

UC San Diego

UC San Diego Previously Published Works

Title

Special issue of Appetite: The proceedings of the American University Symposium on Childhood Obesity and Cognition

Permalink

<https://escholarship.org/uc/item/80p5t06g>

Authors

Davidson, Terry L
Boutelle, Kerri N

Publication Date

2015-10-01

DOI

10.1016/j.appet.2015.06.014

Peer reviewed



Special issue of Appetite: The proceedings of the American University Symposium on Childhood Obesity and Cognition



Over 30% of the children who live in the United States are overweight or obese. It is well-established that these children are at increased risk for Type II diabetes, hypertension, and bone and joint problems that were once largely confined to adults. However, these types of physical diseases are not the only, and may not be the most serious, threats to the health and well-being of our children. Recent findings also link obesity to the emergence of cognitive deficits that begin in childhood and continue across the lifespan. In fact, it has been suggested that brain pathologies leading to Alzheimer's disease and other types of late-life cognitive dementia may have childhood origins. Thus, while obesity is widely recognized as a serious threat to the current and future physical health of our children, another very important question is: *What is the threat posed by obesity to our children's cognitive health?*

This Special Issue of *Appetite* considers this question from several levels of analysis. All of the papers were authored or co-authored by scientists and scholars who spoke at the American University Symposium on Childhood Obesity and Cognition on October 13–14, in Washington, DC.¹ The first paper in the Special Issue (Yanovski, 2015) provides an update and overview of the epidemiology, etiology and consequences of pediatric obesity and thus serves as a general introduction to papers that deal with specific aspects of childhood obesity and cognition. In new empirical research and focused reviews, several of the remaining papers describe the use of diverse measures (imaging, behavioral, and cognitive tasks) to assess how body weight and exposure to various dietary factors are related to brain and intellectual functioning in human children, adolescents, and rats. A number of interesting commonalities emerge from these different approaches. Findings from both behavioral and imaging studies suggest that excess body weight and/or diets that promote weight gain (e.g., diets high in saturated fat and sugar) may impair the utilization of information arising from the internal bodily milieu, while leaving the ability to process environmental food-related cues relatively intact (Bruce et al., 2015; Mata, Verdejo-Roman, Soriano-Mas, & Verdejo-Garcia, 2015; Sample, Hargrave, Jones, & Davidson, 2015). This could set the conditions for overeating by weakening the ability of interoceptive satiety signals to counter eating evoked by external stimuli. Other papers

in this issue show that obesity and diet are related to interference with cognitive functions such as choice behavior, memory, impulse control, and decision making (Hargrave, Davidson, Lee, & Kinzig, 2015; Khan, Raine, Drollette, Scudder, & Hillman, 2015; Nederkoorn, Dassen, Franken, Resch, & Houben, 2015; Ross, Yau, & Convit, 2015) and with abnormalities in brain substrates (e.g., hippocampus orbitofrontal cortex, insula, caudate nucleus) that underlie these functions.

The next group of papers illustrates how learning and memory principles can be applied to improve the control of energy intake and body weight regulation in children and adolescents. These principles can be used to improve diet quality and combat obesity by increasing children's preferences for vegetables and other healthy food choices (Wadhera, Capaldi Phillips, & Wilkie, 2015), to explain how intake of some dietary factors (e.g., non-caloric sweeteners) may exert a disruptive influence on energy regulation (Swithers, 2015), and to weaken or extinguish associations that enable environmental food cues to evoke intake in excess of energy needs (Boutelle & Bouton, 2015). The final paper in this Special Issue (Snelling et al., 2015) steps out of the laboratory to provide an example of "school-level" research on health and academic performance and how it intersects with governmental policy. This paper reveals some of the challenges facing investigators that conduct this type of research. As a way of meeting these challenges, the paper advocates for expanding "student-level" research in public school systems on how obesity and physical activity influence the cognitive processes that underlie academic achievement.

The papers in this Special Issue of *Appetite* show that brain pathologies and impaired cognitive functioning are not solely the adult manifestations of years of exposure to unhealthy diets, sedentary lifestyles, and to the consequences of obesity and its co-morbidities. The findings reported here provide evidence that such exposure is also associated with signs of cognitive impairment and brain pathology that can emerge early in life. Some of these abnormalities could contribute to excessive weight gain and to the prevention of weight loss by interfering with important associative controls of energy and body weight regulation. It may be possible to teach children ways to strengthen those associative controls and to prevent them from being weakened. Learning and memory principles might also be used to improve the effectiveness of physical activity or dietary restraint as means of reducing body weight and preserving the cognitive function of children and adolescents. The findings and ideas discussed in this Special Issue suggest that one way to reduce the problems of adult obesity and late-life

¹ The invited speakers at the symposium were Drs. Sarah Irvine Belson, Kerri Boutelle, Amanda Bruce, Antonio Convit, Terry Davidson, Sara Hargrave, Naiman Khan, Mark Mattson, Chantal Nederkoorn, Anastasia Snelling, Susan Swithers, Antonio Verdejo-Garcia, and Jack Yanovski. Dr. Mattson did not submit a paper for this Special Issue.

cognitive decline is to recognize diet- or obesity-induced cognitive dysfunctions that occur during childhood and to develop interventions to prevent or remedy their expression at that time.

References

- Boutelle, K. N., & Bouton, M. E. (2015). Implications of learning theory for developing programs to decrease overeating. *Appetite*, 93, 62–74.
- Bruce, A. S., Lim, S. L., Smith, T. R., Cherry, J. B. C., Black, W. R., Davis, A. M., et al. (2015). Apples or candy? Internal and external influences on children's food choices. *Appetite*, 93, 31–34.
- Hargrave, S. L., Davidson, T. L., Lee, T.-J., & Kinzig, K. P. (2015). Brain and behavioral perturbations in rats following Western diet access. *Appetite*, 93, 35–43.
- Khan, N. A., Raine, L. B., Drollette, E. S., Scudder, M. R., & Hillman, C. H. (2015). The relation of saturated fats and dietary cholesterol to childhood cognitive flexibility. *Appetite*, 93, 51–56.
- Mata, F., Verdejo-Roman, J., Soriano-Mas, C., & Verdejo-Garcia, A. (2015). Insula tuning towards external eating versus interoceptive input in adolescents with overweight and obesity. *Appetite*, 93, 24–30.
- Nederkoorn, C., Dassen, F. C. M., Franken, L., Resch, C., & Houben, K. (2015). Impulsivity and overeating in children in the absence and presence of hunger. *Appetite*, 93, 57–61.
- Ross, N., Yau, P. L., & Convit, A. (2015). Obesity, fitness, and brain integrity in adolescence. *Appetite*, 93, 44–50.
- Sample, C. H., Martin, A. A., Jones, S., Hargrave, S. L., & Davidson, T. L. (2015). Western-style diet impairs stimulus control by food deprivation state cues. Implications for obesogenic environments. *Appetite*, 93, 13–23.
- Snelling, A. M., Belson, S. I., Watts, E., George, S., Van Dyke, H., Malloy, E., et al. (2015). Translating school health research to policy. School outcomes related to the health environment and changes in mathematics achievement. *Appetite*, 93, 91–95.
- Swithers, E. (2015). Artificial sweeteners are not the answer to childhood obesity. *Appetite*, 93, 85–90.
- Wadhwa, D., Capaldi Phillips, E. D., & Wilkie, L. M. (2015). Teaching children to like and eat vegetables. *Appetite*, 93, 75–84.
- Yanovski, J. A. (2015). Pediatric obesity. An introduction. *Appetite*, 93, 3–12.

Terry L. Davidson ^{a,*}, Kerri N. Boutelle ^b

^a Center for Behavioral Neuroscience, Department of Psychology,
American University, 4400 Massachusetts Avenue, NW, Washington,
DC 20016, USA

^b Pediatrics and Psychiatry, Center for Healthy Eating and Activity
Research, UCSD Eating Disorders Program, UCSD, 9500 Gilman Dr,
MC 0874, La Jolla, CA 92093, USA

* Corresponding author.

E-mail address: terryd@american.edu (T.L. Davidson).

Available online 25 June 2015