WSRO POSITION STATEMENT

Sugar and Addiction

Updated December 2013

Background
A number of scientific studies have suggested that consumption of certain foods, such as those containing sugars, engage similar nerve pathways in the brain (those associated with pleasure) as drugs of abuse, and consequently, should be considered addictive substances (1). It is further argued that addiction of this type leads to binge-eating and that this is responsible for the currently high prevalence of obesity in many countries (2).

Each of these three hypotheses has been questioned (3-5). It is therefore important to examine separately the evidence for each of them, since acceptance of the first does not necessarily imply that the two dependent hypotheses are also valid (4). It is also necessary to critically examine the suggestion that the addiction model provides useful insights into reasonable public policy approaches to the obesity issue (4).

The problems of rational interpretation of the conflicting evidence in these areas are compounded by doubts as to the meaning of the term “addiction” and its usefulness in clinical practice and public health discussion (3,4,6). Most researchers in this field rely on the term “substance dependence” as defined in the psychological literature (7), which may not be relevant (5) or helpful (4) in the context of behaviour towards foods. Since consumption of calorific food is essential to survival, it is unsurprising that the human brain is programmed to find such consumption pleasurable (5). Examination of brain responses to food consumption, particularly in the absence of subsequent behavioural responses, are insufficient evidence for foods possessing addiction-like characteristics (8). Key features of substance dependence include tolerance (increasing amounts of the substance are required to produce the desired effect) and the experience of serious withdrawal symptoms when intake is stopped. Neither features have been observed in human subjects with respect to food (3). Neither the American Psychological Society or the EU FP7-funded research group, NeuroFAST, consider that foods can result in a substance-based type of addiction (9,10).

Evidence for sugar “addiction” comes mainly from a limited number of animal model experiments in which “binge eating” of sugar has been observed after the availability of sugar is limited to certain times of the day (11). Withdrawal symptoms are induced by removal of that limited access (11), but this may not be unique to sugar (3). Studies like these rely on feeding regimens that involve depriving rats of access to sugar for prolonged periods of the day. The symptoms attributed to “addiction” in these animals are not seen when they are given unlimited access to sugar (12), suggesting that the behaviour is, at least partly, dependent on food deprivation rather than the nature of the food itself. Additionally, there is insufficient evidence on other macronutrients to determine whether this “binging” behaviour is specific to sugar or to palatable foods generally (3). Furthermore, it is noteworthy that these rats who are described as “binging” on sugar do not become obese, since they reduce their consumption of other food (11).

Comparable observations to this rat model have not been made in humans and no evidence of tolerance or of withdrawal symptoms have been reported in relation to sugar consumption (3).

The rat studies also include studies of brain activation patterns, and these have been reported to be similar to those activated by certain drugs of abuse. This is unsurprising, since the drugs of abuse are known to mimic the effects of food consumption in the brain.
There are differences however (3,4), and attempts to replicate these findings in human studies have yielded widely conflicting results both in normal weight and obese subjects (4).

Given the lack of consistent evidence to suggest that addiction to sugar is a valid concept to describe the behaviour of even a small proportion of the human population, it could be argued that it can have no relevance to the widespread problem of obesity. In addition, there are lines of evidence from human population studies that further weaken the hypothesis that sugar addiction is commonly responsible for obesity, and these merit rehearsal (4). First, the vast majority of overweight individuals do not show a convincing behavioural or neurobiological profile that might be seen to resemble addiction (4,10). Second, those people who can be defined clinically as suffering from Binge Eating Disorder (7) are not always obese nor do the vast majority of obese individuals exhibit Binge Eating Disorder (4). Third, if sugar addiction does exist within the human population, further research will be needed to delineate this aberrant behaviour from the normal. But at present, the available evidence overwhelmingly conflicts with the notion that sugar addiction, or food addiction of any sort, exists at all (9) or that it is a major driver of the current prevalence of human obesity (10).

Alternative psychosocial explanations exist for the cravings and behaviours towards certain foods that are often subjectively attributed to "addiction" (13). A strong desire to eat a particular food is likely to arise if the food is well liked but consumption is resisted for any reason. To call such a desire "addiction" is neither accurate nor helpful. The compulsive eating seen in bulimia and binge eating disorder should not be seen as addictive behaviours but rather the consequence of well-known psychological mechanisms, coupled with socially-derived perceptions of appropriate eating behaviours (13).

In summary, the current evidence does not support the idea that human addiction to sugar is a valid concept (3-5), or that it is a characteristic of individuals who suffer from binge eating (3,13), or who are obese (3,4).

**Statement**

There are a number of reasons to doubt that it is useful or reasonable to attribute to “addiction” the eating behaviours observed in the vast majority of individuals who are obese, or in those who engage in binge eating. In addition, there is no persuasive evidence that sugar itself, as opposed to mistaken attitudes to sugar, encourages excessive consumption, still less uncontrollable consumption. Cravings for any food may arise if it is perceived as pleasurable but consumption is arbitrarily resisted.

**References**


