The science behind Smarter Lunchrooms

The Smarter Lunchrooms intervention approach aims to tackle childhood obesity by promoting healthier nutrition through the use of choice architecture or ‘nudge’ tactics in school lunchrooms. I reviewed research papers that were described by Cornell University as forming the evidence base for the Smarter Lunchrooms approach. Here I discuss concerns about the way that research informing the Smarter Lunchrooms approach has been conducted and disseminated. The widespread implementation of the Smarter Lunchrooms approach is discussed and the likely efficacy of this public health intervention is also considered.

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The Science Behind Smarter Lunchrooms

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Background

The 'Smarter Lunchrooms' intervention approach aims to tackle childhood obesity by promoting healthier nutrition through the use of choice architecture or 'nudge' tactics in school lunchrooms. The intervention approach has been funded by the US Department of Agriculture (USDA) Food and Nutrition Service and is based on the premise that small cosmetic changes to school lunchrooms can lead to marked effects on dietary behaviour. For example, intervention components include giving fruit and vegetable dishes more appetising names and presenting healthier foods to make their choice more appealing and convenient. According to the website of Smarter Lunchrooms link over 29,000 US schools are now using the Smarter Lunchrooms intervention approach.

In early 2017 I viewed a series of popular media reports that featured some of the research team behind the Smarter Lunchrooms intervention approach (in particular, Brian Wansink and David Just of Cornell University) and was surprised by how effective this 'light touch' intervention approach was described to be. I then decided to take a closer look at the science behind the Smarter Lunchrooms approach. To do so, I read published research papers that were described by Cornell University as forming the evidence base for the Smarter Lunchrooms approach. During February and March 2017, I accessed these research papers at Cornell University's Food and Brand Lab web pages: link or from the Smarter Lunchrooms website[1]: link.

Concerns

I identified concerns about the way that the research informing the Smarter Lunchrooms approach had been conducted and disseminated. In particular, I noted multiple instances of:

(a) Errors and inconsistencies in research studies
(b) Research being described in a way ('spun') that resulted in Smarter Lunchrooms intervention approaches appearing more effective than they objectively were

Some examples of *(a)* and *(b)* are provided overleaf.

Rapid and Widespread Implementation

I was also surprised by how quickly the Smarter Lunchrooms intervention approach appears to have been disseminated and implemented in US schools. For example, according to data collected in 2014 by researchers from Cornell University (Gabrielyan et al., 2017), thousands of schools in the US were likely to be using this intervention approach in 2014. However, the first randomized control trial assessing the overall effectiveness of the Smarter Lunchrooms intervention approach only began in 2014 (Greene et al., 2017). The speed at which this intervention approach has been implemented in schools surprised me because of the limited and low quality evidence base supporting it.

Effective and Meaningful?

Since my initial examination of the evidence base informing the Smarter Lunchrooms approach a relatively high quality randomized control trial examining the effectiveness of the Smarter Lunchrooms intervention approach on children's fruit consumption has been published. Greene, Gabrielyan, Just and Wansink (2017) report a research study comparing the Smarter Lunchroom intervention vs. a waiting list control condition on child fruit

[1] As of the 8th August 2017 the content of this webpage had been updated in parts

consumption across nine weeks using a cluster randomized control trial design. This is the largest and most methodologically appropriate examination of the Smarter Lunchrooms intervention approach to date. Moreover, the intervention condition employed eight different Smarter Lunchroom strategies to alter dietary behaviour (Gabrielyan, Just and Wansink (2017):

1. Fruit was placed first on the line.
2. At least two varieties of fruit were offered.
3. Fruit was offered in at least two separate locations.
4. Cut fruits were displayed in small, attractive cups.
5. Whole fruits were displayed in a large, attractive fruit bowl at eye level.
6. Fruits were labelled with creative names.
7. Creative fruit names were displayed on monthly and daily menus.
8. "Fruit factoids" were displayed on dry-erase boards at eye level.

In this trial, among children receiving the Smarter Lunchrooms intervention there was an average increase in daily fruit consumption of 0.10 units of fruit and this was statistically significantly different to the control condition. Put in a more meaningful context, this suggests that children receiving the Smarter Lunchrooms intervention approach increased their daily fruit consumption by approximately one tenth of a small apple (USDA link). Whether this increase is meaningful and has a real world benefit is questionable.

Figure 1. A small apple

Figure 2. One tenth of that apple (approximately 13 grams)

Examples of Concerns: ***(a) Errors and inconsistencies in published research studies***

1) *Wansink et al., 2012. Attractive names sustain increased vegetable intake in schools. Preventive Medicine, Study 1*

In the abstract of this article the sample size of Study 1 is described as being N=147. Yet, in the methods section it is described as being N=113. However, the values presented in Table 1 of the results section indicate a sample size of N=115. There are also data errors concerning the main dependent variables reported in Study 1. Table 1 of the article presents '*Number taken, eaten and uneaten'* of carrots. The article states that these values were calculated by subtracting the weight of uneaten food from the starting weight of the food served (carrots). Because of this, the 'number eaten' values and 'uneaten' values should equal to the 'number taken' values in the table. However, the number eaten and uneaten values reported in the table do not equal the number taken values. Moreover, the discrepancies are too large for the rounding of decimal places to explain these discrepancies.

2) *Wansink et al., 2012. Attractive names sustain increased vegetable intake in schools. Preventive Medicine, Study 2*

In Study 2 of this article there are data errors for the main dependent variables. Table 2 reports vegetable selection during month 1 and month 2 of the study followed by the *'% change'* from month 1 to month 2 of the study. Therefore, the % change value in Table 2 is calculable from the vegetable selection values reported for month 1 and month 2 of Table 2. However, the majority of the *'% change'* data is discrepant to the month 1 and month 2 values. Moreover, the discrepancies are so large that rounding of decimal places cannot explain these discrepancies. For example, based on the values reported in the table, the *'% change'* for green beans in the control condition should be >100%, but it is reported as being 35.7% in Table 2.

3) *Wansink et al., 2013. Pre-sliced fruit in school cafeterias: children's selection and intake. American Journal of Preventive Medicine*

In the abstract of this article it is reported that schools using fruit slicers (treatment schools) observed a *71% increase* in apple sales compared to control schools. In the results section of the manuscript this 71% statistic is repeated and Table 1 is referenced. Yet, the only value that corresponds to 71% in Table 1 is the *'% of students consuming more than half an apple'*. Based on Table 1, the difference in % between the treatment schools and control schools for apple sales during the intervention is 4% (according to the table column 'treatment period') or 5% (according to table column 'all periods'); neither of which are 71%.

4) *Wansink et al., 2012. Can branding improve school lunches? Archives of Pediatric Adolescent Medicine*

In the Methods section of the article the child participants are described as 8–11 year olds from schools in New York. Yet, in the comment section of the article, the children are described as 'preliterate'. This is an odd way to describe 8–11 year olds. According to the US department of education, most children are able to write by the age of 6, so very few 8–11 years olds would be considered as 'preliterate' link. In two later articles [1,2] published by the same first author, he cites this original study and describes the child participants as being in 'day care'. Children in day care are typically under the age of 5, so could be considered 'preliterate'. However, the children who participated in the study are described in the original

article as being 8–11 year old school children, not children in day care. These inconsistencies in the way the study is reported in the original article and then described elsewhere (by the same author) make it unclear where this study was actually conducted or who the real participants were.

[1] Wansink, B. (2015). Change their choice! Changing behavior using the CAN approach and activism research. *Psychology & Marketing*, 32(5), 486-500.
[2] Wansink, B. (2013). Convenient, attractive, and normative: The CAN approach to making children slim by design. *Childhood Obesity*, 9(4), 277-278.

Examples of Concerns: ***(b) Research studies being described in a way that resulted in Smarter Lunchrooms intervention approaches appearing more effective than they objectively were***

5) *Wansink et al., 2013. Nutrition report cards: an opportunity to improve school lunch selection. PLoS One*

In the section *'Discussion and Implications for Student Health'* the authors state that 'although the results are preliminary, they suggest that Nutrition Report Cards (NRCs) may be helpful in nudging children towards healthy, less expensive options…' Yet, in the results section of the paper, all analyses reported by the authors concerning the purchasing of 'healthy' options clearly indicate that the NRCs had no effect on purchasing of healthy options. Thus, this description of the study findings is misleading.

6) *Hanks, Just & Wansink, 2012. Trigger foods: the influence of irrelevant alternatives in school lunchrooms. Agricultural and Resource Economic Review*

The authors state in their discussion of this correlational study that '*green beans and bananas decreased sales of the unhealthy items we studied'*. Yet, the results of the study are far more complicated and inconsistent than the overall conclusions made. In the results section of the article (Table 3) there are 12 results concerning whether the presence of green beans or bananas were associated with sales of three unhealthy food items studied; cookies, ice cream, and little Debbie snacks. Half of these (6/12) analyses on the individual unhealthy food items indicate no association, one analysis indicates an unexpected increase in sales of an unhealthy food item and five analyses indicate that green beans or bananas were associated with a decrease in sales of an unhealthy food item. Grouping all sales of unhealthy food items together, two sets of analyses attempt to address whether green beans and bananas affect sales. In one of the two analyses green beans are associated with total sales of unhealthy food items, but in the other analysis there is no evidence of any association. The same goes for bananas; in one of the analyses there is no evidence of bananas having any association with total sales of unhealthy food items, whereas in the other there is an association. In sum, there are more analyses reported that do not support the authors' conclusions than those that do support the authors' conclusions. Thus, when the authors conclude that *'green beans and bananas decreased sales of the unhealthy items we studied'* this conclusion is misleading because it fails to highlight the substantial inconsistency in the results.

7) *Wansink et al., 2012. Attractive names sustain increased vegetable intake in schools. Preventive Medicine*

One of the objectives of this research was to '*determine if the selective use of attractive names can be a sustainable, scalable means to increase the selection of vegetables'*. Two studies are reported. In Study 1 vegetable selection and consumption were measured for a total of one day. In Study 2 vegetable selection (but not consumption) was measured for 20 consecutive days. Thus, the length of measurement in Study 1 means that it cannot provide evidence on sustainability and Study 2 at best would only be able to provide evidence on short-term sustainability. This point aside, no analysis strategy used in Study 2 tests for sustainability or persistence over time. For example, the analyses reported do not tell us what effect the 'attractive names' intervention was having on vegetable selection by day 20. Because of this it is misleading to make any claims regarding the sustainability or persistence of this intervention. However, the authors conclude in the abstract that the intervention approach *'persistently' increased healthy food consumption'* and the article title is *'attractive names sustain increased vegetable intake in schools'*. The notion that the reported studies provide evidence for sustained consumption is also misleading because consumption was only measured in Study 1 and there it was measured for a total of one day.

8) *Hanks, Just, Smit & Wansink, 2012. Healthy convenience: Nudging students toward healthier choices in the lunchroom. Journal of Public Health*

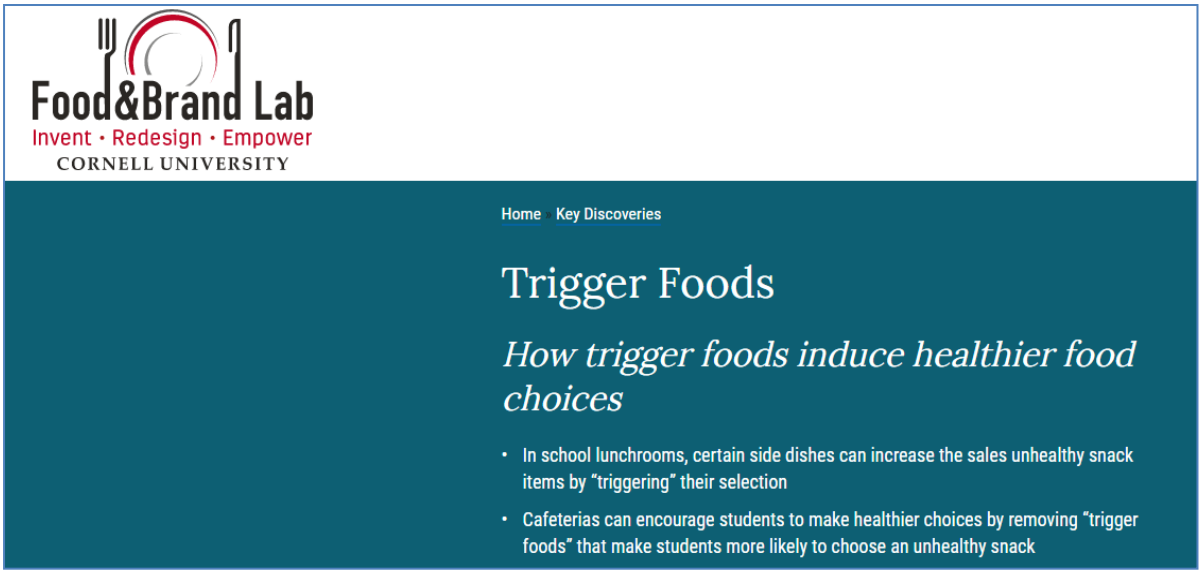
In a pre-post design with no control condition the authors examined the effect of a Smarter Lunchroom intervention that was designed to make healthier food choices more convenient. The authors hypothesised that the introduced intervention would be associated with children choosing and consuming more healthy foods and also choosing and consuming fewer unhealthy foods. This is not what was found. In partial support of their hypotheses, the authors found that the number of healthy foods *chosen* increased, but the amount of healthy food that was actually *consumed* did not change. In addition, going against the authors' hypotheses, the amount of flavoured milk (considered less healthy than white milk) chosen and consumed increased, whereas the amount of white milk (which is considered 'healthier' than flavoured milk) chosen and consumed did not change. Thus, this intervention, which was designed to promote healthier food consumption by convenience, was not associated with children consuming healthier foods and had both positive and negative associations with the consumption of less healthy food and milk options. In addition, the lack of control condition in the study design does not allow for causal inference. Yet, the authors conclude that the described intervention *'is a very effective method for combatting the current obesity crisis.'*

9) *Hanks, Just &, Wansink, 2012. Smarter Lunchrooms can address new school lunchroom guidelines and childhood obesity. Journal of Pediatrics*

The title of this article suggests the research described ***'can address childhood obesity'***. However, this article describes a short-term observational study that examined consumption of a limited number of food items in school canteens, not 'childhood obesity'. Moreover, the results that the authors report indicate that the introduction of the intervention was associated with a small increase in fruit and vegetable consumption, but this did not occur at the expense of any other food items. Thus, these findings indicate that the intervention is associated with a small *increase* in calories consumed by children during lunch. To address childhood obesity through nutrition, it is well recognised that calorie consumption needs to be reduced.

10) *Hanks, Just & Wansink, 2012. Trigger foods: the influence of irrelevant alternatives in school lunchrooms. Agricultural and Resource Economic Review*

In this study the authors examine correlational data on food choices in school canteens. There is no way to infer causality from this type of research because of the study design adopted. However, the title of the article uses causal language and in the abstract the authors state that *'seemingly irrelevant alternatives **influence** choice in a school lunch setting'.* Moreover, this inaccurate description is included in a dissemination webpage for the study (also reproduced below) link.



Notes

Some (and other) errors and inconsistencies in studies relating to the Smarter Lunch approach outlined here, as well as other output from the Cornell Food and Brand Lab, have been noted by others. In particular, see link

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