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Associations between aspects of friendship networks and dietary behavior in youth: Findings from a systematized review

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ABSTRACT

Objective: To gather and synthesize current evidence on the associations between aspects of friendship networks (e.g., friends' dietary behavior, popularity) and an individual's dietary behavior among children and adolescents.
Methods: A systematic search of six scientific online databases was conducted in August 2013. Eligible studies included child or adolescent participants (aged 6 to 18 years), a measure of each participant's friendship network, and a measure of habitual dietary behavior for both the participant and the participant's nominated friend(s). Data on study design, participant characteristics, friendship networks, dietary behavior, and study outcomes were abstracted.
Results: From a total of 9041 articles retrieved, seven studies were included in this review. Overall, friends' unhealthy food consumption was associated with an individual's unhealthy food consumption, and this association appeared to be stronger for boys compared with girls. More popular adolescents also tended to consume more unhealthy foods. Best friends' total energy intake was correlated with an individual's total energy intake. Similarities among friends' healthy food consumption, as well as daily breakfast consumption, were inconclusive. Longitudinal evidence showed that an individual's unhealthy food consumption tended to become similar to friends' unhealthy food consumption over time.
Conclusions: Social network analysis in the adolescent dietary behavior literature is beginning to emerge. Results highlight friends' particular influence on unhealthy food consumption among adolescents. Focus on modeling healthy dietary behaviors among adolescent friendship group may help reduce unhealthy dietary behaviors and promote healthy weight status among youth.

Contents

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1. Introduction

Diet plays an essential role in supporting healthy development among children and adolescents. The quality of children's diets (i.e., micro- and macronutrient profiles) is found to influence their physical and mental health (Greer, Krebs, & Committee on Nutrition, 2006; Patel, Flisher, Hetrick, et al., 2007), as well as academic performance (Florence, Asbridge, & Veugelers, 2008; Jyoti, Frongillo, & Jones, 2005). For instance, children who consume unhealthy diets—consisting of large quantities of high fat, caloric dense foods—are at a greater risk of becoming overweight or obese (Ebbeling, Pawlak, & Ludwig, 2002). Despite children and their caregivers being aware of the importance of healthy diets (De Bourdeaudhuij & Van Oost, 2000; Hesketh, Waters, Green, et al., 2005; O'Dea, 2003), the majority of children in North America and elsewhere (e.g., Australia, Europe) have diets that do not comprise of the types and quantities of foods recommended by established guidelines (Cook, Rutishauser, & Seelig, 2001; Ervin, Kit, Carroll, et al., 2012; Munoz, Krebs-Smith, Ballard-Barbash, et al., 1997; Vereecken, Ojala, & Jordan, 2004). For example, in Canada, 13.4% of boys and 12.9% of girls aged 14 to 18 years are above the acceptable macronutrient distribution rate for total fat, and more than 97% of boys and 80% of girls are above the tolerable upper intake level of sodium (Health Canada, 2012).

The determinants of children's food choices are multiple and complex and include biological (e.g., allergies), psychological (e.g., self-efficacy, taste, food preferences), social environmental (e.g., caregiver and friend influence), physical environmental (e.g., proximity to grocery stores, access to school food and drink vending machines), and policy (e.g., healthy school lunch programs) factors (Neumark-Sztainer, Story, Perry, et al., 1999; Patrick & Nicklas, 2005; Rasmussen, Krolner, Klepp, et al., 2006; Story, Neumark-Sztainer, & French, 2002). Moreover, these determinants likely influence diet and eating behavior to different extents depending on the child's life-stage and social context (Birch, 1999). In early years, caregivers have a strong influence on child health behaviors, including diet and food preference (Patrick & Nicklas, 2005; Pearson, Biddle, & Gorely, 2009; Scaglioni, Salvioni, & Galimberti, 2008). During the transition from childhood to adolescence, children decrease the amount of time spent with parents, and spend more time alone and with friends (Larson & Richards, 1991). This transition provides opportunities for adolescents' behaviors to be shaped and more heavily influenced by their friends. Mackey and La Greca (2007) found that crowd affiliation was associated with diet; adolescents identifying themselves as 'Brains' (i.e., enjoying school and academics) had healthier diets than other peer crowds while 'Burnouts' (i.e., get into trouble, skip school) and 'Populars' (i.e., involved in activities and concerned with image) had unhealthier diets than other adolescents. Other evidence has identified perceptions of friends' fruit and vegetable intake to positively influence a child's intake of fruit and vegetables (Rasmussen et al., 2006).

The attitudes and behaviors of friends are associated with an adolescent's health-related behaviors, including smoking (Seo & Huang, 2012), extreme weight-loss behaviors (Fletcher, Bonell, & Sorhaindo, 2011), and physical activity (Macdonald-Wallis, Jago, & Sterne, 2012; Sawka, McCormack, Nettel-Aguirre, et al., 2013). However, the extent to which peer contagion (i.e., the influence of friends' behaviors causing changes in an individual's behavior) and homophily (i.e., an individual with certain behaviors seeking out others who also share similar behaviors) are associated with health-related behavior in children and adolescents remains poorly understood (Valente, 2010). Modeling (i.e., witnessing another individual perform a behavior thereby encouraging, or discouraging, the observer to perform the behavior) as well as perceived norms (i.e., individual's perception of the approval of a behavior by others or an individual's perception of the extent to which a behavior is performed by others) are key mechanisms that are associated with child and adolescent food choices (Patrick & Nicklas, 2005; te Velde, ChinAPaw, De Bourdeaudhuij, et al., 2014). Peer groups can have direct (e.g., social reinforcement and persuasion) and indirect (e.g., modeling of behavior) influence on diet behavior of other group members (Lieberman, Gauvin, Bukowski, et al., 2001). Moreover, the relationships between peer groups and diet are further complicated by issues of perceived body image, appearance comparison, and popularity (Lieberman et al., 2001; Shroff & Thompson, 2006).

Observational studies suggest that adverse friend norms (e.g., friends think that soft drink intake is good and breakfast consumption is bad) and modeling (e.g., perceived friends' soft drink and breakfast consumption) are associated with consuming more soft drinks and reporting fewer breakfast meals, after controlling for perceived parent norms and modeling (te Velde et al., 2014). In controlled experiments, children have been found to consume fewer calories from unhealthy snacks when they were in the presence of their mothers compared to when they were in the presence of their friends (Salvy, Elmo, Nitecki, et al., 2011). Certain characteristics of the model may also influence a child's food choice; Romero, Epstein, and Salvy (2009) found that, in a sample of girls, individuals tended to eat more cookies when exposed to a peer that also ate more cookies, compared with a peer that ate a small number of cookies, while Salvy, Howard, Read, et al. (2009) found that adolescents consumed more food when with a friend than when with an unfamiliar peer. These studies offer support for friends' modeling and food choices as a significant predictor of a child's and adolescent's food choices.

Social network analysis provides a theoretical framework and method of investigating the structural nature of individual's peer and friend networks, while also taking into account the attributes of friends within the network (e.g., health-related behaviors, sociodemographic characteristics) in relation to the behavior of the individual. A systematic review of studies investigating reciprocated (i.e., individual A nominated individual B as a friend, and B nominated A as a friend) school-based social networks on eating-related behavior, caloric intake and body weight in adolescents 11 to 18 years of age, identified a single study (de la Haye, Robins, Mohr, et al., 2010) that examined the association between friends' food intake and an individual's food intake (Fletcher et al., 2011). Specifically, for boys only, friends' high-caloric food consumption, including fast food and sweet snack foods, was associated with an individual's high-caloric food consumption (de la Haye et al., 2010). Despite excluding studies that included non-reciprocated nominations, the review also found evidence for similarities between dieting, extreme weight-loss behavior, and weight status among school-based friendship groups (Fletcher et al., 2011). While reciprocated friendship nominations can indicate a stronger bond between two individuals (Valente, 2010), non-reciprocated friendship nominations also offer valuable information as behavioral modeling of a perceived friend can occur without the modeler acknowledging the other individual as a friend.

The purpose of this review was to update and expand a previous synthesis (Fletcher et al., 2011) by undertaking a review of studies examining the association between aspects of friendship networks—derived using social network analysis—and dietary behavior in children and adolescents 6 to 18 years of age. Specifically, this review investigated the extent to which: 1) friends' dietary behavior was associated with an individual's dietary behavior; 2) the number of friendship nominations (i.e., popularity) and network positioning are associated with an individual's dietary behavior; and 3) network variables based on reciprocated versus non-reciprocated nominations are associated with an individual's dietary behavior.

2. Methods

2.1. Database search and study inclusion

Six scientific online databases (CINAHL, ERIC, MEDLINE, PsycINFO, PubMed, SocINDEX) were searched to identify studies for possible inclusion. Search terms and phrases were combined and reflected the