



# Sugar and 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 amongst some health professionals and caregivers that sugar, particularly refined sugar or sucrose, does affect children's behaviours.

A New Zealand-based study looking at the changes that parents make to their child's diet, particularly deliberate additions and avoidances, clearly illustrates the level of concern some people have about sugar consumption.<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.

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

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, hyperactivity or ADHD (attention deficit hyperactivity disorder).

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>1</sup>

The frequency of true hyperactivity 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 1970's when several cross sectional studies suggested an association between sugar intake and hyperactivity.<sup>3</sup>

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 on children's behaviour. In these studies, 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).

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

## Behaviour and cognition

Following these studies, 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 sixteen studies conducted between 1982 and 1994.<sup>4</sup> These 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>4</sup>

## Limitations of the research

There appears to be little further research on the subject of sugar and behaviour since the mid 1990s. Many studies included in the meta-analysis had small sample sizes, meaning they have 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 can not 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 food additives, may not make a significant difference in behaviour.<sup>2</sup>

## 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>5</sup> For instance, children become excitable at birthday parties and holidays, which generally coincide with high sugar intakes. Variation in their behaviour may be mistakenly correlated with sugar consumption. This, along with negative media publicity on sugar, may encourage current misunderstandings.<sup>4</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.

An exciting area for future ADHD research is the use of topographic EEG mapping of brain electrical activity as a diagnostic tool for identifying food sensitivities. Instead of relying solely on children's behavioural and cognitive performance after consuming various foods, by identifying changes in brain electrical activity, EEG mapping can provide strong objective measures.<sup>2</sup>

## Summary

Although current research provides little support for the effect of sugar on behaviour, there are not enough studies to reach a definitive conclusion. 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 to children.

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.

## References

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