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Sharp, Catherine

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Feature article:

Childhood obesity: 'Super Dynamic Food Dudes' to the rescue

Catherine Sharp

Globally, there are more than 42 million pre-school children who are overweight or obese (WHO, 2013). This highlights the urgent need to design effective behaviour change interventions that establish a healthy lifestyle where children enjoy eating fruit and vegetables, and being active, during early development. This paper will describe my PhD research of an intervention set to do just that!

Introduction

IT'S NEARLY TWO DECADES since the World Health Organisation first identified childhood obesity as a 'global epidemic', and unfortunately the situation has still not improved. By 2013, it was estimated that over 42 million pre-school children globally were either overweight or obese (WHO, 2013). This has serious ramifications as obesity can result in multiple preventable non-communicable diseases such as: cardiovascular disease, diabetes, and some cancers (Finer, 2015). With the UK economy already struggling to balance its books, they certainly do not need to be spending an additional £47 billion annually on a problem that is preventable (Dobbs et al., 2014). Something must be done to change the current trends of childhood obesity, as the cost is only likely to increase.

One of the major causes of obesity is an imbalance between calorie intake and energy expenditure (Hill et al., 2012). Two behaviours correlated with obesity are the low consumption of fruit and vegetables (He et al., 2004) and low physical activity levels (Lakka & Bouchard, 2005). Children are currently not meeting the guidelines of either behaviours (Public Health England, 2014; Tucker, 2008). There is increasing evidence that fruit and vegetable intake can displace foods high in fat and sugar from the diet (Epstein et al., 2001). Research also shows that poor diet and sedentary behaviour tend to track from childhood into adulthood (Freedman et al., 2008; Telama et al., 2014). Consequently, in order to help tackle obesity we need to help children build a lifestyle that includes eating fruit and vegetables, and regularly participating in moderate-to-vigorous physical activity.

My PhD research has built on the successful Food Dudes Primary School Healthy Eating Programme (Horne et al., 2004; Lowe et al., 2004), to develop a programme tailored to pre-school children, targeting their consumption of fruit and vegetables, and their physical activity levels in the school and home. This paper will describe the research development and how the PsyPAG Research Grant bursary that I have gratefully received will be utilised.

Food Dudes

The Food Dudes Primary School Healthy Eating Programme was originally developed by Lowe and Horne in 1990. The objective of the programme was to establish diets rich in fruit and vegetables in primary school aged children (4–11 years) by developing an evidence-based programme incorporating 50+ psychological principles drawn from a range of areas including: behaviour analysis, behaviour change, and developmental psychology. The 3 core principles that underpin the programme are (i) Role-modelling, (ii) Repeated presentation, and

(iii) Rewards. These are commonly referred to as the '3Rs'.

During the programme, children watch videos of the 'Food Dudes', who are four animated and live-action characters, who enjoy eating fruit and vegetables and getting lots of 'special energy' as a result of eating the foods (role-modelling). Each of the characters has a favourite fruit or vegetable. In the classroom, children have multiple opportunities to consume the target raw fruit and vegetables and acquire a taste for the foods (repeated presentation); and finally, the children receive small prizes for the behaviour of consumption (rewards). The aim is to change the children's mind-set that these foods are 'uncool', and that they actually want to eat such foods.

Experimental evaluations of the programme found the synergy of 3R's to be an effective method of increasing the children's fruit and vegetable consumption with increases between 60–200 per cent of target fruit and vegetables, particularly in the poorest eaters (Lowe et al., 2004). The programme also transfers into the home environment. Horne et al. (2009) found 12 months following the programme, parents provided significantly more fruit and vegetables for their children as compared to the control condition, and the children consumed significantly more compared to baseline and the control condition (all $p<.001$). To date, more than 700,000 children across the UK, Ireland, Italy and USA have benefited from the programme.

However, given the severity of the current obesity crisis, it became evident that the Food Dudes programme needed to broaden their target population to target younger children; specifically, pre-school aged children (3–4 year olds). Also, the principles that underpin the programme could also be used to target other behaviours, particularly physical activity.

In 2012, we tailored the primary school version of the programme, leading to the development and evaluation of a nursery-based programme. As the programme is targeting a younger age group, the Food Dudes characters themselves were modified to ensure that they would appeal to the new target audience and be appropriate for their developmental stage, as were the materials and procedures. As in the primary school version, the characters have maintained their favourite fruit or vegetables: Rocco loves broccoli; Razz loves raspberries; Tom loves tomatoes; and Charlie loves carrots. The children watch an animated role-modelling video of the Food Dudes and sing along to a song that encourages them to be fruit and vegetable eaters. Each time the children eat the target fruit or vegetables, of which they are repeatedly presented, they receive an inexpensive prize, e.g. stickers and tokens.

In order to test the effectiveness of our new initiative a controlled evaluation study was designed that took place in six nursery classes attached to primary schools across the West Midlands (N=289). The children's consumption of four target fruit and four target vegetables was evaluated using visual estimation. The results demonstrated large and lasting increases in the pre-school children's consumption at three-months follow-up (Sharp et al., 2015). The Food Dudes nurseries consumed significantly more of both the target fruit and vegetables as compared to the control condition, which received fruit and vegetable provision only.

This research was recognised by a Local Area Research and Intelligence Association award and following the success of the trial, local authorities across the UK commissioned the programme to be implemented in over 200 nurseries. The ability to establish and sustain behaviours using the key principles outlined is clear. As increasing healthy eating is only one way to reduce childhood obesity, we have now applied the principles to develop a new programme targeting pre-school children's low physical activity levels. The same characters were used as role models but referred to as the 'Dynamic Dudes'.

Dynamic Dudes

The UK Department of Health (2011) recommend a daily minimum activity target of 180 minutes for pre-school children. Despite the common notion that pre-school children are always active, they are not achieving recommended levels (Tucker, 2008). With the help of the Dynamic Dudes we are trying to change this.

Each of the four role-modelling characters not only have a favourite fruit or vegetable, but now they also have a favourite activity; Rocco likes football, Razz loves to dance, Tom likes gymnastics, and Charlie likes martial arts. Utilising these signature sports, we have created four exercise videos and four interactive stories. In keeping with the themes of the videos and stories, complementary music was composed for each by students from Bangor University Music Department. The exercise videos and interactive stories are between 10 to 12 minutes in length, and the children are invited to join in the actions modelled on screen. This provides the children with a brief bout of moderate-to-vigorous activity.

A proof-of-principle role-modelling intervention was conducted in North Wales to test the effectiveness of the Dynamic Food Dudes programme. The children completed the new videos in their nursery class following a daily schedule stipulated on their Dynamic Dudes calendar. In this study, no tangible prizes were given to the children for their participation. The children's physical activity levels were evaluated through their step count. In order to accurately measure the children's activity each child wore a Fitbit Zip activity monitor. The Fitbit Zips were worn in a pocket of a 'Rainbowtop©', a custom-made cotton rainbow-striped, tabard. Preliminary results found the intervention was successful in increasing pre-school children's physical activity levels ($p<.001$). Teachers reported in a questionnaire that the videos were enjoyed by the children and that they considered them acceptable for the classroom. With growing pressures on teachers it is important that school-based programmes are easy to integrate into the classroom and based on the preliminary results, feedback, and our own observations, refinements were made to the exercise videos and interactive stories in advance of a controlled pilot trial.

Drawing on the findings of both the Food Dudes programme and the Dynamic Dudes programme, we collated the programmes into a multi-component programme targeting both healthy eating and physical activity. Here the 'Super Dynamic Food Dudes' came to the rescue.

Super Dynamic Food Dudes

Currently nearly 200 children from four nursery classes attached to primary schools in North Wales are becoming Super Dynamic Food Dudes. The multi-component programme was delivered in sections: (i) a physical activity component, (ii) a healthy eating component with a physical activity stream, and (iii) a maintenance phase. The PsyPAG Research Grant will cover part of the costs of the raw fruit and vegetables that are presented to the children during the healthy eating component.

To help transfer the effects established in the classroom into the home environment, the children have also had password-protected online access to the exercise videos and interactive stories where they can complete the videos and stories with their parents and siblings. In time, resources and instructions will also be distributed for parents to introduce the healthy eating intervention at home.

The study spans six months, and will be completed in July. Again, the children's physical activity levels are evaluated using the Fitbit Zips, and food consumption is measured using visual estimation of plate reside in the classroom. Additional measures taken in this trial are anthropometrics. This has included height, weight, waist circumference and blood pressure. These are important measures to evaluate long-term impact of the programme and so we conducted them here to see how procedurally possible the measures were in the given setting. We did

not have any problems, and will use these measures in future trials. The intervention condition will be compared to the control condition who have participated in all the objective measurements, but are continuing with their typical nursery practice. We will also be evaluating the home interventions administered in the intervention condition only using qualitative measures (e.g. focus groups and semi-structured interviews with parents).

Conclusion

As aforementioned, the research is currently underway and I look forward to disseminating the results when completed. Seeing the children who did not want to eat the foods, and/or were not active, engaging in both the target behaviours makes all the hard work worthwhile. I would like to thank the School of Psychology at Bangor University and PsyPAG for their financial contribution that allows me to undertake this important research. If you would like more information about the research please contact me or visit http://caer.bangor.ac.uk.

Correspondence

Catherine Sharp
PhD Student, School of Psychology,
Bangor University
c.sharp@bangor.ac.uk
@Cas__Sharp

References

Department of Health. (2011). Start active, stay active. A report on physical activity for health from the four home countries' chief medical officers. Retrieved [04/04/2016] from: http://www.bhfactive.org.uk/userfiles/Documents/startactivestayactive.pdf.

Dobbs, R., Sawers, C., F., Thompson et al. (2014). Overcoming obesity: An initial economic analysis. Retrieved [04/04/2016] from: http://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/how-the-world-could-better-fight-obesity

Epstein, L.H., Gordy, C.C., Raynor, H.A. et al. (2001). Increasing fruit and vegetables intake and decreasing fat and sugar intake in families at risk for childhood obesity. *Obesity Research*, *9*(3), 171–178. doi: 10.1038/oby.2001.18

Finer, N. (2015). Medical consequences of obesity. *Medicine*, *43*(2), 88–93. doi:10.1016/j.mpmed.2014.11.003

Freedman, D.S., Patel, D.A., Srinivasan, S.R. et al. (2008) The contribution of childhood obesity to adult carotid intima-media thickness. The Bogalusa heart study. *International Journal of Obesity*, *23*, 749–756. doi:10.1038/sj.ijo.0803798.

He, K., Hu, F.B., Colditz, G.A. et al. (2004). Changes in intake of fruits and vegetables in relation to risk of obesity and weight gain among middle-aged women. *International Journal of Obesity and Related Metabolic Disorders*, 12, 1569–1574. doi:10.1038/sj.ijo.0802795

Hill, J.O., Wyatt, H.R. & Peters, J.C. (2012). Energy balance and obesity. *Circulation*, 126(1), 126–132. Doi: 10.1161/CIRCULATIONAHA.111.087213

Horne, P.J., Hardman, C.A., Lowe, C.F. et al. (2009). 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. doi: 10.1038/ejcn.2008.34

Horne, P.J., Tapper, K., Lowe, C.F. et al. (2004). Increasing children's fruit and vegetable consumption: a peer-modelling and rewards-based intervention. *European Journal of Clinical Nutrition*, *58*(12), 1649–1660. doi:10.1038/sj.ejcn.1601838

Lakka, T.A. & Bouchard, C. (2005). Physical activity, obesity and cardiovascular diseases. *Handbook of Experimental Pharmacology*, 170, 137–163. doi:10.1007/3-540-27661-0_4

Lowe, C.F., Horne, P.J., Tapper, K. et al. (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. doi:10.1038/sj.ejcn.1601838

Public Health England. (2014). *National Diet and Nutrition Survey. Results from Years 1, 2, 3 and 4 (combined) of the Rolling Programme (2008/2009-2011/2012).* Retrieved from [04/04/2016]: https://www.gov.uk/government/uploads/system/ uploads/attachment_data/file/310995/NDNS_Y1_to_4_UK_report.pdf

Sharp, C., Horne, J., Erjavec, M. & Lowe, C.F. (2015). Increasing pre-school children's consumption of fruit and vegetables. A modelling and rewards intervention [Abstract]. *Appetite*, 87, 389. doi:10.1016/j.appet.2014.12.157.

Telama, R., Yang, X., Leskined, E. et al. (2014). Tracking of physical activity from early childhood through youth into adulthood. *Medicine & Science in Sports & Exercise*, *46*(5), 955–962. 10.1249/MSS.0000000000000181

Tucker, P. (2008). The physical activity levels of preschool-aged children: a systematic review. *Early Childhood Research Quarterly*, *23*(4), 547–558. Doi: 10.1016/j.ecresq.2008.08.005

World Health Organisation (WHO). (2013, March). *Childhood overweight and obesity*. Retrieved from [04/04/2016]: http://www.who.int/dietphysicalactivity/childhood/en/