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# An investigation into the protective factors for overweight among low socio-economic status children

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Youth overweight and obesity are serious and escalating public health issues. Obesity brings in its train serious immediate consequences for the affected child, including raised risk of type 2 diabetes, hypertension, sleep apnoea, social exclusion and depression.<sup>1</sup> Furthermore, weight status in youth predicts weight status in adults.<sup>2,3</sup> Among adults, obesity is now recognised as a primary risk factor for cardiovascular disease as well as other conditions such as diabetes, gall bladder disease, osteoarthritis and certain cancers.

It is generally accepted that the obesity epidemic is a result of 'obesogenic' factors that promote increased consumption of energy-dense foods and decreased energy expenditure, resulting in accumulation of body fat.<sup>1,4,5</sup> Surveys in New South Wales (NSW)<sup>6</sup> and South Australia (SA)<sup>7</sup> reveal higher prevalence of overweight among low socio-economic status (SES) youth, underscoring the need for greater understanding of the complex

relationships between SES and the health of young people.

Little is confirmed in the literature about the impact of a child's family and neighbourhood environments on health-related behaviours. There are reports of greater concerns about cost of sport participation, physical risk in the neighbourhood, restricted means of private transport and limited access to playgrounds and community facilities among parents of less active children.<sup>8</sup> While specific evidence is scarce, it seems reasonable to hypothesise that barriers such as these are more likely to affect children in economically disadvantaged circumstances.

This study aimed to expand the knowledge base about the attributes of children in neighbourhoods defined as low SES who display healthy behaviours in their eating and physical activity. This study design is modelled on the salutogenic approach to epidemiological research that pursues origins of health rather than causes of disease. Of particular interest are

## Abstract

**Issue addressed:** In light of the current obesity epidemic, this study aimed to expand the knowledge base about the factors involved and the characteristics of children of low socio-economic status (SES) who display healthy behaviours in their eating and physical activity.

**Methods:** This project was conducted in two phases: a non-experimental, quantitative design was used in phase one to assess the characteristics of a sample of children in a low SES community. This phase identified children who displayed healthy eating and physical activity behaviours. Phase two used interpretive qualitative methods to investigate the perceptions of these children and their parents about the protective factors involved. Focus groups with children and interviews with their mothers were conducted.

**Results:** In phase one, 45 of 227 children assessed met *a priori* criteria set for healthy eating and physical activity behaviours. Central themes identified in phase two include: the influence of perceived health benefits; parental and child values regarding healthy eating and physical activity; the sense of enjoyment that children experience; the impact of child preferences and choice; and social influences.

**Conclusion:** The study illustrated the complexity of factors involved in physical activity and healthy eating among children in a low socio-economic community.

**Keywords:** children, socio-economic status, overweight

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## So what?

From this study, recommendations are made for health promotion programs related to physical activity and healthy eating. These recommendations, based on the Health Belief Model, include the education of parents about general parenting skills, life skills, self-efficacy and problem-solving skills as well as focusing on enjoyment and choice for children.

the 'resistance resources' that allow people to maintain good health despite exposure to disease risk. It is anticipated that the findings from this study will increase our understanding of children in low SES communities who display healthy behaviours and characteristics in relation to pre-disposers to overweight, and their perspectives on the protective factors involved.

## Research methodology

This project was conducted in two phases. Phase one used a non-experimental, quantitative design to assess the characteristics of a sample of children in a low SES community in Adelaide, SA. This phase identified children who displayed behaviours indicative of a healthy lifestyle in their dietary intake and physical activity. Phase two used qualitative methods to investigate the perceptions of these children and their parents about the protective factors involved. Table 1 provides an overview of the phases involved and the corresponding research aims and instruments used.

### Phase one: assessment of characteristics of children in relation to predisposers to overweight

#### Sampling method

All children in Years 5, 6 and 7 from public schools in the northern suburbs of Adelaide were invited to participate. Six schools with school-card registers of more than 65% (i.e. more than 65% of children qualify for government support to meet the costs of attendance) were approached, and five agreed to participate. A total of 565 children were given information sheets and consent forms to take home. Of these, 227 children completed all aspects of phase one (40.2% of those initially invited).

#### Research instruments and measurements

*Height, weight and Body Mass Index (BMI)*

Body weight (to 100 g) and stretch stature (to 0.1 cm) were

measured using electronic scales and portable stadiometers, respectively. Stretch stature was used to minimise the effect of diurnal variation in stature, so that assessments could be made at any time during school hours. This involves application of gentle upward pressure through the mastoid processes during measurement. BMI was calculated as weight (kg)/stature (m<sup>2</sup>). Normal weight and overweight/obese children were identified using internationally derived cut-offs for these classifications.<sup>9</sup>

#### *Teacher rating of child's attitude to physical education (PE)*

Classroom teachers (or where appropriate PE specialists) were asked to complete a brief questionnaire on attitudes towards school PE among children in their classes. The focus was more on willingness to participate rather than skill in order to identify those with a positive attitude to physical activity. Each child in the class was ranked on a four-point scale, with one indicating low participation and four very high participation.

#### *Global physical activity rating*

Children completed a slightly modified version of the Physical Activity Questionnaire for Adolescents (PAQ-A). The modifications were linguistic, with American examples altered to Australian examples to make the information more culturally specific. The PAQ-A asks children to recall the number of times in the last week they performed moderate to vigorous physical activity, choosing from a checklist. Physical activity is described as "sports, games, or dance that make you breathe hard, make your legs feel tired, or make you sweat". Seven questions assess physical activity in both school and out-of-school hours, covering PE, recess and lunch, right after school, evenings and the weekend. One question asks which statement "describes you best for the last seven days" with five statements describing low activity to very high activity levels.<sup>10</sup> The items of the PAQ-A are scored on a five-point scale, with higher scores indicating higher levels of activity. A global physical activity rating was calculated from the average of these seven items to reflect the overall physical activity level.

**Table 1: Overview of phases of the project with corresponding research aims and research instruments utilised.**

Phases of the project and aim	Research instruments for each phase
Phase one: Assessment of characteristics of children in relation to predisposers to overweight	<ul style="list-style-type: none"> <li>• Height, weight and Body Mass Index (BMI)</li> <li>• Teacher rating of attitude towards physical education (PE)</li> <li>• Physical Activity Questionnaire (PAQ-A), time spent on organised sport and screen-time</li> <li>• Dietary intake questionnaire</li> </ul>
Identification of children according to a priori criteria for physical activity and dietary intake ↓	
Phase two: Description of children and parents' perspectives on protective factors	<ul style="list-style-type: none"> <li>• Focus groups with children</li> <li>• Interviews with parents</li> </ul>

*Organised sport participation*

Children were asked in a questionnaire how many organised sports they had played on a regular basis over the most recent summer and winter, and whether they had represented the school, a club or both in these sports.

*Screen time*

There is emerging evidence that screen-based leisure affects children's body composition independent of levels of physical activity.<sup>1</sup> A question appended to the PAQ-A asked children about screen-based leisure: "On an average day how many hours of TV/Video/DVD do you watch?" Response options ranged from: never/rarely to more than four hours per day.

*Dietary intake*

Dietary intake was assessed by a 22-item questionnaire completed by children. Using checklists, children were asked to indicate their intake of beverages and foods at breakfast, on the way to school, recess and lunch on the day surveyed and what they most often consumed after school. Checklists were based on those foods known to be commonly consumed by primary school children at these times.<sup>11</sup> In addition, for each item on a list of 18 fruits and 28 vegetables, they were asked to indicate if they consumed it yesterday, had it sometime or did not know/did not know what it was. Based on the *Dietary Guidelines for Children and Adolescents*<sup>12</sup> and the *Australian Guide to Healthy Eating*,<sup>13</sup> two scores were calculated from the completed questionnaire: a healthy eating score and an unhealthy eating score.

**Table 2: Characteristics of the sample.**

Variable	Boys	Girls
Age (years) <sup>a</sup>	11.25 (0.94)	11.20 (1.02)
Stature (cm) <sup>a</sup>	148.8 (9.8)	148.9 (8.9)
Weight (kg) <sup>a</sup>	46.41 (14.43)	44.70 (11.37)
BMI (kg.m <sup>-2</sup> ) <sup>a</sup>	20.71 (5.18)	19.96 (3.54)
Teacher rating (1-4) <sup>b</sup>	3.0 (2.0)	2.0 (1.0) <sup>e</sup>
Global PA (1-5) <sup>a</sup>	3.56 (0.87)	3.22 (0.65) <sup>e</sup>
Screen time (1-5) <sup>b,c</sup>	4.0 (3.0)	4.0 (2.0)
% normal weight: overweight/obese <sup>d</sup>	62.3: 37.7	70.5: 29.5
% meeting teacher rating criterion (high to very high) <sup>d</sup>	68%	51% <sup>e</sup>
% meeting screen-time criterion (< 4 hrs/day) <sup>d</sup>	28%	29%
% playing two or more organised sports <sup>d</sup>	67%	54% <sup>e</sup>
n=227	n=114	n=113

(a) Presented as means and standard deviations, comparisons by ANOVA.

(b) Presented as medians and interquartile ranges, comparisons by Mann-Whitney U.

(c) 1=never/rarely; 2=0-1 hours; 3=1-2 hours; 4=3-4 hours; 5=more than 4 hours.

(d) Comparisons by chi square.

(e) Boys and girls significantly different,  $p=0.05$ .

**Results of phase one: identification of children***Description of participants*

As can be seen in Table 2, boys were more active than girls according to the teacher rating ( $p=0.0004$ ) and self-reported global physical activity rating ( $p=0.01$ ), with no gender differences in screen time ( $p=0.63$ ). The proportions of overweight boys (37.7%) and girls (29.5%) are somewhat higher than reported for a representative sample of upper primary age South Australians from 1997 (23.3% of boys and 19.8% of girls).<sup>6</sup>

*Relationships between variables*

Teacher rating of physical activity and global physical activity were correlated in boys and girls, providing evidence of concurrent validity between these subjective ratings (see Table 3). There was a significant inverse association of teacher-rated physical activity and BMI in boys but not girls, while screen time was unrelated to BMI and both measures of physical activity among boys and girls.

*Identification of children: physical activity*

The criteria used for children's physical activity were: children who were in the normal BMI range; rated by their teacher as 'high' or 'very high' in PE participation; and possessed at least two of the following three attributes: global physical activity rating above the median; two hours or less of daily screen time; and participation in two or more organised sports in the previous 12 months.

Of the 114 boys and 113 girls, 16 (14%) and 15 (13%) respectively met the criteria and therefore entry into phase two. The criterion that most participants failed to reach was the recommended screen-time exposure of two hours or less per day, with 72% of boys and 71% of girls exceeding this threshold. Most boys were active participants in PE (67%), while 68% played at least two organised sports in the previous 12 months. About half the girls met the criteria for active engagement in PE and organised sport participation.

**Table 3: Correlations<sup>a</sup> among measured variables.**

	BMI	Global PA	Teacher rating	Screen time
BMI		-0.172 ( $p=0.07$ )	-0.250 ( $p=0.01$ )	0.16 ( $p=0.09$ )
Global PA	-0.009 ( $p=0.89$ )		0.250 ( $p=0.01$ )	-0.086 ( $p=0.37$ )
Teacher rating	-0.062 ( $p=0.25$ )	0.302 ( $p=0.01$ )		-0.048 ( $p=0.62$ )
Screen time	-0.055 ( $p=0.57$ )	-0.002 ( $p=0.98$ )	-0.069 ( $p=0.95$ )	
n=227				

Boys in *italics*.

(a) Spearman rank order correlation coefficients.

### *Identification of children: dietary intake*

The healthy eating score ranged from four to 20 (median 10) and the unhealthy eating score from three to 30 (median 14). Eighteen children were identified by plotting the healthy eating score against the unhealthy eating score and those children with a healthy eating score in the top 20% (14 or greater) and an unhealthy eating score in the bottom 20% (i.e. least unhealthy, 10 or less) were identified.

Of the children identified, only four met all criteria for both physical activity and dietary intake; consequently, selection into phase two was performed on the basis of these behaviours separately, with phase two focus groups and interviews therefore focusing on either physical activity or dietary behaviours. Children meeting both dietary and physical activity criteria were asked to attend both focus groups, and two of the four agreed to do so.

## **Phase two: children's and parents' perspectives on protective behaviours**

### **Research methodology**

During this phase, an interpretive qualitative methodology<sup>14,15</sup> was used to investigate the perceptions of children and their parents as to why the children participated in physical activity and ate specific foods. A qualitative design was chosen to create a rich description of the phenomenon, aiming to understand the thoughts, feelings and experiences of the children and their parents. Focus groups were conducted in schools with children and home interviews were used to collect data from their parents.

### **Participants and sampling method**

Twenty-seven children of the 49 identified in phase one, aged between 10 and 13 years, participated in a focus group on physical activity or healthy eating. Some identified children were unable to participate because of practical reasons such as illness or outings on the day of the focus groups. Eighteen of these children's mothers were involved in interviews. Ten boys and eleven girls participated in three 'all boy' and four 'all girl' physical activity focus groups and four boys and four girls participated in three mixed gender healthy eating focus groups. One boy and one girl participated in both a physical activity and a healthy eating group. Sizes of groups ranged from two to five children. Groups were composed based on the school that the child was attending.

### **Research instruments used**

Focus groups were designed to facilitate children's active participation in the discussion and involved activities as recommended by the literature.<sup>16</sup> The activities aimed to gain access to children's meanings by using accompanying questions

designed to elicit discussion. The researcher took on the roles of observer and facilitator, being aware of the need to facilitate spontaneous conversation between peers<sup>17,18</sup> rather than with the adult researcher. A trained research assistant facilitated the focus groups. The focus group questions and process were pilot tested<sup>19</sup> before use.

The activities utilised were the creation of collages in the physical activity groups, and during the healthy eating groups the children were asked to identify healthy and unhealthy foods from the dietary intake questionnaire to prompt thinking about food choices. Questions were used to promote discussion of the specific chosen activity, who they do it with, when they do it and their likes and dislikes regarding the activity. Key discussion points were captured on a whiteboard and verified by the children. Consensus was reached on the accuracy of the data for both types of focus groups. Focus group discussions were audio-taped and written records kept.

Semi-structured interviews with parents provided an opportunity to verify data obtained from the children. Similar questions used in the focus groups were asked of parents. Notes were taken and interviews were taped and transcribed.

In collaboration with other researchers, an inductive thematic data analysis approach was employed.<sup>20</sup> The categories were derived from the data, which were then developed into themes and were referred back to the original data to check for accuracy.

### **Findings of the study: phase two**

Findings from the focus groups and home interviews were integrated into themes within the two main topics: physical activity and healthy eating.

#### *Physical activity*

The majority of children selected a sport when prompted to select a physical activity to create a collage; for example, cricket and netball. Mothers also often listed sports first and then discussed other physical activity such as riding bikes and playing with the dog. Themes were developed from the combined focus groups and interviews, and the first four below were derived from both the children and their mothers. The last three themes mentioned were identified by the mothers only.

#### *Perceived health, fitness, and well-being benefits*

Participants reported involvement in activities for a range of health, physical and psychological well-being benefits. Children identified physical activity as a means to be, or become, fit and healthy. Examples of statements are: "good for health"; "work off calories", "increased energy", and keeps "muscles working". Statements included that physical activity "makes me feel good" and it "makes me fit and healthy". Mothers mentioned explicitly the health benefits of physical activity, for example as a means to control weight.

*Sense of enjoyment*

Every child reported that the physical activity they participated in was fun, which was supported by all mothers. Comments from children included: "It makes me happy" and "It's more fun than watching my favourite movie". Sense of enjoyment as a factor in physical activity is supported by other researchers.<sup>21,22</sup>

*Social interaction and recognition*

Children mentioned friends as a factor frequently, for example meeting and making friends and sharing meaningful time together. Family members were another significant group mentioned. At least one child in each focus group participated in a physical activity with a family member. Mothers discussed how physical activity was a family event or habit, with most mothers having participated in a sport as a child. One mother mentioned that she invited her son along to her horse-riding sessions even though he did not ride. At the sessions he "is either kicking the ball around or brushing the horse", which counts as physical activity for the mother. They mentioned the influence of family members, for example some parents were involved as sport coaches. Children discussed the social recognition they received and the role of teams and spectators. Examples include: "help team mates" and "I'm the captain; I have to participate". Other researchers<sup>23-25</sup> also recognised the influence of social factors such as the broader family and community on physical activity.

*Competition against self and others, self-development and sense of competence*

References were made to being a competitive person and liking to win. A few children spoke about the self-development that occurs when they participate in physical activity and most reported a sense of competence in their physical activity. One mother stated: "He improves greatly once he starts ... he picks things up quickly and learns the rules." Most mothers said they thought their children were good at the physical activity they participated in. In exploring the concept of skill development and sense of achievement, Sallis, Prochaska and Taylor<sup>26</sup> found a positive association between perceived activity competence and adolescents' physical activity, as well as a positive association between achievement orientation and physical activity.

*Parents' personal values regarding physical activity*

Mothers exhibited and talked about a variety of personal values related to and influencing their children's physical activity. For the following mother, doing something purposeful is important: "I do want her to do a sport, an activity. ... I don't want her to sit and do nothing." For another, it is important to be outside: "If it's a nice day I like them to get out and play outside."

*Personal characteristics of child*

The majority of mothers mentioned that their child's personality, characteristics or interest in being physically active was present from a young age. Some also compared their child's activity pattern with their own and thought there might be a genetic component. An example of a statement is: "He's not a sitting down person."

*Environmental factors: transport, resources and safety*

Mothers discussed a variety of environmental factors that influenced their ability to allow and encourage their child to participate in physical activity. All of the mothers interviewed inferred that potential barriers existed that may have prevented their child from participating in their chosen physical activity, but that their family had compromised or negotiated strategies to address these barriers.

One mother stated: "So I have to work things out" when talking about facing transport problems. Potential barriers included: transportation, resources (including equipment and financial), and safety concerns. One mother without a car resolved this problem by organising for her ex-husband to provide transport for the children to sport activities. Another mother stated the following strategy to address safety concerns: "... just stay in one place ... like to know where they are". Other mothers spoke of strategies such as use of mobile phones and older siblings. Financial barriers were issues for most mothers. One mother spoke of finding creative ways to do activities and another of giving uniforms and equipment as gifts for birthdays or Christmas.

**Healthy eating**

Themes from both focus groups and interviews follow below.

*Parental influences, health beliefs, provision, preferences and rules*

Mothers talked about their belief in healthy food choices, which was supported by the children. Mothers restricted unhealthy foods and encouraged healthy foods. One mother said: "I don't restrict what vegetables or fruit he snacks on ... chips I curtail." This finding illustrating parental influence on healthy eating is supported by results from other studies.<sup>27-29</sup>

Children in the current study reported their parents' health beliefs were communicated to them through rules and expectations, for example: "Mum complains if you don't eat breakfast." Portion restrictions and control varied from home to home. Many mothers mentioned specific amounts of food their child was allowed each day. One example is: "When they're at school they each have a container which has their treats in it for the week ... once it's empty, that's it."

Most parents acknowledged that their own actions influenced their children's food choices, which was supported by the

children and other research studies.<sup>30,31</sup> One mother said: "They obviously see the parents having healthy choices." Availability affected what the child chose to eat. For most children, their mother was the primary food purchaser. A comment included: "I eat unhealthy foods when there's nothing else in the cupboard." This finding, which illustrates food availability as a factor in food preferences, is supported by other studies.<sup>27,31-33</sup>

Although some mothers mentioned financial considerations in buying food for the family, they reported that healthier food and home-cooked meals were more affordable. Restrictions are usually placed around less healthy food, which is both a health and a financial consideration for them. One mother's statement illustrates the financial consideration: "... I've got a big family ... I think fruit and vegetables go further..."

#### *Sense of enjoyment, familiarity and variety of foods*

All the children reported that the reason they ate their favourite healthy and unhealthy foods was that they liked them—especially in terms of taste, texture, and smell. They described how their favourite foods had good "colour – ripeness", had "lots of flavour," and "looks nice, smells nice". Mothers described how their children "like the taste" of the foods. This finding is supported by another study into adolescent eating behaviours.<sup>27</sup>

For nearly half of the mothers in the current study, food was described as being enjoyable because of its familiarity. A few of the mothers said that they ate basically the same meals on a regular basis. Mothers also discussed how variety affected the sense of enjoyment and stressed the importance of variety to keep enjoyment levels up. None of the mothers reported forcing their child to eat foods that they did not like, but most shared the expectation that they would at least try new foods. Half the mothers indicated that they tried re-presenting in new ways foods that had previously been disliked.

#### *Child preferences, choice and decision making*

Children expressed that they felt they had a choice in what they ate. Their reasons for choosing foods varied and included personal preferences and specific conditions, for example eating ice-cream in warm weather. The majority of mothers interviewed described their child as "easy to please", with a minority being "picky eaters". Mothers displayed a high level of understanding of the role that their children's personal choice played and provided children with limited choices rather than everything they wanted. For example: "They've usually got a choice of three or four salads to choose from." Law<sup>34</sup> supports this finding by advocating for choice or control over activities in order to provide meaning and encourage involvement in activities.

#### *Wider community influences: health values and beliefs*

Community influences on eating behaviour mentioned by the children were sport coaches, teachers and schools, and television

advertising. Mothers mentioned teachers, adult siblings and coaches. For example: "At her last school [the] class was encouraged to bring in chopped up carrots and fruits ... And if they brought them in, they could eat them all day." Peer pressure was also acknowledged by mothers as a barrier to healthy eating at school. However, they said that this pressure did not always generalise to the home environment.

## Discussion

The findings of this study provide valuable information illustrating the complex nature of physical activity and healthy eating among young people, supported by other researchers.<sup>35,8</sup> The common themes within the two categories of physical activity and healthy eating are displayed in Table 4.

In both the categories of physical activity and healthy eating, parental and child values emerged as a prominent theme. Parental values and influence were stronger in the healthy eating category, with mothers having a direct influence on the provision of healthy foods. In the physical activity category, a balance between parental influence and child preferences was more evident. Recognition therefore needs to be given to the significant influence that parents have in facilitating a healthy lifestyle. Similar results have been obtained by other researchers in this topic area<sup>36-38</sup> in regard to the impact of parents as determinants of engagement in physical activity and diet.<sup>21,28</sup>

Both parents and children displayed values related to healthy eating and physical activity, which are key to pursuing desired behaviours. First, mothers and children had an understanding of the health benefits related to healthy eating and physical activity. Second, parents displayed a sense of self-efficacy, i.e. a belief in their ability to take appropriate action and utilise their problem-solving skills in their pursuit of a healthy lifestyle, in spite of difficulties faced. Examples of strategies include the availability of healthy foods; parents' involvement in sport activities; setting rules about dietary intake and activity participation; food availability; and overcoming barriers to physical activity such as transport, safety and limited finances. These findings are consistent with the Health Belief Model in interventions.<sup>39,40</sup> The Health Belief Model explains the process by which an individual will take action related to a given health problem. Individuals will take action to protect or promote health

**Table 4: Common themes within the categories of physical activity and healthy eating.**

Physical activity and healthy eating.
Perceived health benefits, parental and child values regarding healthy eating and physical activity.
Sense of enjoyment.
Child preferences, choice and characteristics.
Social influences: family, friends and wider community.

if they perceive themselves to be susceptible to a condition or problem and if they believe it will have potentially serious consequences. They believe a course of action is available that will reduce their susceptibility or minimise the consequences and that the benefits of taking action outweigh the costs or barriers. Self-efficacy is an important factor in this process. Other influences on this process are personal characteristics, social circumstances and immediate cues for action, for example media publicity.

This study has provided valuable information on potential strategies for assisting other families to incorporate healthy eating and physical activity into children's lifestyles. Strategies for further consideration include:

- More research and appropriate educational programs related to internal drivers such as motivation, values and self-efficacy.
- The provision of training for parents in self-efficacy and problem-solving skills in order to address barriers to implementing a healthy lifestyle. The unique and complex nature of some family situations in lower SES communities warrant a sensitive and tailored approach to support parents.
- Parental training in life skills, such as buying and cooking healthy and cost-effective family meals, making healthy fast food choices, active play with their children and general parenting skills.
- A balanced approach between parental influence and children's choice in activities. The provision of choices for children in physical activity and healthy eating is a strategy to ensure that children's own preferences and personal characteristics are incorporated, thereby increasing their sense of enjoyment.

### Critical evaluation of the study

The use of both child focus groups and parental interviews supports the credibility of the findings of this study because many of the themes were similar for both the children and parents. Generalisability of the findings is limited to groups with similar characteristics, that is, children aged 10-13 years from the northern suburbs of metropolitan Adelaide. This study focused on the viewpoints of selected children identified with a high physical activity level and healthy eating patterns. Exploration of the viewpoints of less active children and with unhealthy eating patterns would be valuable for a future research study.

### Conclusion

This study has provided valuable information on children and their parents' perspectives on protective behaviours against obesity. It has illustrated the complex interplay of child specific, parental and environmental influences on healthy eating and engagement in physical activity. The descriptions provided by

parents and children have identified potential strategies to be explored further for the promotion of healthy lifestyles among families in similar circumstances.

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