



## FACT SHEET

# Sugar & children's behaviour

Sugar can be used in moderation in children's diets, but is there reason to exclude it altogether? Numerous myths persist about the effects of sugar on children, particularly related to behaviour. However, research into sugar and behaviour shows that sugar is not the villain it was once considered to be.

Despite the results of carefully controlled studies there is still a strong belief among some health professionals and caregivers that sugar, particularly refined sugar or sucrose, does affect children's behaviours.

While information on this subject is dated, research largely conducted since the mid 90s illustrates that there is no clear association between sugar intake and inappropriate behaviour patterns in childhood.

A New Zealand-based study undertaken in 1989 looking at the changes parents made to their child's diet, particularly deliberate

additions and avoidances, clearly illustrated the level of concern some people had about sugar consumption – even at that time.<sup>1</sup> Among 103 children a specific alteration to the diet was seen in 48 cases. There were 38 avoidances, 20 additions and in 10 children there were both. In five cases sucrose was avoided due to health beliefs, perceived hyperactivity, overweight and constipation. Interestingly, the source of advice directing these sucrose avoidances were media, family and in one instance, a physiotherapist. While the researchers acknowledge these dietary adjustments were not harmful to the children, they do

illustrate the varied beliefs and sources of information caregivers rely on.<sup>1</sup>

In the last 20 years, while much scientific study has been completed on possible dietary causes of hyperactivity (showing no association with sugar intake), parents continue to receive misinformation about the role of sugar on childhood behaviour from the same sources.

The following information presents the most up-to-date information on the subject of sugar and behaviour.

## Hyperactivity

A review of research explores the possible link between sugar intake and excessive activity in children. Hyperactivity or ADHD (Attention Deficit Hyperactivity Disorder) are often used synonymously. However, there are subtle differences. ADHD can be considered 'true hyperactivity'.

ADHD is characterised by difficulty in delaying gratification, inattentiveness, distractibility, impulsive behaviour, anxiety and excessive motor activity. It is often accompanied by emotional immaturity, aggressiveness and poor academic performance.<sup>2</sup>

The prevalence of ADHD, as opposed to the child simply being overactive at times, is very low. It has been estimated that approximately 3% of children may suffer from ADHD with the disorder six to nine times more common in boys than girls.<sup>2</sup> Clearly the perceived frequency is far higher. There has been much speculation about the causes of ADHD and both genetic and environmental factors have been associated with it.<sup>2</sup>

Nutritional factors such as food additives, food sensitivities/allergies, fatty acid deficiencies and refined sugar have all been linked to ADHD at times. While there is some evidence that children with behavioural problems are sensitive to one or more food components, researchers agree that ADHD is a problem of complex etiology.<sup>2</sup>

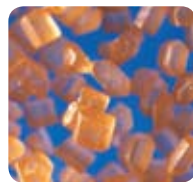
## Hyperactivity and sugar intake

The interest in sugar and hyperactivity peaked in the mid 1970s when several cross sectional studies suggested an association between sugar intake and hyperactivity.

However, a major limitation of cross sectional studies is that it is impossible to determine a cause and effect relationship i.e. it was equally possible that the behaviour caused the increased sugar intake, rather than the increased sugar intake causing the behaviour.<sup>3</sup> It was also likely that a third variable such as different parental discipline style may have been a causal factor. Another problem was that these studies were based on retrospective meal intakes providing data on what children had been eating a week or so before the assessment of behaviour, whereas sugar's effect on behaviour could be more immediate e.g. within 30 to 60 minutes from sugar consumption.<sup>2</sup>

A more detailed assessment of this issue has required intervention studies. This is where a dietary challenge method is used, along with attempts to replicate real life situations reported by parents, to demonstrate adverse effects of refined sugar (sucrose) on children's behaviour. In one study, children's behaviour was rated for several hours after consuming either a sugar-containing food or beverage or a placebo containing an artificial sweetener (aspartame or saccharine).<sup>3</sup>

The study was double blind. The children, their parents and researchers were unaware of the composition of foods or drinks consumed.



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### CONTINUED ► Hyperactivity and sugar intake

Crossover procedures were also employed whereby children were given the sugar-containing item on one day and a placebo on another, with the order of presentation varying among the children. Results showed that even when sucrose or aspartame intakes exceeded typical dietary levels that there were no effects on the children's behaviour or cognitive function.<sup>3</sup>

## Behaviour and cognition

Behaviour and cognition are complex issues that can be influenced by a magnitude of factors including social, familial or psychological. Nutrition is only one aspect involved in performance. It is now generally accepted that sugar consumption is not linked to adversely affecting children's behaviour.<sup>4</sup>

Following the research of the mid 90s, researchers conducted a meta-analysis of results. They examined intervention studies looking at the effects of sugar intake on the behaviour or cognition of children, and reviewed 23 studies conducted between 1982 and 1994.<sup>5</sup> The researchers examined the cumulative results of studies which identified any effects of sugar on the behaviour or cognitive performance of children. Subjects included both normal and reportedly hyperactive children. The studies reviewed included a combination of academic tests, motor skills tests and direct observation. Results of this meta-analysis found that sugars (mainly sucrose) do not affect the behaviour or cognitive performance of children.<sup>5</sup> These findings were further supported in another recent review. It was also highlighted that the best way to ensure optimal cognition and behaviour was to have good dietary habits.<sup>6</sup> However, it is possible that there may be a small effect of sugar or effects on subsets of children.<sup>5</sup>

More recently a further review concluded there is little empirical evidence to support the effectiveness of dietary restrictions in treating child psychiatric disorders, in particular, autism and ADHD.<sup>7</sup>

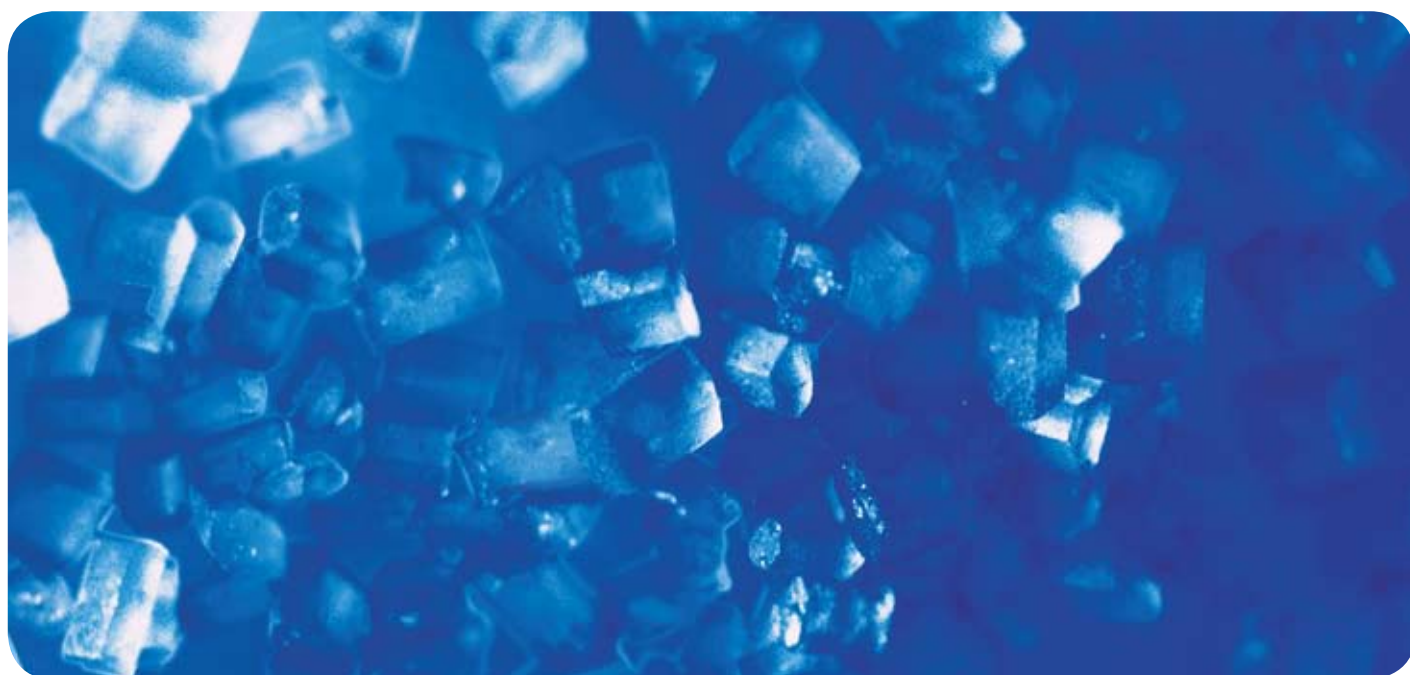
In some instances, research indicates that intakes of sugars can in fact improve performance on cognitive tasks from infants to the elderly.<sup>6,8</sup> It appears that the brain is sensitive to short-term fluctuations in glucose supply and therefore it might be important to maintain even levels during the day to optimise cognition. The mechanism by which glucose enhances memory is poorly understood.<sup>9</sup> However one area which future research should focus on is to investigate the effect of ingestion of foods with a low Glycaemic Index (GI).<sup>9</sup>

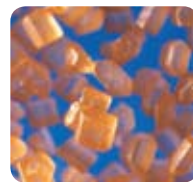
## Limitations of the research

Other than research investigating a positive role for sugar and cognition, there has been little research since the mid 90s. Many studies included in the meta-analysis had a small sample size, so there is limited power to detect significant effects. Furthermore, dosages used in the challenge studies may have been too small to have significant effect when compared to children's normal daily intakes.<sup>2</sup>

Participant selection is another issue. What are the criteria for sugar sensitivity? Studying the reaction of so-called 'sugar sensitive' children to sugar ingestion cannot be generalised to the normal population of children and vice versa.

Hyperactive children may have multiple sensitivities, so eliminating only one of the substances e.g. sugar or a food additive may not make a significant difference in behaviour.<sup>2</sup>





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# Why results of research differ from expectations

Parents' beliefs and expectations can have a major effect on how they perceive behaviour and how they interact with children.<sup>10</sup> The most common explanation as to why there is a so-called "sugar high" is that foods high in sugar are often given to children in contexts which are celebratory, rewarding and exciting.

For instance, children become excitable at birthday parties and holidays, which generally coincide with high sugar intakes from foods like fizzy drinks, lollies or cakes. Variation in their behaviour may be mistakenly correlated with sugar consumption. This, along with negative media publicity on sugar, may encourage current misunderstandings.<sup>5</sup>

## Further research needed

Additional studies are needed to test for differential effects of sugar on restricted subsets of children i.e. there may be a subset of children with behavioural problems who are sensitive to one or more food components. The studies discussed in this paper show that not all hyperactive children respond to the same offending substance.



## Summary

Current research provides little support for the effect of sugar on behaviour of most children. Consumed in moderation as part of a healthy, balanced diet, sugar poses negligible risks to most children and its addition can assist with consumption of nutritious foods that may otherwise be unacceptable.

It is strongly recommended that removal of any food, component or ingredient from the diet of a child should only be done under the advice and supervision of an appropriate health professional, such as an allergy specialist or dietitian.

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Contact details are:  
The Secretariat  
SRAS  
PO Box 5224  
Wellesley Street  
Auckland  
Fax 09 308 9456  
Email [info@sras.org.nz](mailto:info@sras.org.nz)