

Chocolate and children: a critique

by Sue Dengate 25/4/07

Introduction

A Macquarie University (Sydney) study on chocolate and preschoolers has been widely interpreted to mean that chocolate and other foods don't make kids hyperactive. But is that what researchers really found? Altogether, 26 preschoolers from 3 preschools were videotaped for just 7 minutes half an hour after they ate sultanas or Freddo frogs, and no change was seen in their behaviour. The researchers assumed that any effects would be due to sugar, and didn't mention amines. We agree with them that sugar doesn't affect children's behaviour. But anyone who knows anything about the effects of amines in chocolate understands that reactions are usually delayed. 'I'd bet my bottom dollar that some of those kids responded to the chocolate a day or two later' commented one failsafer. And another thing: the researchers assumed that sultanas were a 'healthy' food that wouldn't affect children's behaviour. Didn't they find out *anything* about food intolerance before they started? Sultanas are high in *both* salicylates and amines, so are likely to affect more children behaviourally than chocolate – but again, you're unlikely to see any reaction within the first 40 minutes. There is no way that the results of this study could lead to the recommendation 'don't blame those Easter eggs for kids behaving badly', as reported by dietitian Nicole Senior in the April Super Food Ideas magazine.

* **Reason for study:** to investigate the 'popular belief' that chocolate adversely affects young children's behaviour.

* **The study:** the researchers videotaped 26 preschoolers while they listened to a story for seven minutes. The children were then given three Freddo chocolate frogs or an equivalent weight of sultanas (dried grapes). After 30 minutes, the children were again videotaped for seven minutes while listening to another story. The study was conducted in three preschools over two mornings, before morning tea, one week apart, with the order of presentation of dried fruit or chocolate varied. Independent raters used the videos to assess the children's activity levels and concentration (Ingram and Rapee, 2006).

* **Results:** there were no significant differences in the children's 'before' and 'after' behaviour with either chocolate or fruit, Researchers concluded that 'giving a moderate amount of chocolate to young children appears to have no more adverse effects on their behaviour than giving them dried fruit'. The researchers did find, however, that there were differences in the children's baseline behaviour (behaviour was significantly worse - both before and after - on fruit days). Researchers suggested that parents may be misinterpreting changes in children's behaviour as due to chocolate when it could be the excitement of a birthday party or irritability after a day at kindergarten.

* **Selection of participants excluded children likely to react:** 26 children were recruited from three preschools. None of the children were identified as having a developmental disability, a history of hyperactivity, or a major adverse behavioural reaction to chocolate. It is estimated that one child in six suffers from a development disability (Grandjean and Landrigan, 2006) thus children who were most likely to be affected were not included in this study. An entire class of children would have been a more representative sample.

* **Superficial literature survey:** The researchers wrote 'there have been no direct investigations into the behavioural response to chocolate consumption' while ignoring successful diet studies which conducted chocolate challenges as part of an elimination diet and challenge protocol. In trials of the Few Foods elimination diet, Egger et al (1985) and Carter et al (1993) found about 60% of subjects responded to chocolate challenges, the latter in double-blind placebo controlled trials. Food chemical elimination diets, however, use a different method. They focus on removing food chemicals such as additives, salicylates and amines from the diet, and reintroduce chocolate as part of the test for reactions to biogenic amines such as tyramine. Swain et al (1985) found a high proportion of reactions to amines

in 86 hyperactive children, although significantly fewer than those who reacted to salicylates. For some children, chocolate is a safe treat that does not contribute to hyperactivity. For children who are sensitive to amines, it is not.

* **Unstable baseline:** the 'gold standard' for food challenge testing is the double blind placebo controlled challenge, preceded by some form of an elimination diet to achieve a low and stable baseline before challenges. Baseline readings as reported in this study were not stable, as shown by significantly different baselines on fruit versus chocolate days, which were dismissed by the authors as due to 'unpredictability of children in general'.

* **Lack of theoretical framework for food reactions:** immunoglobulin E (IgE) antibodies, overabundant in people with allergies and linked to wheezing, sneezing, itching and swelling, were first isolated and described in the 1960s. Although many food-behaviour researchers in the 1970s and 80s assumed that behaviour food reactions were "allergies" more recent research has showed that behavioural reactions to foods are not related to IgE mediated allergy, but seem to be pharmacological reactions to food chemicals such as amines in chocolate, which are characterised by dose-related, cumulative and delayed reactions (Clarke et al, 1996). Macquarie researchers, apparently unaware of these studies, assumed that any possible effects of chocolate would be due to sucrose or caffeine, despite quoting studies showing that neither sugar or caffeine are related to children's behaviour.

* **Placebo not neutral:** sultanas were chosen for as the placebo because they are a 'healthy' food that researchers assumed would not affect children's behaviour. In fact, sultanas contain high levels of natural amines – the chemical also in chocolate – as well as salicylates. Studies show that salicylates affect children's behaviour and that more children are affected by salicylates than amines (Swain et al, 1985, Breakey 1991) so in this case the placebo would be more likely to cause a reaction than the chocolate, although not within the limited time frame for observations chosen by the researchers.

* **Limited timing of observations:** children were observed for 7 minutes, half an hour after the ingestion of the food. This very limited timing was based on a small study twenty years ago that purported to show behavioural effects of sugar 45-60 minutes after ingestion of sugar, apparently because researchers assumed they were testing the effects of sugar in chocolate. In fact, reactions due to food chemicals can be delayed for hours or even days (Loblay and Swain 1986, Clarke et al 1996), and as many parents in the Food Intolerance Network have discovered, behavioural reactions to amines can be one of the slowest of all reactions. In this situation, we would have predicted no reaction to either salicylates or amines within 40 minutes and that is exactly what happened.

* **What this study showed:** a small group of preschool children had no reaction to 3 Freddo frogs within 37 minutes of ingestion.

* **What this study didn't show:** that children's behaviour at birthday parties is due to excitement rather than additives such as artificial colours and MSG.

* **What the media reported:** Cognitive Daily headlined it as 'don't let your kids read this entry (Chocolate doesn't make them hyperactive)'. The author leapt from the study's limited finding about chocolate to the wider conclusion based on the researchers discussion: 'this suggests that other phenomena such as weather, other goings on in the classroom and so on are much more likely to affect behaviour than the particular food a child eats' as did most others, including dietitian Nicole Senior in a popular magazine widely read by parents.

* **What this study didn't report:** why the chocolate was called Freddo Frogs but the brand of the sultanas wasn't revealed

* **Implications for parents:** independent scientists report that some children can be severely affected by some foods and that ignoring or denying the effects of foods is not helpful for families (Jacobson and Schardt, 1999). Once again, parents and children lose out. This study gives no constructive suggestions for parents who are having trouble controlling their children, children who constantly feel irritable or aggressive, or for teachers with such students.

*** My Conclusion:** due to the superficial literature survey in this study, the authors failed to grasp the complexity of food intolerance and carried out a pseudo-scientific study that gives the food industry another reason to bully parents, while denying parents the right of reply.

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