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Research report

'Big, strong and healthy'. Young children's identification of food and drink that contribute to healthy growth ☆

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ABSTRACT

Growing awareness of the importance of healthy diet in early childhood makes it important to chart the development of children's understanding of food and drink. This study aimed to document young children's evaluation of food and drink as healthy, and to explore relationships with socioeconomic status, family eating habits, and children's television viewing. Data were gathered from children aged 3–5 years (n = 172) in diverse socioeconomic settings in Ireland, and from their parents. Results demonstrated that children had very high levels of ability to identify healthy foods as important for growth and health, but considerably less ability to reject unhealthy items, although knowledge of these increased significantly between ages 3 and 5. Awareness of which foods were healthy, and which foods were not, was not related to family socioeconomic status, parent or child home eating habits, or children's television viewing. Results highlighted the importance of examining young children's response patterns, as many of the youngest showed a consistent 'yes bias'; however, after excluding these responses, the significant findings remained. Findings suggest it is important to teach children about less healthy foods in the preschool years.

Introduction

High rates of childhood obesity (Hedley et al., 2004; IASO, 2012; James, Leach, Kalamara, & Shayeghi, 2001), coupled with growing awareness of young children's susceptibility to marketing of unhealthy foods (Borzekowski & Robinson, 2001; Ferguson, Muñoz, & Medrano, 2012), have led to increased interest in the development of children's understanding of food and its impact on health. Research findings indicate that there are links between children's food education, food knowledge and their diet (Bannon & Schwartz, 2006; Kandiah & Jones, 2002; Taylor, Evers, & McKenna, 2005). This demonstrates the importance of education about food for young children (i.e. those under the age of 6 years), to shape their food attitudes, choices and habits. Education must be based in a firm understanding of children's thinking about food (Holub & Musher-Eizenman, 2010; Skouteris, 2012; Slaughter & Ting, 2010). Research therefore needs to investigate children's knowledge of food and health as aspects of their cognitive development; how family, school and community environmental variables influence this developmental process; and how such influences contribute to children's food choices and diet.

Studies have identified important features of children's knowledge of nutrition and health from the primary school years onwards (Slaughter & Ting, 2010), but very little is known regarding children under the age of 6 years, and research into age differences in young children's food knowledge is scant (Holub & Musher-Eizenman, 2010). This gap is a particular concern, as this is a period of rapid development of food knowledge, and food experiences in early childhood are central to later diet and health (Aldridge, Dovey, & Halford, 2009; Alles-White & Welch, 1985).

One aspect of young children's food knowledge that is of particular importance to educators and nutritionists is their ability to classify food according to its nutritional content or its consequences for health, as these skills are relevant for educating children about healthy food choices. Very few studies have investigated this topic, however, there is some evidence that these abilities develop before children are 6 years old. For example, Holub and Musher-Eizenman (2010) demonstrated that children as young as 3 years could create 'healthy' and 'unhealthy' meals which were meaningfully different from one another, e.g. the healthy meals, on average, contained significantly less fat and more fruit and vegetables than the unhealthy meals. Nguyen and

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Murphy (2003) found that children aged 4 years could categorise certain foods as 'junky' at a level that was better than chance. Holub and Musher-Eizenman (2010) found that, compared to younger children, 6 year olds chose more fruits, vegetables and fewer desserts when creating healthy meals and more desserts and fewer entrees for unhealthy meals.

Research also highlights specific gaps in young children's knowledge about food. For example, Nguyen, Gordon, and McCullough (2011) found that 4 year olds had markedly less knowledge that high-fat savoury and sweet foods are not healthy than that vegetables are healthy. Research also points to gaps in young children's understanding of the processes through which food influences health. Slaughter and Ting (2010) found that at 5 years, causal reasoning linking food and health was largely absent; by 8 years, children gave explanations that were linked to naïve biological theories, e.g. energy-giving (vitalistic) or the movement of substances through the body (mechanical). Such findings suggest young children's categorisations and theories of food are flexible and undergo age-related changes consistent with claims that children do not fully understand a food's healthful properties until age 7 or 8, and this has implications for teaching children about food, nutrition and health.

It should be noted that most of this research with young children has been conducted with small, middle-class samples. However, research indicates that poorer eating habits and greater overweight/obesity in children are consistently linked to lower socioeconomic status in Australia, Europe, the USA and elsewhere (Cameron et al., 2012; Craig, McNeill, Macdiarmid, Masson, & Holemes, 2010; James et al., 2001; Lamerz et al., 2005; Moschonis et al., 2010; Patrick & Nicklas, 2005). Further research is needed to confirm these findings with children from a wider range of demographic backgrounds in order to allow firmer conclusions to be drawn about features and correlates of young children's food knowledge.

Studies on the sources of young children's food understanding have rarely been conducted, although it is assumed that parents, peers, media and school all introduce children to information about food, eating, nutrition and health (Slaughter & Ting, 2010). Research into how children's eating is shaped is still underdeveloped (Jansen, Daniels, & Nicholson, 2012), although researchers argue that parent behaviours have a significant impact, such as modelling of eating behaviours and the food they give their young children (Slusser et al., 2012). Parents' behaviours and eating patterns are likely to be particularly influential in early childhood as children of this age make few independent food choices. Nyberg, Sundblom, Norman, and Elinder (2011) have proposed a conceptual model where family socioeconomic status is mediated by parent and classroom factors, to affect children's food knowledge, attitude and preferences, which in turn influence children's diet.

Another possible environmental influence on young children's food understanding is television advertising (Ferguson et al., 2012). A modest effect of television advertising on children's understanding of healthy and unhealthy foods was identified in a World Health Organisation review (Cairns, Angus, & Hastings, 2009), but just two of the experiments reviewed included preschool-aged samples, and these did not find effects. However, these studies were conducted in the USA several decades ago, and researchers have argued that if children view many advertisements for foods that should be consumed infrequently, e.g. those high in sugar and salt, their perception of a normal diet may be distorted (Keller & Schulz, 2010). We believe, therefore, that an investigation into children's understanding of healthy and unhealthy food and drink should include measures of the family food environment (parents' and children's eating) and of children's television viewing.

The present study aims to expand our understanding of young children's knowledge of healthy and unhealthy food and drink, and relationships of this knowledge to environmental factors. Specifically, the study's first aim is to chart the development of understanding of healthy and unhealthy foods in early childhood, because previous studies have produced conflicting findings, and nutrition education needs to build on children's knowledge. Second, the study aims to explore relationships between food knowledge and three environmental factors: (i) the family food environment (operationalised as the child's and parent's scores on a healthy eating scale); (ii) the amount of television watched each week; and (iii) socio-economic status (operationalised as the highest level of maternal education).

When researching with very young children, research methods need to be designed to reflect their abilities (Greene & Hill, 2005). Qualitative research has established that, for young children, comprehension of abstract nutrition concepts such as 'healthy' is challenging (Lytle et al., 1997). We therefore designed an illustrated story to define healthy foods for our very young research participants as foods that 'help to make you big and strong and healthy' a concept frequently used by parents to explain the benefits of healthy food to young children.

Method

Participants

A total of 172 children on the island of Ireland took part (25% from Northern Ireland and 75% from the Republic of Ireland), drawn from 11 preschools and 3 primary schools. Children were aged 3–5 years (36–71 months); 31% were 3 years; 47% were 4 years; 22% were 5 years and 48% were boys (see Table 1).

Quota sampling took place in order to achieve a balance of participants from advantaged and disadvantaged communities. Levels of community advantage were identified in Northern Ireland using local government statistics, and in the Republic of Ireland by identifying whether preschools and schools received government supports for disadvantaged communities. Over half of participating children (55%; $n = 94$) attended preschool/school in disadvantaged communities.

Information about environmental variables (family demographics, family eating habits and children's television viewing) was sourced through a parent questionnaire. After reminders and distribution of second questionnaires, 100 parents returned completed questionnaires, representing 58% of the sample of participating children. This raised the question of whether the children for whom we had data regarding environmental variables differed systematically from those for whom we did not. A series of *t*-tests and chi-square analyses however, identified no significant differences in core study variables, with one exception. Significantly more parents than expected in advantaged communities (68%) returned questionnaires compared to parents in disadvantaged communities (50%); χ^2 5.643, $df = 1$, $p = .018$. We therefore examined mothers' reports of their highest level of completed education (a indicator of family socio-economic status) to identify the

Table 1
Age ranges, means, standard deviations and percentages, for each age group.

	N		Age (months)	*M*	SD	Males		Females	
	%	*n*				%	*n*	%	*n*
Full sample	100	172	36–71	52.16	8.55	48	82	52	90
3 Years	31	54	36–47	42.52	3.00	52	28	48	26
4 Years	47	81	48–59	53.02	3.63	42	34	58	47
5 Years	22	37	60–71	64.35	3.35	54	20	46	17