement Specialist; Wolverhampton City Council, responsible for delivering Food Dudes programme to all primary schools in Wolverhampton (20,000 children).

5.3 Testimonial 3: Research & Development Director, Unilever, specialist in behaviour change.

5.4. Wengreen, H. J., Madden, G. J., Aguilar, S.S., Smits, R. S., & Jones, B. A. (2013). Incentivizing children's fruit and vegetable consumption: Results of a United States pilot study of the Food Dudes Program. *Journal of Nutrition Education and Behavior*, 45, 54-59. DOI:10.1016/j.jneb.2012.06.001

5.5. Presti, G., Cau, S., & Moderato, P. (2013). Changing the way our children eat: a behaviour analytic approach. *Progress of Medical Sciences [Postępy Nauk Medycznych]*, 26, 28-34. A copy is available on request

5.6. Walsall Commissioner's Evaluation Report, including Midlands Special Schools Trial, (2012). A copy is available on request

5.7. Wolverhampton PCT Commissioner Report on Impacts of the Food Dudes programme, (2009). A copy is available on request

5.8. Industry support: Article in Horticulture Week (20th August, 2010) "Government urged to extend Food Dudes scheme across England primary schools". Available as a pdf copy or at: <http://www.hortweek.com/news/1022687/Government-urged-extend-Food-Dudes-scheme-across-English-primary-schools/?DCMP=ILC-SEARCH>

5.9. UK Conservative Party Policy Green Paper No 12, "A Healthier Nation": Food Dudes highlighted (Case Study 4.7) as "good example of how many of the characteristics of successful behaviour change programmes can be incorporated in a single highly specific initiative". Available: http://www.conservatives.com/News/News_stories/2010/01/~/_media/Files/Green%20Papers/A%20Healthier%20Nation.ashx

5.10. Society for the Advancement of Behavior Analysis Scientific Translation Award to recognize 22 years of behaviour change research by Horne and Lowe in the domain of applied children's food preferences, and its successful national and international translation. Presented before audience of 4,000 delegates at the Annual International Association for Behavior Analysis conference in Seattle, May 2012. A copy is available on request.