You are what you eat:
Ethical implications of diet-induced neuroplasticity research during the war on obesity

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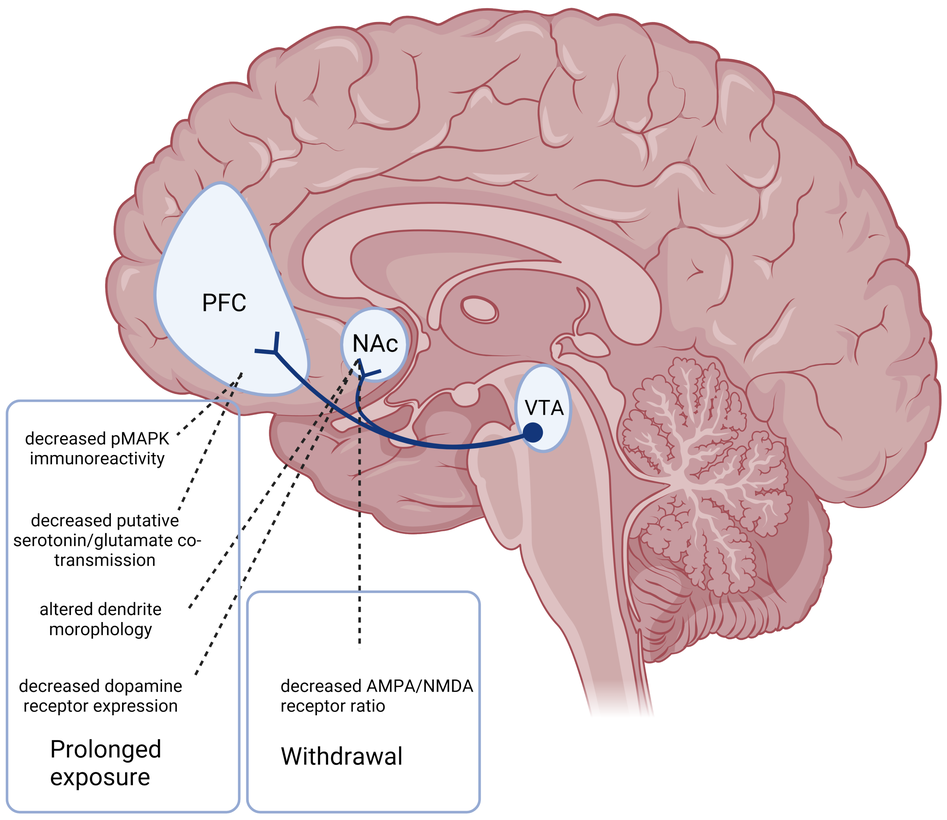
Diet-induced neuroplasticity

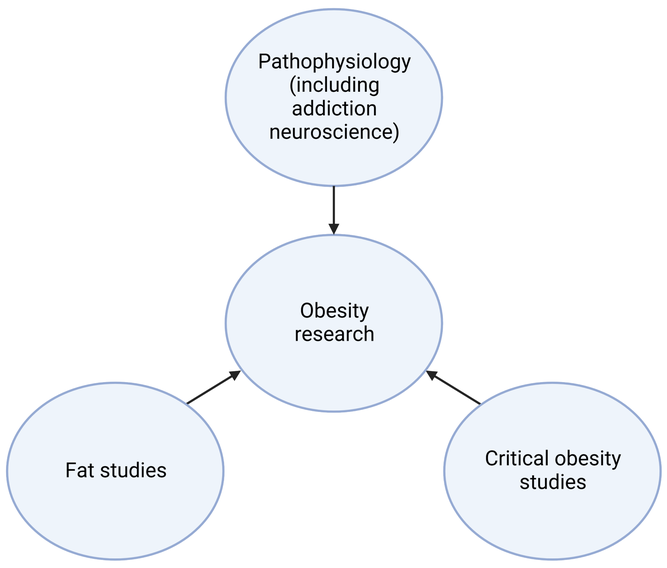
Obesity was historically considered a purely metabolic or endocrine disorder, and therefore evaded the interests of neuroscientists. This changed when obesity was first framed as a consequence of food addiction[1,2]. As a result, some neuroscientists have utilised their accumulated capital from drug addiction research to attempt to develop new treatments for obesity. This has involved dissecting the neural circuits responsible for appetite, and more recently, characterising how the consumption of obesogenic diets high in sugar and fat induce neuroplastic changes to these structures.



Effect of prolonged sugar overconsumption on the brain's mesolimbic dopaminergic (reward) system[3-6]

Other obesity frames

Obesity is configured as a predominately medical disease resulting from poor individual choices. This dominant perspective permeates current neuroscientific research into obesity, but there are alternative interpretations. Critical obesity scholars invesitgate the limitations of traditional obesity paradigms, for example by citing a lack of consideration towards systemic obesogenic factors at a societal level. Much less respected in medical research communities is the activist discipline of fat studies. This mode of research privileges the lived experiences of fat people and problematises the restricted human rights of these individuals, rather than fatness itself[7].

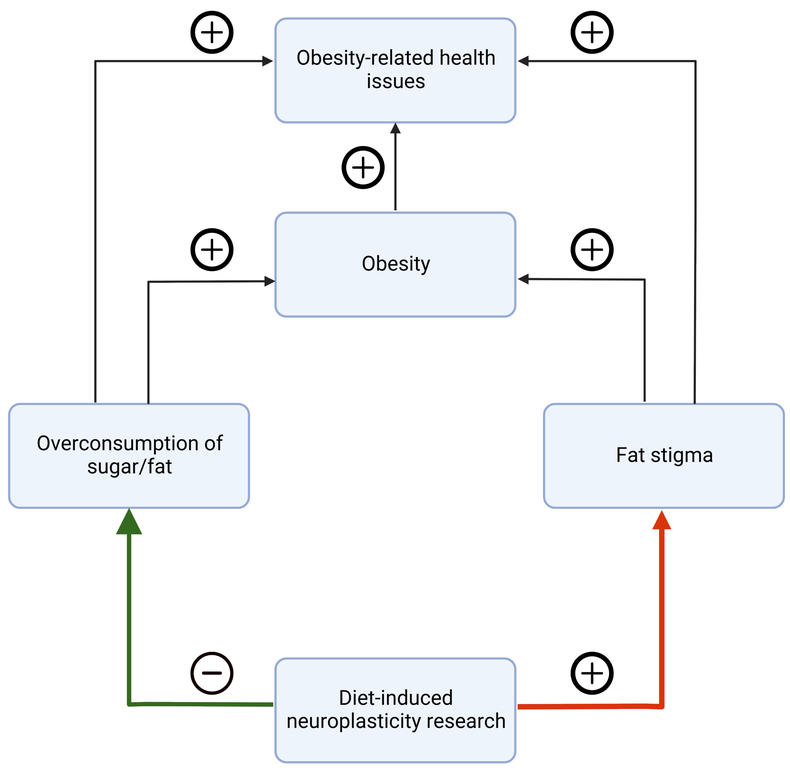


Given the medical origins of food addiction neuroscience research, findings from fat studies and critical obesity studies have rarely been considered by obesity neuroscientists. However, their findings hold important ethical considerations for obesity neuroscientists

Neuroethical considerations

- While diet plays an undeniable role in the pathogenesis of obesity, often ignored in medical research is the mediating role of fat stigma
- Fat people experience widespread discrimination from their healthcare providers, work managers and family[8]
- These experiences are pernicious, and induce biological states of stress[9], as well as amplify obesogenic behaviours such as binge eating[10] and withdrawal from exercise [11Bevan]
- Diet-induced neuroplasticity research may have profound impacts on public perceptions of fat people, given widespread neuroessentialism in the public[12]
- Neuroscience research therefore not only influences obesity through treating aberrant appetite, but may also reinforce fat stigma[13]
- If neuroscience is to truly help fat people, the stigmatising influence of neuroscience research should be a foundational neuroethical consideration in the design of future research

Neuroscience and obesity determinants



Ethical considerations in obesity neuroscience research

- incentive to adopt alarmist, epidemic narratives of obesity
- potential for manipulation by food industry sponsors[14]

Funding acquisition

- lack of ethological validity in animal experiments[15]
- sex-bias[15]

Experimental design

- seductive allure of neuroscience - immediate belief of preclinical, exploratory data[12]

Dissemination of findings

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