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It's always snack time: An investigation of event scripts in young children

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Abstract

This study examined whether young children include eating in their cognitive scripts for various events, and whether food-related scripts are associated with body mass index (BMI) percentile. Data were collected in a structured interview format. Participants, recruited from area preschools and day cares, provided a four-activity sequence for each of three events, and responses were recorded verbatim. Forty-four children (45% female) participated, with an average BMI percentile of 73.3% ($SD = 25.9$). Data were binarily coded to indicate whether each response was food-related. Frequencies were obtained, and responses were correlated with BMI percentile. Over 22% of the activities in the children's scripts involved food. The number of food-related activities reported was positively correlated with children's BMI percentile ($r = 0.53$, $p = 0.03$). Results provide preliminary evidence that food features prominently in young children's event scripts and that children with higher BMI percentiles may possess scripts that feature more food-related themes. Future researchers should investigate the causal nature of this relationship.

Keywords

Food choice; Schema; Child psychology; Obesity; Qualitative

Introduction

According to the World Health Organization (WHO), in 2010 more than 42 million children worldwide under the age of five were overweight (World Health Organization, 2013). In the United States, the prevalence of obesity among children 4–6 years old was recently estimated to be approximately 15% (Castetbon & Andreyeva, 2012), which parallels the National Health and Nutrition Examination Survey-based estimate that 16.9% of children in the 2–19 years age bracket are obese (Ogden, Carroll, Kit, & Flegal, 2012). Because overweight and obesity have been identified as risk factors for a number of chronic diseases and health problems, as well as social and psychological consequences, the WHO identified prevention as a high priority, and formed the WHO Global Strategy on Diet, Physical Activity, and Health in 2004 to address the high rates of overweight and obesity (World Health Organization, 2014), which are viewed as highly preventable (World Health Organization, 2013).

One avenue to prevent and treat childhood overweight and obesity is to address child caloric intake and dietary quality. A recent review by Kuhl, Clifford, and Stark (2012) cites a number of ways in which the food environment impacts child diet and weight status. The authors emphasized that the food environment interacts with parental feeding practices and young children's eating behaviors. Poor eating habits that children develop, which endure over time, combined with sedentary behavior, contribute to childhood overweight and obesity (Schwartz & Brownell, 2007).

Changes in the food environment are likely associated with a shift in children's expectations about when and where eating typically occurs. Children today consume more calories and eat more frequently than children did 30 years ago (Popkin & Duffey, 2010). This is related to an increase in the frequency of snack consumption and an increase in overall calorie consumption among children (Jahns, Siega-Riz, & Popkin, 2001). One study found that for school-age children, "snacks account for 27% of total daily calories, which is more than the calories consumed at breakfast (18%) and lunch (24%), but not dinner (31%)" (Roblin, 2007).

If children are eating more calories and eating more frequently today than in the past, it is likely that they view the consumption of food as relatively more normal and appropriate across a greater variety of contexts and situations than children in the past. When individuals experience events frequently, they develop cognitive scripts (also known as mental schemas) for these events, which represent the typical order and type of events that occur in a particular situation or context (Abelson, 1981; Siegler & Alibali, 2005). Abelson (1981) defines scripts as "conceptual representations of stereotyped event sequences" that involve "expectations about the order as well as the occurrence of events." A common event during a specific situation or context is more likely to be represented in an individual's event script for that situation or context. Because scripts can influence future behavior, and can be influenced by past behavior, understanding the food-related content of children's scripts is especially important in understanding children's food intake. Thus, the goal of the current study is to investigate the extent to which children's scripts for various events include food intake.

There is evidence that children as young as two possess cognitive scripts, as indicated by their ability to express knowledge of event sequence (Sell, 1992). By the age of three, children can reliably reproduce an ordered sequence of events in a scripted format (O'Connell & Gerard, 1985). For older children, script acquisition occurs rapidly; typical school day event scripts among Kindergarteners are reported in the appropriate order, with appropriate content, and appropriate frequency after only one day of school (Fivush, 1984). As children obtain more experience in the school setting, their school-setting event scripts become richer (include more events) (Fivush, 1984, 2006; Hudson, Fivush, & Kuebli, 1992). Additionally, with increased experience, children's event scripts become more generic and include fewer details, suggesting that the most frequent events within a particular situation or context become central to the cognitive event script, while events that occur less frequently are not included in the script (Hudson & Nelson, 1986; Myles-Worsley, Cromer, & Dodd, 1986).

Research has also shown that the content of event scripts is similar for younger and older children. Although older children are better able to express event scripts verbally than younger children (due to their more advanced verbal abilities), there is no evidence that there is a significant difference in the ratings of the typicality of particular events in the scripts of preschool children and young school-age children (Adams & Worden, 1986; Farrar & Goodman, 1992; Hudson, Shapiro, & Sosa, 1995; Hudson & Nelson, 1986; McCartney & Nelson, 1981; Price & Goodman, 1990).

Once individuals develop event scripts, research has demonstrated that the scripts affect their behavior. For example, Anderson (1983) demonstrated that thinking about oneself engaging in a particular action increases behavioral intentions to perform that action. This study also provided evidence that the frequency of a behavior in a script is related to past frequency of performing the reported behavior, and is directly related to the likelihood that the behavior will occur in the future. Similarly, in children, context cues have been shown to activate scripts, which in turn affect behavior in play situations (Dalton et al., 2005).

The link between scripts and behavior has been evidenced in many domains, including: caregiving and parenting behaviors (Azar, Nix, & Makin-Byrd, 2005); decision making about sexual behaviors (Gilmore, DeLamater, & Wagstaff, 1996; Humphreys, 2013; Jones & Oliver, 2007; O'Sullivan & Byers, 1992), first date behavior (Serewicz & Gale, 2008), condom use and relationship status (Alvarez & Garcia-Marques, 2008), sexual aggression, victimization, and risky sexual behavior (Krahé, Bieneck, & Scheinberger-Olwig, 2007), and social drinking and smoking (Erblich, Montgomery, & Bovbjerg, 2009). In all of these domains, individuals' scripts regarding a topic were linked to their reported behaviors. Some studies also demonstrate that interventions targeting scripts lead to changes in behavior (Azar et al., 2005; Jones, Mace, Bray, MacRae, & Stockbridge, 2002; Smith, Holmes, Whitmore, Collins, & Devonport, 2001).

In contrast, there is only a small amount of research on the relationship between food scripts and eating behavior, and this research has been solely conducted with adults. For example, support for the link between food scripts and eating behavior is provided by the Food Choice Process Model (Bisogni, Jastran, & Blake, 2011; Sobal & Bisogni, 2009). This model suggests that food scripts provide key sequential information about food-related events, and that this information is used to simplify decision-making and guide behavior in food-related contexts. The link between scripts and behavior has been demonstrated for evening meals (Blake, Bisogni, Sobal, Jastran, & Devine, 2008) and family food choices (Blake & Bisogni, 2003). For example, food providers that act as Peacekeepers select foods to accommodate the needs of others in order to avoid conflict, while Healthy Providers organize and monitor all intake and encourage healthy food consumption (Blake & Bisogni, 2003). The presence of food scripts for specific events, such as dates, has also been demonstrated in the literature (Amiraian & Sobal, 2009). Specifically, the consumption of some foods on a date is reported to be appropriate (based on messiness, odor pungency, whether the food is "romantic," etc.) while the consumption of other foods is considered inappropriate (Amiraian & Sobal, 2009).

The present study was designed to investigate whether children's scripts for various situations included food. The three events examined were going on a play date, viewing a

movie at a movie theater, and attending a sports game. Each of these events had the potential to include food consumption, but food was not deemed central to the nature of the event (as it would be for a restaurant meal or Thanksgiving dinner). Based on prior research that has established that children today eat more frequently than children in the past (Popkin & Duffey, 2010), and are therefore more likely to include food as part of their event scripts (Abelson, 1981), we hypothesized that children would mention food at least once per event in their descriptions of the typical sequence of activities in these situations. Additionally, we hypothesized that the number of times food was mentioned across event contexts would be positively associated with children's body mass index percentile.

Method

Participants

Participants between the ages of 4 and 6 years ($M = 4.5$, $SD = 0.5$) were recruited from preschools and day cares in northwest Ohio. Parental consent and child assent were obtained. Forty-four children (45% girls) participated. The number of participants varied by event script (play date $n = 37$; movie theater $n = 38$; sporting event $n = 28$) because not all children reported knowledge of each type of event. Height and weight information was obtained by parent report for 52% ($n = 23$) of the sample and birthdates were obtained for 47% ($n = 21$) of the sample. Average body mass index of participants was 17.4 ($SD = 3.7$), and average body mass index percentile of all participants was 73.3% ($SD = 25.9$), which falls in the 5–85% healthy range of BMI percentile as suggested by the Centers for Disease Control (2014). The University Human Subjects Review Board approved all procedures prior to study initiation.

Procedure

Children were tested individually by two trained researchers at a quiet table in their classroom. The event script protocol was introduced with a sample event script about getting ready for school in the morning, in which one of the researchers described and showed pictures for the main activities that occur during this event. Then, for each of the three events (playdate, movie theater, sporting event), the child was asked to tell a story about four activities that occur during that event. These three events were chosen because they were considered to be events that children between ages 4 and 6 would have likely experienced or have sufficient knowledge of, and where food is available but consumption is not integral to the event. Other commonly experienced events were specifically not chosen because the availability of food at the event was considered highly variable (e.g., school), or because food consumption was considered to be integral to the nature of the event (e.g., a restaurant meal or certain holiday). A visual storyboard featuring a very simple line drawing illustrating the location of the event (child at the front door of a house, a movie theater, a sporting arena) followed by four empty boxes was used as a prompt for each event. One researcher used verbal prompts to aid the child in script completion, if necessary. For example, to solicit a second activity for an event script, a researcher might say, "You said that you usually play dress-up first, so that went in the first box. What do you usually do next on a playdate? What goes in the second box?"

All of the responses were recorded verbatim by a second researcher. If the child reported no knowledge of what would happen at an event, the researcher skipped that event script. After each of the event script questions, both researchers looked for food-related responses for the event. Although exploration of the presence of food-related responses in spontaneous, child-generated event scripts was the primary focus of the study, the presence of food-related responses in cued child-generated event scripts was also explored. To facilitate this inquiry, after each event protocol was completed, if none of the spontaneous, child-generated responses were food-related, one researcher prompted the child for the presence of food-related activities in his/her event script: "Do you ever have anything to eat or drink [at the specified event]?" Children's responses to this prompt were also recorded verbatim. After testing, responses were coded to indicate whether each response did or did not include food or caloric drink.

Results

Of the 361 event-related activities reported by the children, 83 (23%) were food-related (Table 1). The event script associated with the highest prevalence of spontaneous, child-generated food-related responses was the movie theater event script. For this event, 74% of children mentioned a food-related activity in their response ($n = 38$). According to Pearson product-moment correlations, the number of food-related activity responses was unrelated to child age ($r = 0.08$, $p = 0.63$, $n = 21$) or gender ($r = -0.08$, $p = 0.63$, $n = 44$).

For the subset of children with both complete script data and BMI data available, BMI percentile was found to be moderately positively correlated with total number of food-related activities cited ($r = 0.53$, $p < .05$; $n = 16$, 95% CI [.05, .81]). This provides preliminary evidence of the presence of a positive relationship between food-related activities in children's event scripts and body mass index percentile.

Discussion

The present study investigated the prevalence of food-related activities in young children's event scripts and the relationship between the number of food-related activity responses of children across scripts and their body mass index percentiles.

Results indicated that nearly a quarter of the activities cited in event scripts were food-related and that there was a moderate positive relationship between the number of food-related activities mentioned across event scripts and the child's body mass index percentile. Given that previous research has indicated that scripts can both influence future behavior and be influenced by past behavior (Anderson, 1983), it is possible that the prevalence of eating in the children's event scripts indicates a greater number of eating occasions in their daily lives. Further, higher prevalence of food in children's event scripts may also be a risk factor for overweight and obesity, as it indicates that consumption occurs frequently. Since snacking accounts for a higher percentage of total caloric intake for children than for other age groups, and for a larger proportion when compared to need, snacking likely leads to excess caloric intake and contributes to weight gain (Jahns et al., 2001; Schwartz & Brownell, 2007). Frequent snacking in adults has been linked to consumption of fewer

nutrients and an incomplete diet (Kerver, Yang, Obayashi, Bianchi, & Song, 2006). A recent study found that U.S. youth consume about 1/5 of their daily calories through snacking, and that 20% of their diet consists of fast food (Adair & Popkin, 2005). Although there is sparse research on the snacking habits of children, given the availability of unhealthy foods in the environment, and the prevalence of fast food in their diet, it is likely that children's snacks are also less nutritionally valuable (Schwartz & Brownell, 2007).

Two primary limitations of this study were the small sample size and limited number of event scripts investigations. Additionally, not all parents reported their children's height and weight, which limited the number of body mass index percentile values that could be calculated and used in the current study. Despite these limitations, the current findings provide preliminary evidence supporting a positive relationship between the prevalence of food-related activities in children's cognitive scripts and the important health outcome of child body mass index percentile.

Further research could shed light on potential causal mechanisms that underlie the current study's findings and the directionality of variable relationships. One possibility is that the presence of food-related themes in event scripts leads to greater food consumption, which contributes to subsequent weight gain. Researchers could examine this possibility in the laboratory by exposing children to novel situations for which children do not have pre-existing scripts, and then examining their script development. These studies could measure spontaneous, child-generated novel event script food-related responses and then test child food consumption when the child is later exposed to the same event. It is also possible that consumption of food during events strengthens the presence of food-related event script themes, which reinforces eating during these events and subsequent weight gain. This could be investigated by measuring the frequency of food-related responses in children's various event scripts across time in tandem with their body mass index. From this, researchers could determine body mass index trajectories for children based on the growth of food-related content in their event scripts. Additionally, it is possible that the process involves both past experiences impacting scripts and scripts impacting future behavior, or that a third variable such as parental feeding practices or availability of food in the home influences both children's scripts and body mass index.

Additional directions for future research may include an investigation of whether food consumption mediates the relationship between the prevalence of event script food-related activity responses and body mass index percentile, whether higher prevalence of familial and friend modeling of food consumption during common non-food-related events leads to longitudinal increases in the prevalence of event script food-related themes among children, and whether the number of food-related responses mediates the relationship between social modeling and child body mass index percentile. Finally, exploring children's scripts for additional events or common contexts (e.g., a day of shopping, a typical day at school) would broaden our understanding of how prevalent food-related activities are in children's daily lives.

Understanding more completely how children's scripts for everyday events come to include food and how this impacts behavior might be an important step in designing effective interventions to reduce childhood overweight.

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Table 1

Inclusion of food-related responses in children's event scripts.

Event	<i>n</i>	Percent of spontaneous food-related responses	Average number of food-related responses(<i>SD</i>)	Percent of children who generated a food-related response once prompted
Playdate	37	54%	1.20 (0.52)	71%
Movie theater	38	74%	1.39 (0.57)	50%
Sporting event	28	54%	1.33 (0.49)	82%