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Abstract

Parenting style may have a role in the development of young children's dietary behaviour, and a better understanding of parenting style may lead to better-targeted childhood obesity prevention interventions. This study aimed to investigate the association of parental self-efficacy, parenting style and dietary behaviour of young children. A cross-sectional study with 242 first-time mothers and their children was conducted using the data from the Healthy Beginnings Trial undertaken in one of the most socially and economically disadvantaged areas of south-western Sydney, in 2007-2010. Parental self-efficacy, parenting style (warmth and hostility) and children's dietary behaviours (consumption of vegetables, fruit, soft-drink and snacks) were assessed by face-to-face interviews with participating mothers in the control group when their children were 2 years old. Logistic regression analysis was conducted to examine the association between parenting style and the child's dietary behaviour. Mothers with higher levels of global parental self-efficacy and self-efficacy for an infant were more likely to report their children had 2 serves of vegetables per day, with odds ratio (OR) 2.40 (95%CI 1.35-4.27, $P = 0.003$) and OR 1.88 (95%CI 1.06-3.36, $P = 0.03$), respectively. A higher level of global parental self-efficacy or self-efficacy for an infant was significantly associated with having 2 serves of fruit per day with adjusted odds ratio (AOR) 2.46 (95%CI 1.35-4.48, $P = 0.003$) and AOR 1.85 (95%CI 1.00-3.41, $P = 0.048$), respectively, after adjusting for annual household income. Mothers with a higher level of parental warmth were more likely to report their children had 2 serves of vegetable per day with OR 1.85 (95%CI 1.06-3.25, $P = 0.03$). Parental self-efficacy and parenting style were associated, cross-sectionally, with important children's dietary behaviours. Interventions which target parental self-efficacy and parenting style may improve eating habits of young children, and contribute to childhood obesity prevention.

Keywords

children, findings, healthy, beginnings, trial, style, parenting, dietary, behaviour, young

Disciplines

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Original research

Parenting style and dietary behaviour of young children: Findings from the Healthy Beginnings Trial

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Abstract

Parenting style may have a role in the development of young children's dietary behaviour, and a better understanding of parenting style may lead to better-targeted childhood obesity prevention interventions. This study aimed to investigate the association of parental self-efficacy, parenting style and dietary behaviour of young children. A cross-sectional study with 242 first-time mothers and their children was conducted using the data from the Healthy Beginnings Trial undertaken in one of the most socially and economically disadvantaged areas of south-western Sydney, in 2007-10. Parental self-efficacy, parenting styles (warmth and hostility) and children's dietary behaviours (consumption of vegetables, fruit, soft-drink and snacks) were assessed by face-to-face interviews with participating mothers in the control group when their children were two years old. Logistic regression analysis was conducted to examine the association between parenting style and the child's dietary behaviour.

Mothers with higher levels of global parental self-efficacy and self-efficacy for an infant were more likely to report their children had 2 serves of vegetables per day, with odds ratio (OR) 2.40 (95%CI 1.35-4.27, $P=0.003$) and OR 1.88 (95%CI 1.06-3.36, $P=0.03$), respectively. A higher level of global parental self-efficacy or self-efficacy for an infant was significantly associated with having 2 serves of fruit per day with adjusted odds ratio (AOR) 2.46 (95%CI 1.35-4.48, $P=0.003$) and AOR 1.85 (95%CI 1.00-3.41, $P=0.048$), respectively, after adjusting for annual household income. Mothers with a higher level of parental warmth were more likely to report their children had 2 serves of vegetable per day with OR 1.85 (95%CI 1.06-3.25, $P=0.03$). Parental self-efficacy and parenting style were associated, cross-sectionally, with important children's dietary behaviours. Interventions which target parental self-efficacy and parenting style may improve eating habits of young children, and contribute to childhood obesity prevention.

Keywords: Parenting style, Parental self-efficacy, Dietary behaviour

Introduction

Dietary behaviour is one of the main factors associated with childhood overweight and obesity (Du & Feskens, 2010; Jebb, 2005). With increasing rates of overweight and obesity among Australian young children in recent years, promoting healthy dietary behaviour and addressing factors related to children's dietary behaviour have become important. Unhealthy dietary behaviours such as the consumption of soft drink, fast-food and snacks often find their origin in early childhood (Savage, Fisher, & Birch, 2007) and tend to persist into adulthood (Kelder, Perry, Klepp, & Lytle, 1994). Parents play an important role in the development of children's dietary behaviour, especially in the early years of life when parents have a high degree of control over their children's eating environment and experience. The first few years of life, characterised by high plasticity and rapid transitions, including the prenatal period, the postnatal suckling period and the transition to modified adult diet, may provide opportunities for preventive interventions (Anzman, Rollins, & Birch, 2010).

Parenting style refers to a general pattern of parenting that provides the emotional background in which parents' behaviours are expressed and interpreted by a child (Rhee, 2008). It can be conceptualised as a context that moderates the influence of specific parenting practices on the child. One commonly used classification of parenting style is based on the work of Maccoby and Martin (Maccoby & Martin, 1983) that is an expanded version of Baumrind's categorization of parenting style (Baumrind, 1971), with two dimensions—responsiveness (parental warmth/hostility) and demandingness (parental control). Parental self-efficacy, as one determinant of positive parenting style, has also been reported (Coleman & Karraker, 2003; Sanders & Woolley, 2005). Mothers with greater parental self-efficacy are more likely to be successful in establishing a warm and sensitive relationship with their babies and be able to interpret infant signals correctly and respond appropriately (Teti & Candelaria, 2002). In contrast, mothers with lower parental self-efficacy may

have more difficulty in handling their babies and be insensitive to their baby's feeling (Teti & Gelfand, 1991).

There is a growing body of research investigating the effect of parenting style on children's dietary behaviours (De Bourdeaudhuij et al., 2009; Gubbels et al., 2009; Kremers, Bruga, H, & Engels, 2003; Pearson, Atkin, Biddle, Gorely, & Edwardson, 2009; Rodenburg, Oenema, Kremers, & van de Mheen, 2012; Vereecken, Legiest, De Bourdeaudhuij, & Maes, 2009; Vereecken, Rovner, & Maes, 2010). Most studies have been focused on school-aged children and adolescents, with few studies of this kind conducted specifically among young children. Studies examining the relationship between mothers' parental self-efficacy and young children's dietary behaviour are rarely reported.

Given the importance of parental influences on children's dietary behaviour in the early years of life and the relative lack of studies on parental self-efficacy, parenting style and young children's dietary behaviour, the present study therefore aimed to investigate the relationship between parental self-efficacy, parental responsiveness (warmth and hostility) and dietary behaviour (i.e. fruit, vegetables, soft drink and snack consumptions) of children at 2 years of age. In this study, only one dimension (parental responsiveness) of parenting style was measured. Therefore, the term parenting style in this study refers to parental warmth and hostility.

Methods

Study Design

For this particular study a cross-sectional data analysis was conducted using data extracted from the Healthy Beginnings Trial, which was a home-based randomised controlled trial with a total of 667 first-time mothers recruited from one of the most socially and economically disadvantaged areas of south-western Sydney over the period of 2007-10 (Wen et al., 2007) The study was approved by the

Ethics Review Committee of Sydney South West Area Health Service (RPAH Zone). The details of the research protocol and the outcomes of the Healthy Beginnings Trial have been reported elsewhere (Wen et al., 2007; Wen et al., 2012).

Selection of study participants

A total of 667 first-time mothers (337 in the intervention group and 330 in the control group) at 24–34 weeks of pregnancy were recruited to the trial from antenatal clinics at Liverpool or Campbelltown Hospitals, located in south-western Sydney, Australia. First-time mothers who were aged 16 years and over, and able to communicate in English were eligible for the trial. Once eligibility was established and consent obtained, mothers were asked to fill in a registration form with their contact information to allow the research assistants to make further arrangements for the baseline data collection.

For this particular analysis, mothers and their children who were allocated to the control group and retained at age 2 years ($n = 242$, a retention rate of 73%) were selected in order to avoid any potential effects of the intervention (i.e. healthy feeding practices).

Data Collection and Measures

Face-to-face interviews with each participating mother were conducted to collect mothers' demographic information at baseline, and assess parental self-efficacy, parenting style and children's dietary behaviours at 2 years by one of two research assistants.

Dietary behaviours of children aged 2 years

Dietary behaviours were measured using questions from NSW Child Health Survey 2001 (Centre for Epidemiology and Research, 2002). Mothers were asked to report on their children's consumption of vegetables, fruit, soft drink, and snacks including hot chips, salty snacks and confectionery.

Vegetable and fruit consumption were assessed by asking the mother, 'How many serves of vegetables does your child usually eat in a day? (1 serve = $\frac{1}{2}$ cup cooked vegetables or 1 cup of salad vegetables)' and 'How many serves of fruit does your child usually eat in a day? (1 serve = 1 medium piece or two small pieces of fruit or 1 cup of diced pieces).

Soft drink consumption was assessed by asking the mother, 'How many cups of soft drink (such as lemonade), cordial or sports drinks (such as Gatorade) does your child usually drink per week? (1 cup = 250ml, 1 can soft drink = 1 $\frac{1}{2}$ cups, one bottle Gatorade = 2 cups)'.

The frequencies of having hot chips, salty snacks and confectionery were obtained by asking the mother, 'How often does your child eat hot chips, French fries, wedges or fried potatoes?' 'How often does your child eat potato crisps or other salty snacks (such as Twisties or corn chips)?' 'How often does your child eat confectionery, such as lollies and chocolate?' The validity of these questions has been reported elsewhere (Flood et al., 2013);. In brief, Spearman rank correlation coefficients were >0.5 for vegetables and fruit, and 0.15 to 0.38 for salty snacks, hot chips and confectionery, and for increasing reported serves of vegetables, fruit and soft drinks there was a significant trend of an increased consumption of these foods in a 3 day food record (all trend $P < 0.01$) (Flood et al., 2013).

Parental self-efficacy and parenting style

Four aspects of parenting including global parental self-efficacy, parental self-efficacy for an infant, parental warmth and hostility were assessed using the questions from ‘Growing up in Australia: The Longitudinal Study of Australian Children’ (see Table 1) (FaHCSIA, AIFS, & ABS, 2004)

Global parental self-efficacy refers to a parent’s belief that he or she is capable of organising and executing tasks related to parenting a child (Montigny & Lacharite, 2005). There are 5 categories for global parental self-efficacy, from ‘not very good’ to ‘very good’ (see Table 1). We categorised those who were ‘very good’ or ‘better than average’ as ‘high self-efficacy’, and the rest as ‘low self-efficacy’.

Parental self-efficacy for an infant refers to a parent’s feeling about the extent to which they are capable of looking after their child. The mothers were asked about how they generally felt to the 4 statements (see Table 1, i.e. I feel that I am very good at keeping my child amused’). Mothers responded to each of the statements by indicating on a ten-point scale, ‘1’ for ‘not at all how I feel’ to ‘10’ for ‘exactly how I feel’. The scores related to each of 4 statements were summed and then divided by 4. The range of the overall score was between 1 and 10.

Parental warmth was measured by asking mothers 6 questions about how often they displayed warm affectionate behavior towards their child (see Table 1). Mothers were asked to provide a score to each of 6 questions about parental warmth on a five-point scale, with ‘1’ referring ‘never/almost never’ and ‘5’ referring ‘always/almost always’. The scores were summed and then divided by 6. The range of overall score was between 1 and 5.

Parental hostility was also measured by asking mothers about the extent to which they engaged in irritable and angry behaviors. Five statements assessing parental hostility are provided in Table 1.

Mothers responded to each of the statements by indicating on a ten-point scale with '1' 'not at all' and '10' referring 'all the time'. The scores were summed and then divided by 5. The range of overall score was between 1 and 10.

Mothers' demographics

Mothers' demographics were collected using the questions from NSW Child Health Survey 2001 (Centre for Epidemiology and Research, 2002). These questions have been widely used in NSW population health surveys. Mothers' age, education, employment status, annual household income and marital status were each categorised into two groups, respectively.

Statistical Methods

Statistical analyses were carried out using Stata 12 (StataCorp, 2011). Children's dietary behaviour indicators were found not to be normally distributed and consequently were regrouped into binary measures based on the median level of 2 serves of vegetable or fruit found in this study population. Thus, we grouped children into two groups based on whether they had vegetables or fruit ≥ 2 serves per day or not. Soft drink consumption was dichotomised to 'yes' and 'no'. Children who had hot chips, salty snacks or confectionery ≤ 1 time per week were grouped into one group, while the rest was grouped into another group. Mothers' scores of parental self-efficacy for an infant, parental warmth and hostility were skewed. Therefore, scores of parental self-efficacy for an infant and parental warmth that fell below the 25th percentile were classified as low self-efficacy for an infant and low warmth respectively, while the rest were classified as high self-efficacy for an infant or warmth. For parental hostility, scores above the 75th percentile were classified as the high hostility group, while the rest were in the low hostility score group. Therefore, by this classification, 25% of mothers were categorized as low self-efficacy for an infant, low warmth or high hostility.

Chi square tests were used to describe the relationship between dietary behaviours of children aged 2 years and their mothers' age, education, annual household income, parental self-efficacy and parenting style. Both bivariate and multivariable logistic regression models were built to investigate the effect of parental self-efficacy, parenting style and mothers' demographics on children's dietary behaviours. Sixteen bivariate logistic regression models were built. Odds ratios (ORs) with 95% confidence intervals (CIs) were estimated.

For multivariable logistic regression models, a forward selection process was used, where predictor variables were tested in the model in order of their unadjusted association with the outcome variable and only the predictors with $P < 0.05$ were retained, except for the main predictors—parental self-efficacy and parenting style. Subsequently, the predictor variables which were not included in the model were given an extra chance to enter the final model one by one. Sixteen multivariable logistic regression models were built. Half of these models did not include other predictors in the final model except for the main predictors—parental self-efficacy and parenting style. Therefore, 8 multivariable logistic regression models were built. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were estimated.

Results

Mothers' demographics and dietary behaviours of children

Demographic characteristics of participating mothers and dietary behaviours of children are shown in Table 2. Most mothers were aged 25 years or older (64%), married (95%) and employed (62%), with annual household income more than \$40,000 (74%), but only a quarter had tertiary education (26%). Just above half of the children (54%) were reported as consuming 2 or more serves of vegetables a day, 71% reported consuming 2 or more serves of fruit a day and 74% reported they did not

consume any soft drink, while more than half of the children (56%) reported to eat snacks more than 1 time per week.

Relationship between mothers' demographics and children's dietary behaviours

On bivariate analyses in Table 3, the proportion of children with reported soft drink use or reported to consume snacks more than once per week, was higher in children of mothers aged < 25 years old compared to those of mothers aged ≥ 25 years old (38% vs. 20%, $P=0.002$; 66% vs. 50%, $P=0.02$ respectively). Annual household income was associated with children's fruit, soft drink and snack consumption. The proportion of reporting fruit ≥ 2 serves per day was higher in children from families with annual household income $\geq \$40,000$ compared to those with annual household income < \$40,000 (74% vs. 60%, $P=0.04$). The proportion of children reported to consume any soft drink or snacks more than once a week was higher in children from families with a household income < \$40,000 compared to those with a household income $\geq \$40,000$ (38% vs. 22%, $P=0.02$; 73% vs. 50%, $P=0.001$ respectively).

Using logistic regression adjusting for mothers' global parental self-efficacy, children of mothers aged ≥ 25 years old were less likely to consume soft drink, with AOR 0.47 (95%CI 0.26-0.85). Children from families with annual household income $\geq \$40,000$ were more likely to have 2 serves of fruit per day (AOR 1.92, 95%CI 1.02-3.63) and less likely to eat snacks more than once a week (AOR 0.36, 95%CI 0.19-0.69) after adjusting for mothers' parental hostility which was the main independent variable in the model.

Relationship between parental self-efficacy, parenting style and children's dietary behaviours

Also shown in Table 3 on bivariate analyses the proportion of having 2 serves of vegetables and fruit were higher among children of mothers with high global parental self-efficacy compared to those

with low global parental self-efficacy (60% vs. 38%, $P=0.003$; 76% vs. 56%, $P=0.002$ respectively). The proportion having consumed soft drink was higher among children of mothers with low global parental self-efficacy compared to those with high global parental self-efficacy (40% vs. 21%, $P=0.003$). Likewise, a higher proportion having 2 serves of vegetables or fruit and a lower proportion of consuming soft drink was found among children of mothers with high self-efficacy for an infant compared to those who had low self-efficacy for an infant (58% vs. 42%, $P=0.03$; 74% vs. 61%, $P=0.046$; and 23% vs. 36%, $P=0.045$, respectively).

The proportion having 2 serves of vegetables per day was higher among children of mothers with a high level of parental warmth (58% vs. 43%, $P=0.03$), compared to those with a low level of parental warmth. The proportion reported to consume 2 or more serves of fruit per day was higher among children of mothers who had low level of parental hostility compared to those with a high level of parental hostility (78% vs. 48%, $P<0.0001$). The proportion reported to consume any soft drink or snacks more than once per week was higher among children of mothers with a high level of parental hostility compared to those with a low level of parental hostility (43% vs. 21%, $P=0.001$; 73% vs. 50%, $P=0.002$ respectively).

Using logistic regression in Table 4, reported children's vegetable consumption was positively associated with global parental self-efficacy (OR 2.40, 95%CI 1.35-4.27, $P=0.003$), self-efficacy for an infant (OR 1.88, 95%CI 1.06-3.36, $P=0.03$), and parental warmth (OR 1.85, 95%CI 1.06-3.25, $P=0.03$). Children's vegetable consumption was inversely associated with parental hostility (OR 0.57, 95%CI 0.32-1.03, $p=0.06$). No adjustments were needed for vegetable consumption since no confounders were detected in the modelling process. Children's fruit consumption was positively associated with mothers' global parental self-efficacy (AOR 2.46, 95%CI 1.35-4.48, $P=0.003$), self-

efficacy for an infant (AOR 1.85, 95%CI 1.00-3.41, $P=0.048$), and inversely associated with parental hostility (AOR 0.26, 95%CI 0.14-0.49, $P<0.0001$), after adjustment for annual household income.

Children's reported soft drink consumption was inversely associated with mothers' global parental self-efficacy with AOR 0.47 (95%CI 0.25-0.89, $P=0.02$) and positively associated with parental hostility (AOR 3.02, 95%CI 1.59-5.72, $P=0.001$) after adjusting for mothers' age. Reported soft drink consumption appeared to be marginally inversely associated with self-efficacy for an infant (AOR 0.57, 95%CI 0.30-1.08, $P=0.08$), though this was not significant.

Children's snack consumption was positively associated with mothers' parental hostility (AOR 2.78, 95%CI 1.45-5.35, $P=0.002$) after adjusting for annual household income and marginally inversely associated with mothers' global self-efficacy (OR 0.60, 95%CI 0.33-1.07, $P=0.08$).

Discussion

Main findings

This study examined the relationship between parental self-efficacy, parental responsiveness (warmth/hostility), and the reported dietary behaviour of children at 2 years of age. It found that a high level of global parental self-efficacy was positively associated with vegetable and fruit consumption and inversely associated with soft drink consumption. Similar associations were also found between parenting self-efficacy for an infant, parental warmth and the dietary behavior of children. Increased scores of parental hostility were associated with increased soft drink and snack consumption and reduced fruit and vegetable consumption.

In this study, only 20% ($n=48$) of children reported meeting the national recommendations (National Health and Medical Research Council of Australia, 2013) for vegetable consumption (2 to 3

serves/day), but most children (n=224, 93%) reported meeting the recommendation for fruit consumption (1 serve/day). Therefore, given the distribution of the responses, the median level of 2 serves of vegetables or fruit was used to categorize the vegetable or fruit consumption. It should be noted from the previously reported validity paper of the short diet questions assessed among preschool children (Flood et al., 2013), that the positive predictive value for vegetables was relatively low (34%) but higher for fruit (75%). This means that among those who report meeting the recommended serves of vegetables, there is a relatively low probability that they truly are meeting these recommendations, but this is higher for fruit.

What is already known

Studies on parenting style and parental self-efficacy and their associations with children's dietary behaviour have produced mixed results (Campbell, Hesketh, Silverii, & Abbott, 2010; De Bourdeaudhuij et al., 2009; Gubbels et al., 2009; Kremers et al., 2003; Pearson et al., 2009; Rodenburg et al., 2012; Vereecken et al., 2009; Vereecken et al., 2010), and these results may not be comparable because different definitions, classifications or measures in relation to parenting styles have been used.

Some studies (De Bourdeaudhuij et al., 2009; Kremers et al., 2003; Pearson et al., 2009; Vereecken et al., 2009) have used Maccoby and Martin's (Maccoby & Martin, 1983) classifications of parenting style with two dimensions — responsiveness (parental warmth/hostility) and demandingness (parental control). By crossing the dimensions of responsiveness and demandingness, four types of parenting style are created: authoritative (high-responsive, high-demanding), authoritarian (low-responsive, high-demanding), indulgent (high-responsive, low-demanding), and neglectful (low-responsive, low-demanding). Two studies have provided evidence that adolescents who were raised with an authoritative parenting style consume more healthy food (Kremers et al., 2003; Pearson et

al., 2009) and parental warmth was independently associated with adolescents' fruit intake (Kremers et al., 2003); another two studies did not find such an association (De Bourdeaudhuij et al., 2009; Vereecken et al., 2009). These latter two studies concluded that parenting style is not sufficient to change dietary behavior of children or sensitive to differences in dietary behaviour of children, and more specific diet related parenting practice has a stronger influence on children's dietary behavior.

Other studies (Rodenburg et al., 2012; Vereecken et al., 2010), using different classifications and measures regarding parenting styles, have provided contradictory evidence. One study found children (7-10-years of age) of rejecting parents consumed less fruit than children of non-rejecting parents (Rodenburg et al., 2012), and another found no general parenting style dimension explained differences in preschool children's fruit and vegetable intakes (Vereecken et al., 2010). Yet another study found that diet-related restrictive parenting practices were related to less consumption of unhealthy food and higher consumption of healthy food in 2-year-old children (Gubbels et al., 2009). In addition, a study using self-developed measures of maternal self-efficacy found that higher maternal self-efficacy regarding child diet, physical activity and sedentary behaviours was associated with children having more obesity-protective diets and reduced sedentary behaviours (Campbell et al., 2010).

What this study adds

Our study focused on parental self-efficacy, parental responsiveness (parental warmth and hostility) and children's dietary behaviour at 2 years of age. Our findings support previous evidence on the relationship between parenting style and children's dietary behaviour (Campbell et al., 2010; Kremers et al., 2003; Pearson et al., 2009; Rodenburg et al., 2012; Vereecken et al., 2010). The study suggests that global parental self-efficacy is a better predictor for dietary behaviour of young children, showing a stronger association with healthy dietary behaviours, compared with parental

self-efficacy for an infant. The study also confirms that mothers' age and socioeconomic status are important factors associated with children's dietary behaviour in the early years of life (Lorson, Melgar-Quinones, & Taylor, 2009; Riediger, Shooshtari, & Moghadasian, 2007).

Strengths and limitations of this study

One of the strengths of this study is that we examined the parenting styles and dietary behaviour of young children at 2 years of age as we believe that parenting styles have more influence on children in the early stage of life, in contrast to most previous studies that focussed on adolescent or school children. A validated questionnaire was used to assess a range of children's dietary behaviours and parental self-efficacy and parental responsiveness (Flood et al., 2013).

However, this study is limited by not including parental demandingness in the assessment of parenting styles, although the effect of demandingness may vary depending on whether it is in the context of a warm and responsive parent-child relationship (Kremers et al., 2003). The measurement information in this study was based on parent-report, which might be influenced by social desirability. Furthermore, mothers' ethnicity was not included in the analysis, making it difficult to compare these findings to results from other studies. A further limitation is that we only assessed the parenting styles of mothers, not of both parents.

In addition, given the cross-sectional nature of the study, causality cannot be concluded. A longitudinal analysis is planned in examining the relationship further between parenting styles and children's dietary behaviours using the Healthy Beginnings Trial data. Whether changes in parenting style can lead to changes in children's dietary behaviour remains to be tested.

Conclusions

Parental self-efficacy and parenting style are associated with children's dietary behaviour in early years of life. Parenting characteristics matter for children's development of dietary behaviours. Parental self-efficacy and parenting style targeted interventions may be a promising approach to improve children's dietary behaviours. Interventions that address parental self-efficacy and parenting style have the potential to contribute to tackling childhood overweight and obesity.

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Competing interests:

All authors have declared there were no competing interests in this study.

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Table 1. Questions used in assessing the parental self-efficacy and parenting style of participating mothers from the Healthy Beginnings Trial undertaken in south-western Sydney, in 2007-10

(source: Growing up in Australia: The Longitudinal Study of Australian Children)

<p>Global parental self-efficacy:</p> <p>Overall, as a parent do you feel you are...</p> <p>Not very good at being a parent A person who has some trouble being a parent An average parent A better than average parent A very good parent Don't know. Refused</p>
<p>Parental self-efficacy for an infant:</p> <p>Please indicate the extent to which these statements describe the way you generally feel or behave with your child (on a 10-point scale, '1' for 'not at all how I feel' to '10' for 'exactly how I feel').</p> <p>i. I feel that I am very good at keeping my child amused ii. I feel that I am very good at calming my child when he/she is upset iii. I feel that I am very good at keeping my child busy while I am doing other things iv. I feel that I am very good at routine tasks of caring for my child (e.g. feeding him/her, changing his/her nappies, giving him/her a bath)</p>
<p>Parental warmth:</p> <p>How often do you do the following with your child? [1 = <i>Never or almost never</i>, 2 = <i>Rarely</i>, 3 = <i>Sometimes</i>, 4 = <i>Often</i>, 5 = <i>Always or almost always</i>, DK = <i>Don't know</i>, R = <i>Refused</i>]</p> <p>i. Express affection by hugging, kissing and holding your child ii. Hug or hold your child for no particular reason iii. Tell your child how happy he/she makes you iv. Have warm, close times together with your child v. Enjoy doing things with your child vi. Feel close to your child both when he/she is happy and when he/she is upset</p>
<p>Parental hostility:</p> <p>Thinking about the last four weeks, how much do these statements describe how you have been feeling or behaving with your child (on a 10-point scale, '1' for 'not at all' to '10' for 'all the time')?</p> <p>i. I have been angry with my child ii. I have raised my voice with or shouted at my child iii. When my child cries, he/she gets on my nerves iv. I have lost my temper with this child v. I have left this child alone in his/her bedroom when he/she was particularly irritable or upset</p>

Table 2. Characteristics of participating mothers (n=242), and children's dietary behaviours from the Healthy Beginnings Trial undertaken in south-western Sydney, in 2007-10

	Number (%)
Demographics	
Age (years)	
< 25	87 (36)
≥ 25	155 (64)
Household income	
< \$40,000	63 (26)
≥ \$40,000	179 (74)
Education	
Under university	179 (74)
University/higher	62 (26)
Employment status	
Employed	150 (62)
Unemployed and others	92 (38)
Marital status	
Never-married	12 (5)
Married/de-factor	230 (95)
Dietary behaviour of children	
Vegetables (serves/day)	
< 2	112 (46)
≥ 2	130 (54)
Fruit (serves/day)	
< 2	71 (29)
≥ 2	171 (71)
Soft drink	
No	178 (74)
Yes	64 (26)
Snacks* (times/week)	
≤ 1	107 (44)
> 1	135 (56)

*Includes hot chips, potato crisps, and confectionery

Table 3. Associations of mothers' demographics, parental self-efficacy and parenting style with children's dietary behaviour by bivariate analyses

Variables	Vegetables ≥ 2 serves/day		Fruit ≥ 2 serves/day		Soft drink Yes		Snacks* > 1 time/week	
	n (row %)	P	n (row %)	P	n (row %)	P	n (row %)	P
Mothers' age (years)		0.316		0.664		0.002		0.022
< 25	43 (49)		60 (69)		33 (38)		57 (66)	
≥ 25	87 (56)		111 (72)		31 (20)		78 (50)	
Mothers' education		0.450		0.748		0.068		0.089
Under university	94 (53)		128 (72)		53 (30)		106 (59)	
University/higher	36 (58)		43 (69)		11 (18)		29 (47)	
Annual household income		0.086		0.036		0.015		0.001
<\$40,000	28 (44)		38 (60)		24 (38)		46 (73)	
≥ \$40,000	102 (57)		133 (74)		40 (22)		89 (50)	
Global parenting self-efficacy		0.003		0.002		0.003		0.081
Low self-efficacy	26 (38)		38 (56)		27 (40)		44 (65)	
High self-efficacy	104 (60)		133 (76)		37 (21)		91 (52)	
Parental self-efficacy for an infant		0.031		0.046		0.045		0.120
Low self-efficacy	27 (42)		39 (61)		23 (36)		41 (64)	
High self-efficacy	103 (58)		132 (74)		41 (23)		94 (53)	
Parental warmth		0.031		0.281		0.424		0.259
Low	30 (43)		46 (66)		21 (30)		43 (61)	
High	100 (58)		125 (73)		43 (25)		92 (53)	
Parental hostility		0.063		<0.0001		0.001		0.002
Low	104 (57)		142 (78)		38 (21)		91 (50)	
High	26 (43)		29 (48)		26 (43)		44 (73)	

* Includes hot chips, potato crisps, and confectionery

Table 4. Relationship between parental self-efficacy, parenting style and children's dietary behavior using logistic regression

Variables	Vegetable ≥2 serves/day		Fruit ≥2 serves/day		Soft drink Yes		Snacks^ > 1 time/week	
	AOR (95%CI)	P	AOR (95%CI)	P	AOR (95%CI)	P	AOR (95%CI)	P
Global parenting self-efficacy		0.003		0.003		0.019		0.082
Low self-efficacy	-		-		-		-	
High self-efficacy	2.40 (1.35-4.27)†		2.46 (1.35-4.48)*		0.47 (0.25-0.89)#		0.60 (0.33-1.07)†	
Parental self-efficacy for an infant		0.032		0.048		0.084		0.119
Low self-efficacy	-		-		-		-	
High self-efficacy	1.88 (1.06-3.36)†		1.85 (1.00-3.41)*		0.57 (0.30-1.08)#		0.62 (0.34-1.13)*	
Parental warmth		0.032		0.282		0.425		0.260
Low	-		-		-		-	
High	1.85 (1.06-3.25)†		1.39 (0.76-2.52)†		0.78 (0.42-1.44)†		0.72 (0.41-1.27)†	
Parental hostility		0.064		<0.0001		0.001		0.002
Low	-		-		-		-	
High	0.57 (0.32-1.03)†		0.26 (0.14-0.49)*		3.02 (1.59-5.72)#		2.78 (1.45-5.35)*	

* AOR was adjusted by household income.

AOR was adjusted by mothers' age.

† OR (No AORs obtained since no confounders were found in modeling process.)

^Includes hot chips, potato crisps and similar, and confectionery