Access to excess: how do adolescents deal with unhealthy foods in their environment?

Emely de Vet1, John B. F. de Wit2,3, Aleks Luszczynska4,5, F. Marijn Stok1, Tania Gaspar6, Michelle Pratt1, Jane Wardle7, Denise T. D. de Ridder1

1 Clinical and Health Psychology, Utrecht University, Utrecht, The Netherlands
2 Social and Organizational Psychology, Utrecht University, Utrecht, The Netherlands
3 National Centre in HIV Social Research, University of New South Wales, Kensington, Sydney, Australia
4 Trauma, Health, and Hazards Center, University of Colorado, CO, USA
5 Warsaw School of Social Sciences and Humanities, Warsaw, Poland
6 Instituto de Psicologia e Ciências da Educação (IPCE), Universidade Lusíada de Lisboa
7 Department of Epidemiology and Public Health, Health Behaviour Research Centre, University College London, London, UK

Correspondence: Emely de Vet, Clinical and Health Psychology, Utrecht University, P.O. Box 80140, 3508 TC Utrecht, The Netherlands, tel: +31 (0) 30 253 9250, fax: +31 (0) 30 253 4718, e-mail: e.devet@uu.nl

Purpose: Easy access to unhealthy foods is believed to contribute to the current overweight epidemic. It remains unclear, however, how access to unhealthy foods is related to self-regulation of food intake. This study tests the hypothesis that using self-regulation strategies buffers the negative influences of easy access to unhealthy foods. Methods: Cross-sectional survey data from 2764 adolescents aged 10–17 years from four European countries (The Netherlands, UK, Poland and Portugal) about use of self-regulation strategies, access to unhealthy foods and intake of unhealthy foods (sweet and salty snacks and sugar-sweetened beverages) were used. Results: Both access to unhealthy foods and use of self-regulation strategies were independently, but in opposing directions, related to intake of unhealthy foods. Easy access to unhealthy food products was associated with higher consumption, but this effect could be attenuated by use of self-regulation strategies to facilitate healthy eating even when the food environment tempts one to do otherwise. Conclusions: Health promotion policy and programs should not only address the food environment but could also teach young people better strategies to deal with it.
Introduction

The prevalence of overweight and obesity in children and adolescents has increased dramatically in the past decades, with a third of European youth now overweight or obese. A main contributor to this epidemic is youngsters’ diets, which show considerable room for improvement. Healthy diets are a challenge in today’s food-rich environment. Modern societies are characterized by abundant availability and easy accessibility of foods, placing a high burden on the individual’s capacity to control food intake.

During the past 25 years, changing diets of adolescents have been observed in parallel with changes in the food environment, but evidence for a direct link between food accessibility and adolescents’ diets is not widely documented. In a systematic review of reviews, no evidence was found for an association between food accessibility and the dietary behaviours of children and adolescents. Most studies have focused on the availability of healthy products and healthy eating, with few studies addressing the role that easy access to unhealthy foods plays in unhealthy eating. One goal of the present study was, therefore, to examine associations between accessibility of unhealthy foods and unhealthy eating.

Past research focused mainly on the food accessibility itself, but there may also be ways that some individuals are able to resist the temptations associated with easy accessibility of unhealthy foods, so-called self-regulation. Self-regulation reflects the ability to forego immediate reward and pleasure (e.g. having a sweet dessert) in the service of long-term goals (e.g. staying healthy). For example, self-regulation is required when individuals are confronted with a conflict between the urge to indulge in a delicious food and their long-term goal of maintaining a healthy weight. In this situation, people may make small changes to their surroundings, such as choosing to keep the tempting foods at a distance or activating their dietary goals when confronted with a food temptation.

Three categories of dietary self-regulation have been reported by adolescents. First, adolescents used strategies directly addressing the food environment, either avoiding temptation (e.g. avoid fast-food places) or re-arranging their food environment to make it less tempting (e.g. putting crisps out of reach when watching television). Second, they used strategies addressing the meaning of the food environment, such as distraction (e.g. keeping oneself busy if one gets hungry before dinner) or suppression (e.g. ignoring the smell of tasty foods when passing a bakery). Third, they used strategies that directly addressed the goal to eat healthily such as setting goals and rules (e.g. how many candies a day one can have) or deliberating goals (e.g. when feeling like eating something unhealthy, taking a moment to consider whether you really want it) (De Vet E et al. submitted for publication). These self-regulation strategies are hypothesized to correlate with lower intake of unhealthy foods.

Although easy access to unhealthy foods may be detrimental to a healthy diet, using the appropriate strategies may be beneficial to it. Furthermore, these opposing forces may operate jointly rather than in isolation, and we expect food accessibility and the use of self-regulation strategies to interact. More specifically, easy access to unhealthy foods is only problematic if adolescents lack the appropriate strategies to handle the access to excess. Similarly, self-regulation strategies might be particularly useful when the goal to eat healthily is challenged by an unsupportive environment. This study tests the hypothesis that using self-regulation strategies buffers the negative influences of easy access to unhealthy foods and reduces the likelihood that an adverse food environment ‘gets under the skin’.

The present study was a large-scale survey of adolescents from four European countries testing the following hypotheses: (i) self-reported accessibility of unhealthy foods is associated with higher intake of those foods; (ii) using self-regulatory dietary strategies is associated with lower intake of unhealthy foods; and (iii) the negative influence of easy access to unhealthy foods can be attenuated by using the appropriate self-regulation strategies.

Methods

Participants, design and procedure

Data were collected in schools in four European countries (The Netherlands, UK, Poland and Portugal), selected to represent a range of overweight prevalence and socio-economic background. Poland and the Netherlands are countries with lower overweight prevalence than the UK and Portugal. The UK and the Netherlands are socio-economically more privileged than Poland and Portugal. Schools were selected to represent variety in rural and urban regions as well as higher and lower socioeconomic status areas.

The data collection protocol complied with the ethical guidelines in each country (i.e. when medical ethical approval was required, approval was established). Passive (i.e. participation unless objection is made by signing the opting-out form) or active (i.e. participation only on signing the opting-in form) consent from adolescents and their parents was obtained, depending on the guidelines from each country’s ethical review board. Adolescents aged 10–17 years were asked to complete the questionnaire in one session at school in the classroom setting. Completing the questionnaire took ~30 min. It assessed background characteristics, self-regulation strategies for eating, access to unhealthy foods and snack and soft drink consumption. A total of 24 schools participated, with 50.9% of these schools located in rural areas and 68.6% of these schools being situated in areas with a high socio-economic status. The questionnaire was completed by 2764 adolescents.

Measures

The questionnaire was similar for all four countries. A ‘mother version’ was created in English, and each country translated and back-translated it to the country’s native language.

Unhealthy eating was assessed by asking about the average daily intake of two single items, sugar-sweetened beverages and snacks. Specifically, adolescents were required to indicate their consumption on a 0 (<1/none) to 5 (>4) scale by the following items: (i) How many glasses of soft drinks, lemonade or energy drinks do you drink on an average day? (followed by examples of country-specific snacks). Scores for snacking and soft drinks were summed to obtain an index for unhealthy eating.

Accessibility of unhealthy foods was assessed by asking about two items, the ease with which snacks and soft drinks can be obtained during school breaks and leisure time; for example, ‘Whenever I feel like having a snack or soft drink during school breaks, I can easily get it (like from a vending machine, canteen or shop)’. Response options ranged from totally disagree [1] to totally agree [5]. Cronbach’s α was 0.71, and a mean score of the two items was computed.

Self-regulation strategies for eating were assessed using the Tempest Self-Regulation Questionnaire for Eating (TESQ-E). This is a 24-item validated instrument to assess dietary self-regulation strategies among adolescents (De Vet et al., submitted for publication). Individuals are asked to rate on a five-point Likert scale ranging from 1 (never) to 5 (always) how often they use specific self-regulation strategies from the three categories outlined in the introduction. Each category includes two strategies, which are assessed with four items each, and a mean score was calculated for each category. The first category reflects strategies for addressing the food environment directly and includes items describing temptation control and avoidance (Cronbach’s α = 0.83). The second reflects strategies for changing the meaning of the food environment, and includes items describing distraction and suppression (Cronbach’s
Family Affluence Scale (FAS) was used as an indicator to unhealthy foods and unhealthy eating for low users of levels of the moderator, examining the relationship between access to unhealthy foods and the three categories of self-regulation strategies (addressing the food environment for all three strategies (see figure 1). The interaction between access to unhealthy foods and addressing the food environment was significant ($\beta = -0.07, P = 0.001$, adjusted $R^2 = 17.2\%$). Decomposing the interaction revealed that access to unhealthy foods was less strongly associated with unhealthy eating for individuals who frequently apply strategies to address the food environment ($B = 0.67, P < 0.001$) than for those who do not use this kind of self-regulatory strategy often ($B = 0.96, P < 0.001$).

The interaction between access to unhealthy foods and changing the psychological meaning of the food environment was also significant ($\beta = -0.05, P = 0.02$, adjusted $R^2 = 16.3\%$). Decomposing the interaction pointed to a similar pattern, with unhealthy eating being less strongly influenced by access to unhealthy foods for individuals who frequently apply the strategies related to changing the meaning of the food environment ($B = 0.76, P < 0.001$) than for those who do not use this strategy often ($B = 0.96, P < 0.001$).

The interaction between access to unhealthy foods and addressing the goal to eat healthily ($\beta = -0.05$, $P = 0.02$, adjusted $R^2 = 17.3\%$) was also significant. The association between access to unhealthy foods and unhealthy eating was weaker for individuals who often use strategies to address the goal to eat healthily ($B = 0.76, P < 0.001$) than those who do not use this strategy often ($B = 0.96, P < 0.001$). Figure 1 shows a graphical presentation of the interaction between...
access to unhealthy foods and the use of strategies addressing the food environment. The pattern is similar for the interaction between access to unhealthy foods and the other two categories of self-regulation strategies. In sum, these analyses show that access to unhealthy foods is uniquely, but in opposing directions, to unhealthy food intake.

**Discussion**

This is one of the first studies to explore the unique and combined influence of environmental and psychological factors on eating behaviour in adolescents. Studying environment–person interactions is important because it provides valuable insights into the conditions under which environmental features exert an influence on health behaviours. Despite many studies on environmental correlates of weight-related behaviours, it still remains unclear exactly how and why environmental factors exert their influence on behaviour, and why they do not exert the same effect on everyone.

Our results reveal two important findings. First, both access to unhealthy foods and use of self-regulation strategies contributed uniquely, but in opposing directions, to unhealthy food intake. Second, using self-regulation strategies to support healthy eating attenuates, but does not eliminate, the impact of an adverse food environment. Although the negative impact of access to unhealthy foods is not diminished, the reduction is of relevant magnitude. When access to unhealthy foods is easy, high users of self-regulation strategies consume about one daily serving of snacks or sodas less than low users of self-regulation strategies. It has been calculated that weight gain can be prevented in 90% of the population, if the energy balance is affected with about 100 kcal per day, which is comparable with one daily serving of snacks or sodas.

In the present article, we focused on physical aspects of the food environment and how these interact with self-regulation. Yet, also social, cultural, political and economical aspects of the food environment may exert an influence on adolescents eating behaviour and interact with self-regulation. It would be interesting to investigate whether self-regulation interacts similarly with other types of environmental influences.

The present study’s strengths and weaknesses need to be acknowledged. An important strength of the present study is the large and diverse sample with adolescents from four different countries. A first limitation is the use of self-reported weight and height to calculate BMI, which may be subject to misreporting in this age group. Future studies should aim to include more objective body composition measures. Another major limitation of the present study is the cross-sectional design. Although this is one of the first studies exploring the interaction between food environments and strategies to deal with this environment, no conclusions about causality can be drawn. Our findings have some implications for interventions. Currently, much attention goes to understanding or changing environmental contributors to unhealthy lifestyles. Altering food environments (for example, changing the line of products in school canteens or banning vending machines from schools) is important, but is also a complex, costly and time-consuming process, commonly involving many parties and decision makers. Although it remains important that food environments are designed in such a way that the healthy choice is the easiest choice, the present study suggests that additionally there may be ways that people can protect themselves from the temptations of the food environment. The finding that self-regulation strategies were associated with a lesser impact of an adverse food environment, would, if it were shown to be a causal effect, suggest another avenue for health promotion, namely to train young people.
in the use of self-regulation strategies. An additional advantage is that, where environmental adaptations are often restricted to single types of environments and settings, possessing self-regulation strategies to eat healthily may be helpful to deal with temptations irrespective of the setting the influence originates from. To exemplify, although (local) health professionals and school boards may cooperate in removing unhealthy foods from the school environments, unhealthy foods may remain just as easily accessible in the supermarket, convenience store or kiosk just outside the school. Self-regulation strategies, in contrast, reflect general principles that can be applied to eat healthily irrespective of the setting one is in.

To conclude, the present study confirmed that easy access to unhealthy food products was associated with higher consumption, but this effect could be moderated by use of self-regulation strategies to facilitate healthy eating even when the food environment tempts one to do otherwise. This might imply that health promotion actions should not only address the food environment but could also teach young people better strategies to deal with it.

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Key points

- Easy access to unhealthy foods is associated with more unhealthy eating.
- Using self-regulation strategies is associated with lower intake of unhealthy foods.
- Self-regulation and access to unhealthy foods interact
- Self-regulation strategies reduce negative influences of access to unhealthy foods.

References