

The Impact of Exposure to Cartoons Promoting Healthy Eating on Children's Food Preferences and Choices

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ABSTRACT

Objective: This study explored whether a cartoon show with healthy eating messages positively affected children's food choices and food preferences.

Design: Experimental between-subjects design.

Setting: Four elementary schools in Portugal were investigated.

Participants: Children (aged 4–8 years; $n = 142$) were randomly assigned to 1 of 2 groups: a comparison group ($n = 73$) was exposed to cartoons with no reference to food and an intervention group ($n = 69$) was exposed to cartoons with healthy eating messages. After viewing, each child was given the opportunity to eat *ad libitum* for 10 minutes from a small selection of snack foods.

Main Outcome Measure: Number of healthy and unhealthy food items chosen. Food preferences were measured using an adapted version of the Leeds Food Preference Checklist.

Analysis: Generalized linear models were used to test for differences between groups. Results were considered significant at $P \leq .05$.

Results: Children in the experimental group chose significantly more healthy food items than did those in the comparison group ($B = -.600$; $SE = .19$; $P < .05$).

Conclusions and Implications: Future studies may address the effect of prolonged exposure to healthy eating cartoons. Cartoons can be used to promote healthy food choices and can be a part of health promotion campaigns.

Key Words: cartoon show, children, food choices, food preferences, healthy eating promotion (*J Nutr Educ Behav.* 2018;■■:■■–■■.)

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INTRODUCTION

Children spend a substantial portion of their lives in front of a screen, from TVs and laptops to smartphones and tablets. Food advertising on TV that targets children ranges from 11% to 29% of all advertisements, with unhealthy foods present in 53% to 87% of food advertisements and higher percentages found during children's peak viewing periods.¹ According to previ-

ous systematic reviews,²⁻⁴ food promotion directly affects children's nutrition knowledge, preferences, purchasing behavior, consumption patterns, and diet-related health. In addition, food advertising on TV has a critical indirect influence on children's food choices. A recent meta-analysis⁵ of the effect of food advertising exposure on food intake showed that acute exposure to unhealthy food advertisements increased

food intake among children even with short-term exposure.⁶ Although the effect of food advertising in unhealthy food choices and preferences is well established, few studies evaluated the effects of advertisements of healthy food on food choice. Dixon and colleagues⁷ studied 10- to 11-year-olds and found that advertising for nutritious foods promoted positive attitudes and beliefs regarding the foods advertised. Bannon and Schwartz⁸ designed a study to test the influence of nutritional message framing on young children's snack choices and concluded that children who viewed nutritional message videos (ie, a nutritional message related to the positive benefits of eating apples) chose more apples than did children in a control condition. However, Dovey and colleagues⁹ studied 5- to 7-year-olds and found that after exposure to healthy food advertising, although some children consumed fewer chocolate items, they did not increase their intake of healthy snacks.

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Research also focused on the influence of media characters (eg, cartoon characters) on food preferences and choices. For instance, Kotler and colleagues¹⁰ examined 2- to 6-year-olds and showed that the association between cartoon characters and healthy or unhealthy food items did not significantly change children's food choices; however, children were significantly more willing to try foods in the same category when the foods were branded with cartoon characters. Kraak and Story¹¹ concluded that cartoon characters used in branding can have a positive influence on fruit and vegetable choices when compared with no branding. However, this effect is larger with regard to children's preferences and choices when cartoon character branding is used for unhealthy foods.

According to the developmental systems perspective,¹² the development of food choices and preferences can be understood in terms of exposure, social learning, and associative learning. Developmental models of food choice highlight the central role that learning has through the observation of important models. On the other hand, according to the Theory of Planned Behavior,¹³ an individual's behavioral intention is a result of his or her attitudes toward the behavior and the perceived social pressure (subjective norm) to perform that behavior.

Another line of research suggests that children develop parasocial relationships with media characters, creating an emotional relationship that can facilitate learning messages conveyed by their favorite characters and drawing attention to the potential use of cartoons and cartoon characters in promoting healthy eating messages.¹⁴ Although the literature has established the effect of food advertising on food preferences and choices, less research has focused on the role that healthy food advertisements and entertainment characters have in healthy food choices. This novel study tested whether healthy eating TV cartoon characters, which are widely available and can be delivered over a large scale, can be effective in conveying healthy eating messages and affecting children's food preferences and choices. Therefore, this study aimed to

evaluate the effect of healthy food messages delivered by cartoon characters on the food preferences and choices of 4- to 8-year-olds using a randomized controlled trial with a between-participants design. It was hypothesized that children who viewed the cartoons promoting healthy eating would (1) choose healthier food items and (2) prefer more healthy foods than would children who viewed cartoons with no nutritional content.

METHODS

Participants

A total of 142 children were recruited from 4 different elementary schools in the northern region of Portugal. The inclusion criterion was being age 4–8 years. The researchers contacted school directors and obtained permission to conduct the study. Researchers distributed informed consent forms and sociodemographic questionnaires in a sealed envelope to responsible teachers in the classes, who then delivered them to parents for completion. Parents who agreed to allow their children to participate returned the informed consent documents and questionnaires to the responsible teacher in the class. Anonymity was ensured for all participant data collected. An identification code was

given to all participants; no other information (eg, school) was recorded. Children provided verbal assent before any study procedure was undertaken.

Exclusion criteria included the inability to speak Portuguese fluently or understanding it. In addition, participants were excluded if they had been referred to a special educational needs and disabilities team or early intervention team because of cognitive developmental problems. Inclusion and exclusion criteria for the study were communicated to the responsible teacher in each class, who then referred participants for study enrollment according to these criteria and parental consent. Participants were randomly assigned to an intervention ($n = 69$) or comparison group ($n = 73$) using a computer-assisted program (www.randomizer.org; Research Randomizer, version 4.0, 2013).

Procedures

The ethics committee of each institution (the Portuguese Educational Board and the University of Minho) involved approved the study protocol. A trained researcher tested children individually to complete the questionnaires (Figure).¹⁵ After completing the questionnaires, children viewed cartoons in small groups of 4 or 5. Children in the comparison group viewed 2 se-

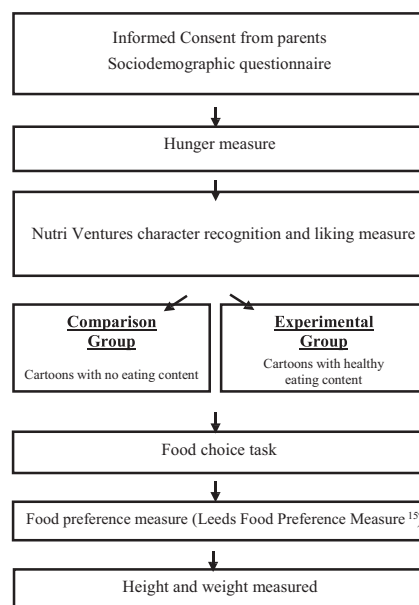


Figure. Schematic representation of experimental procedure for testing the effect of healthy eating cartoons viewing in food choices and preferences.

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