Accessing fruit and vegetable consumption behaviours in children - Visual evaluation techniques

Emma Dresler-Hawke, Massey University, E.K.Dresler-Hawke@massey.ac.nz
Leigh Parker, UCOL, l.parker@ucol.ac.nz

Abstract

Visual evaluation techniques have a strong history in a variety of disciplines, predominantly Sociology, Anthropology, and Educational sciences. However, they have received little attention from academic marketing research. This study utilises four visual evaluation techniques to examine fruit and vegetable consumption behaviours of primary school children: examination of food contents of packed lunches using lunchbox photographs, content analysis of unconsumed foods disposed in rubbish bins, hypothetical exercise in constructing a 'dream' lunchbox using food charts, and photo journals using disposal cameras. Each technique was designed, implemented, and analysed in a highly visual manner. This paper illustrates the advantages of visual evaluation techniques in gathering an accurate record of the children's fruit and vegetable preferences and intake.

Keywords: Fruit and vegetables, lunch-box analyses, photo journals, visual research methods.

Introduction

Visual evaluation techniques, as examples of image based research methods, are concerned with the production, organisation and interpretation of imagery (Prosser, 2007). They involve the observation and recording of patterns relating to people, objects and events, so as to reveal information on the "phenomena of interest" (Moore *et al*., 2008). This research approach has a strong history in various disciplines, such as Anthropology (Banks, 1998), Sociology (Prosser, 1998; Prosser and Loxley, 2008; Wagner, 2002; Wright *et al.*, 2010), and Education (Einarsdottir, 2005; Schratz and Steiner-Löffler, 1998; Singh and Matthews, 2008), which acknowledge that images are one of the fundamental ways people make sense of the everyday cultural world (Crang, 1997). Initially, visual techniques were predominantly used for recording researchers' observations or for supporting research findings (Harper, 1998). A number of Sociologists embraced visual techniques and moved away from traditional observational studies, and, since then, photography has brought benefits to both the research process and data collection (Moore *et al.*, 2008).

Furthermore, visual evaluation techniques have been increasingly recommended in the recruitment of children of all ages into the research process without discrimination as to their abilities, confidence levels and education attainments (Einarsdottir, 2005; Singh and Matthews, 2008). Young and Barrett (2001) have successfully applied a number of visual methods, including photo diaries, drawings and maps, to examine socio-spatial experience with children. Schratz and Steiner-Löffler (1998) have experimented with photographs among primary school children, providing valued insights of school self-evaluation. Visual evaluation techniques have also been used among preschool children to explore their vision and experience in early childhood institutions (Clark, 2004; Dockett and Perry, 2003). Wright et al. (2010) revealed that visual methods can empower young participants, and will enable researchers to reach an inaccessible group, in their case, excluded black youth in Africa. However, such visual evaluation techniques have received little attention in academic marketing research, and even less in children's food consumption research. Although questionnaire surveys (Buijzen, Schuurman and Bomhof, 2008; Cooke and Wardle, 2005; Cullen et al., 2001), interviews (Baxter, Thompson and Davis, 2000; Swaminathan et al., 2009), and focus group studies (Dixey et al., 2001; Fitzgerald et al., 2010) are more common in exploring children's fruit and vegetable consumption, a series of visual techniques will be used in this research.

The objectives of this exploratory study were first, to determine the food contents of packed lunches. Secondly, to identify actual 'consumed' versus 'unconsumed' fruit and vegetables, from studying the contents of provided food wastage bins. The third objective was to explore children's awareness of healthy food choices and investigate which food children would choose themselves if constructing a lunch-box - and given a free choice as to its content, especially with fruit and vegetables that were voluntarily selected given a hypothetical choice of children's 'dream' versus 'healthy' lunch-boxes. Finally, the study sought to access the proportion of children that are meeting the 5+-A-Day initiative. Overall, the project was designed to represent a snapshot of the children's overall fruit and vegetable consumption behaviour.

Methods

Sample
The research was conducted in eight urban primary schools (with children ages ranging from 5-11 years), within the Manawatu region of New Zealand. The schools were randomly selected from a Ministry of Education decile-rating (socio-economic status) list to represent a broad socio-economic spectrum. In the first instance, the school principals were telephoned to obtain consent. Three schools were from the lower deciles (deciles 1, 2 and 3), three schools were from medium decile schools (deciles 4, 5 and 6) and two schools from high-decile schools (deciles 9 and 10), so as to represent a broad socio-economic spectrum. The number of pupils participating in the research varied according to the size of each school and the corresponding size of classes. At least one class from each year (years 1-6) was taken from each school. The numbers of children in each class ranged from 4 to 27.

The parents were provided with information via two routes. First, details were posted in the school newsletter and, second, each child was provided with an information sheet to take home explaining the nature and intent of each phase of the study. Parents were offered the opportunity to contact the school administrator if they did not wish to participate. Only 15 parents declined over the four phases. Part of the information stated that the research was not intended to scrutinize individual children or individual schools, but was instead designed to collect generic anonymous data. Demographic data was also not sought i.e. child's gender and ethnicity.

Data Collection
Four visual techniques were selected for assessing fruit and vegetable consumption in school children. Each technique was implemented, conducted and analysed utilising traditional quantitative observational research strategies. The combination of different visual techniques of data collection from this research generated a more accurate record of the children's fruit and vegetable intake. The details of each project were as follows:

Phase 1: Lunchbox study
By far the most common New Zealand practice for school nutrition is the enforcement of a packed lunch policy. Individual lunch-boxes were photographed at the beginning of the school day (approximately 9.15 a.m.) to obtain the total food contents of the lunch-boxes before the first food break. The lunch-boxes were photographed because the intention was not to individually interview the children for ethical reasons. The number of lunch-boxes for each school studied ranged from 120 to 179. Overall 927 lunch-boxes were surveyed.

The information on the analysis of food groups was collated manually by a single qualified dietician. The food items were judged according to the foods groups represented by the Balance of Good Health (Jefferson & Cowbrough, 2004). These standards suggest that lunch-boxes should contain at least one portion of each of the following categories: fruit and vegetables; dairy item; meat or fish; and starchy food such as bread, pasta or rice. For the purpose of the study a serving of fruit or vegetables was defined as that equivalent to a medium piece of fruit.

Results
Fruit or vegetables were present in 70% of lunch-boxes. However, only 32.4% met

the prescribed standard of two servings of fruit/vegetables, whereas 29% of lunchboxes did not contain any fruit. The 6 schools were organised into 3 categories of low, moderate and high deciles. There was no significant difference in the inclusion of fruit and vegetables in the lunchboxes from different decile areas $F(2, 927) = 2.41$, $p>.05$.

Phase 2: Content analyses of unconsumed foods

After the school lunch period, all the rubbish bins from each school were collected. The content analyses of unconsumed foods were recorded on a standard form developed for this survey. Each food item was listed and categorised according to the discarded portion sizes of 1, ¾, ½, ¼, and <¼. The proportions of food type were added to a single whole. The information on the unconsumed food groups was collated manually by two coders with 100% agreement.

Results

In general, over 80% of unconsumed food items were sandwiches, fruit and dairy items compared to approximately 20% of food items which were energy-dense, micronutrient-poor snacks – or, as some might label, 'junk food'. Table 1 demonstrates that there was no significant difference in the unconsumed fruit and vegetables from different decile schools. This may be because the decile ratings have no influence on children's food choices. However, what it does universally demonstrate is that the proportion of unconsumed food, mainly fruit and vegetables compared to junk food, is significantly higher (see Table 1).

Table 1. Proportions of food categories observed in the waste disposal bins.

School Decile	Low 1	Low 2		Mod 5	Mod 6		High 9	High 10	F (2, 864)
Fruit and vegetables	31.9	47.5		33.3	37.7		39.7	23.7	0.70*
Cakes/muffins	1.8	9.5		2.8	7.9		0	12.5	.01*
Crisps	0.6	0		1.4	9.9		2.4	3.0	1.2*

* No statistically significant differences at an alpha level of $P <.05$

Phase 3: Children's food choices study

There were 1184 children participated in a school wide exercise exploring children's food choices. Children were provided with a checklist and asked to tick icons that represented the food items they would prefer in their lunch-box. They were asked to tick up to six items representing their 'dream' lunch-box. 'Dream' was described to the children as being perfect or ideal, that is, a lunch box that they would create if all food types were available to them. Children were encouraged to choose items they would be happy eating regularly and liked the most. They were then asked to select up to six items representing a 'healthy' lunch-box. The concept of healthy was defined as being good for you - that is, good for your body, nutritious, good for strength and growth. Children were specifically instructed to only select food items that they would eat and not throw away in the waste bins.

The items included in the checklist represented the 40 most common food items from

the lunch-box survey data - eight fruits (apple, banana, grapes, kiwifruit, mandarin, pineapple, raisins, and strawberries) and four vegetables (celery, cucumber, carrots and tomato). The remaining 28 food items included a range of typical lunch-box items such as sandwiches, wraps, yogurt, baked goods, snacks, sweets and junk foods.

Results

The results showed that 57.7% of the children would voluntarily eat one fruit or vegetable and 29.5% would eat two fruits or vegetables for lunch. Furthermore, the children understood the importance of having fruit and vegetables in their healthy lunch-box. Interestingly, 95.4% of children selected fruit and vegetables in their *healthy* lunch-box compared to only 57.7% selected fruit and vegetables in their *dream* lunch-box. There was a significant difference in the amount of fruit and vegetables selected for the *healthy* lunch-box (M = 3.69) when compared to the *dream lunch-box* (M=1.04) $t(1184)=43.62$, $p=.000$.

Phase 4: Photo journal study

In total, 160 pupils aged between 5 and 11 years from four primary schools participated in a class-wide photo journal exercise. This was embedded with other class/school activities. One class from each age group was selected and teachers randomly distributed Photo Journal packages amongst their students. Each Photo Journal package contained a Booklet and a 24 Exposure Disposable Camera. Booklets were designed to be bright, appealing and easy enough for a five year old to use it. Design characteristics of the booklet was A5 size so that it was easy to manage.

Booklets contained four different sections including breakfast, lunch (school lunchbox), snacks and dinner. To capture children's actual consumption versus their dream choices, each section contained two similar questions for each meal. For example: Q1. What are you having for breakfast today? eg. toast, cornflakes, cocopops. Q2. If you could have anything you like, what would you choose for your breakfast?

Each section contained a rectangular space that indicated where the printed photos would be attached after development. All the cameras were taken to be developed in a professional photography studio. The images were downloaded onto an electronic resource, which allowed the images to be viewed on a computer.

Results

The results indicated that 8.5% of the sample consumed five servings of fruit and vegetables, two and three serve respectively. Given free choice in the 'dream' exercise only 2.3% indicated they are willing to have five types of fruit and vegetables within a 24 hour period.

General Discussion

Eating patterns among school-aged children have continuously received attention from education and public health institutions. Despite increased awareness of "5+-A-Day", fruit and vegetables intakes were low. The results from the lunch-box survey indicated that the recommended servings of fruit and vegetables were present in only

a third of the lunch-boxes consumed daily, along with an unexpected amount of fruit or vegetables wasted. Furthermore, the children's food choices study indicated that the children have a good understanding of the educational messages about the importance of fruit and vegetables. They have good knowledge that fruit and vegetables are healthy, but they do not necessarily translate this knowledge into action. Of a particular concern were the findings from the photo journal study showing 8.5% of the children had the recommended servings of fruit/vegetables and only 2.3% indicated they would like to have five servings of fruit and vegetables a day.

The results of the present study call for further understanding of children's low fruit and vegetables consumption behaviours (Cockroft et al., 2005; Cooke et al. 2004; Cullen et al., 2001; Cullen and Zakeri, 2004), and, at the same time, offer a more accurate record of the children's fruit and vegetable preferences and intake. There are a number of important methodological strengths associated with visual evaluation techniques. First, structured visual evaluation techniques allow researchers to develop specific details of what is to be evaluated and how the measurements should be recorded. This reduces the likelihood of observer bias and increases the reliability of the data. Second, the children provided the data without the inhibitory factor of researcher presence, thereby removing the social desirability component. That is, the children understand that fruit and vegetables are healthy, thus some of them may try to please the interviewer with their reporting of fruit and vegetable consumption, as found in previous research (Baxter, Thompson & Davis, 2000). Third, the visual components can help where the children may not have the knowledge to describe their nutritional status or be able to correctly report the portion sizes of fruit and vegetables they have consumed. Furthermore, these visual techniques can also assist where the children may not be able to express their food choices in words or accurately remember which fruit and vegetables they have consumed. Hence, innovative visual evaluation techniques can make a distinctive contribution to overcoming a number of convergent constraints in designing a research project to assess fruit and vegetable consumption behaviours in these specific-aged younger participants.

The influences on children's choices of fruit and vegetables are as complex as the barriers to their eating. Visual evaluation techniques provided us with an accurate record of the current nutrition situation. Further research work is continuing to enable children to identify and describe the barriers they face in fruit and vegetables consumption. Specifically, we are conducting peer-group interviews to examine the common themes on which children base their fruit and vegetables consumption decisions. We hope to understand whether and/or why children are unmotivated to change and to explore potential solutions. Overall, the combination of visual evaluation techniques and peer-group interviews data will generate new insights into the barriers as well as models of what children experience in consuming fruit and vegetables.

References

Banks, M. 1998. Visual anthropology: Image, object and interpretation. In: Prosser, J. (Eds.), Image-Based Research: A Sourcebook for Qualitative Researchers. RoutledgeFalmer, London, pp.9-23.

Baxter, S. D., Thompson, W. O. & Davis, H. C. 2000. Fourth-grade children's observed consumption of and preferences for school lunch foods. Nutrition Research 20(3), 439-443.

Buijzen, M., Schuurman, J. & Bomhof, E. 2008. Associations between children's television advertising exposure and their food consumption patterns: A household diary-survey study. Appetite 50, 231-239.

Clark, A. 2004. The Mosaic approach and research with young children. In: Lewis, A., Kellett, M., Robinson, C., Fraser, S. & Ding, S (Eds.), The Reality of Research with Children and Young People. Sage Publication, London, pp. 142-161.

Cockroft, J. E., Durkin, M., Masding, C. & Cade, J. E. 2005. Fruit and vegetable intakes in a sample of pre-school children participating in the 'Five for All' project in Bradford. Public Health Nutrition 8(7), 861-869.

Cooke, L. J. & Wardle, J. 2005. Age and gender differences in children's food preferences. British Journal of Nutrition 93, 741-746.

Cooke, L. J., Wardle, J., Sapochnik, M. , Sheiham, A., & Lawson, M. 2004. Demograhphic, familial and trait predictors of fruit and vegetable consumption by pre-school children. Public Health Nutrition 7, 295-302.

Crang, M. 1997. Picturing practices: Research through the tourist gaze. Progress in Human Geography 21(3), 359-373.

Cullen, K. W., Baranowski, T., Rittenberry, L., Cosart, C., Hebert, D. & de Moor, C. 2001. Child-reported family and peer influences on fruit, juice and vegetable consumption: Reliability and validity of measures. Health Education Research 16(2), 187-200.

Cullen, K. W. & Zakeri, I. 2004. Fruits, vegetables, milk, and sweetened beverags consumption and access to à la carte/snack bar meals at school. American Journal of Public Health 94, 463-467.

Dockett, S. & Perry, B. 2003. Children' views and children's voices in starting school. Australian Journal of Early Childhood 28(1), 12-17.

Dixey, R., Sahota, P., Atwal, S. & Turner, A. 2001. Children talking about healthy eating: Data from focus groups with 300 9-11-year-olds. Nutrition Bulletin 26, 71-79.

Dresler-Hawke, E., Whitehead, D. & Coad, J. What are New Zealand children eating at school? A content analysis of 'consumed versus unconsumed' food groups in a lunch-box survey. Health Education Journal 68(1), 3-13.

Einarsdottir, J. 2005. Playschool in pictures: Children's photographs as a research method. Early Child Development and Care 175 (6), 523-54.

Fitzgerald, A., Heary, C., Nixon, E. & Kelly, C. 2010. Factors influencing the food choices of Irish children and adolescents: A qualitative investigation. Health Promotion International, 1-10.

Harper, D. 1998. An argument for visual sociology. In: Prosser, J. (Eds.), Image-Based Research: A Sourcebook for Qualitative Researchers. RoutledgeFalmer, London, pp.24-41.

Jefferson, A. & Cowbrough, J. 2004. School lunchbox survey, http://www.food.gov.uk/multimedia/pdfs/lunchbox2004report, accessed 30 January 2007.

Moore, G., Croxford, B., Adams, M., Refaee, M., Cox, T. & Sharples, S. 2008. The photo-survey research method: Capturing life in the city. Visual Studies 23(1), 50-62.

Prosser, J. 1998. The status of image-based research. In: Prosser, J. (Eds.), Image-based Research: A Sourcebook for Qualitative Researchers. RoutledgeFalmer, London, pp.97-112.

Prosser, J. 2007. Visual methods and the visual culture of schools. Visual Studies 22(1), 13-30.

Prosser, J. & Loxley, a. 2008. Introducing visual methods. Economic & Social Research Council National Centre for Research Methods Review Paper, http://eprints.ncrm.ac.uk/420/1/MethodsReviewPaperNCRM-010.pdf, accessed 20 June 2010.

Schratz, M. & Steiner-Löffler, U. 1998. Pupils using photographs in school self-evaluation. In: Prosser, J. (Eds.), Image-Based Research: A Sourcebook for Qualitative Researchers. RoutledgeFalmer, London, pp.235-251.

Singh, P. & Matthews, J. (2008). Visual methodology and ethnographic un/knowing. The Association for active educational researchers 2008 International Education Research Conference – Brisbane, http://www.aare.edu.au/08pap/abs08.htm, accessed 20 June 2010.

Swaminathan, S., Thomas, T., Kurpad, A. V. & Vaz, M. 2009. Perceptions of healthy eating: A qualitative study of school-going children in South India. Health Education Journal 68(2), 94-110.

Wagner, J. 2002. Contrasting images, complementary trajectories: Sociology, visual sociology and visual research. Visual Studies 17(2), 160-171.

Wright, C. Y., Darko, N., Standen, P. J. & Patel, T. G. 2010. Visual research methods: Using cameras to empower socially excluded black youth. Sociology 44(3), 541-588.

Young, L., & Barrett, H. (2001). Adapting visual methods: Action research with Kampala street children. Area 33(2), 141-52.