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A call for research exploring social media influences on mothers' child feeding practices and childhood obesity risk

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ABSTRACT

There is increasing interest in leveraging social media to prevent childhood obesity, however, the evidence base for how social media currently influences related behaviors and how interventions could be developed for these platforms is lacking. This commentary calls for research on the extent to which mothers use social media to learn about child feeding practices and the mechanisms through which social media influences their child feeding practices. Such formative research could be applied to the development and dissemination of evidence-based childhood obesity prevention programs that utilize social media. Mothers are identified as a uniquely important target audience for social media-based interventions because of their proximal influence on children's eating behavior and their high engagement with social media platforms. Understanding mothers' current behaviors, interests, and needs as they relate to their social media use and child feeding practices is an integral first step in the development of interventions that aim to engage mothers for obesity prevention. This commentary highlights the importance of mothers for childhood obesity prevention; discusses theoretical and analytic frameworks that can inform research on social media and mothers' child feeding practices; provides evidence that social media is an emerging context for social influences on mothers' attitudes and behaviors in which food is a salient topic; and suggests directions for future research.

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1. Introduction

For the past decade nearly one-in-five children in the United States have been classified as obese (Ogden, Carroll, Kit, & Flegal, 2014). There is increasing evidence that the first five years of life are a critical period for childhood obesity prevention (Cunningham, Kramer, & Narayan, 2014; Druet et al., 2012; Gillman et al., 2013; Paul et al., 2009). Innovative research identifying modifiable risk and protective factors and potential intervention opportunities during infancy and early childhood is necessary to address this important public health issue (Bentley et al., 2014; Nader et al., 2012). There is growing interest in leveraging social media for childhood obesity prevention due to the high prevalence of use. The use of social media platforms, such as Facebook (Facebook

[Internet]), Twitter (Twitter [Internet]), and Instagram (Instagram [Internet]), has increased among online adults from 16% in 2006 to nearly 75% in 2014 (Pew Research Center, 2014a). In this commentary, "social media" are defined as Internet-based platforms that allow users to create unique personal profiles, contribute and access searchable digital content (e.g., text, images, videos, hyperlinks to other webpages intended to inform, entertain, or sell products), form online relationships with other social media users, and view these social connections (Kane, Alavi, Labianca, & Borgatti, 2014). Social media platforms are accessible through Internet-connected devices including computers, tablets, and smartphones. Although social media may be an innovative setting for childhood obesity prevention initiatives, the evidence base for how social media currently influences behavior and how interventions could be developed for these platforms is lacking (Shin et al., 2014; Tobey et al., 2014; Valente, Palinkas, Czaja, Chu, & Brown, 2015).

Systems frameworks of obesity development suggest factors within broader social and environmental contexts contribute to obesity risk (Davison & Birch, 2001; Davison, Jurkowski, & Lawson,

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2013; Hall, Hammond, & Rahmandad, 2014; Harrison et al., 2011; Institute of Medicine (IOM), 2012). The attitudes and behaviors conveyed by family, peers, and media affect social norms and individual-level decisions related to food intake, physical activity, and body weight (Ajzen et al., 2012; Bandura and 1998; Hammond and 2010; Nestle et al., 1998; Rosenstock, Strecher, & Becker, 1988). Although the Internet and social media may influence numerous risk factors for childhood obesity (e.g., physical activity) (Eysenbach, Powell, Kuss, & Sa, 2002; Eysenbach and 2008; Pagoto et al., 2013), this commentary serves as a specific call for research on the extent to which mothers use social media to learn about child feeding practices and the mechanisms through which social media influences their child feeding practices. “Child feeding practices” are defined as attitudes and behaviors related to what to feed children (i.e. the types and portion sizes of food and beverages), how to feed children (e.g., restricting certain foods, responding to hunger and fullness cues), as well as the extent to which mothers model the consumption of a healthy diet (Faith, Scanlon, Birch, Francis, & Sherry, 2004; Gevers, Kremers, de Vries, & van Assema, 2014; Musher-Eizenman et al., 2007). Formative research on mothers’ social media use and its influence on their child feeding practices could be applied to the development and dissemination of evidence-based childhood obesity prevention strategies that utilize social media.

To encourage researchers in the fields of public health, human development, and nutrition to pursue research on the extent to which mothers use social media to learn about child feeding practices and the mechanisms through which social media influences their child feeding practices, this commentary first highlights the importance of mothers for childhood obesity prevention. It then describes three theoretical and analytic frameworks that could inform research on child feeding practices in the context of social media. Next, the commentary provides evidence that social media platforms are increasingly adopted online social contexts in which food and eating behavior are salient topics. The commentary concludes by offering specific directions for future research.

2. Mothers' child feeding practices influence Children's risk for obesity

During infancy and early childhood, mothers (i.e. primary caregivers) have substantial control over children's food choices, such as determining when, where, what, and how much children eat (Anzman, Rollins, & Birch, 2010; Birch et al., 1998; Gable & Lutz, 2000). On average, mothers spend more time than fathers on child feeding tasks, such as grocery shopping, preparing food, and eating with children, which suggests mothers are the primary nutritional gatekeepers in many households (Bureau of Labor Statistic, 2013). Previous studies have found associations between mothers' child feeding practices and children's food intake and weight status (Faith et al., 2004; Gerards & Kremers, 2015). Children who experience overtly restrictive or indulgent (i.e. permissive, child controlled) feeding are more likely to be overweight or obese than children whose mothers do not engage in these practices (Chaidez, McNiven, Vosti, & Kaiser, 2014; Rodgers et al., 2013; Wehrly, Bonilla, Perez, & Liew, 2014). Children whose mothers model the consumption of healthy foods (e.g., vegetables and fruit) are more likely to consume healthier diets (Entin, Kaufman-Shriqui, Naggan, Vardi, & Shahar, 2014; Gregory, Paxton, & Brozovic, 2011). Responsive feeding practices that encourage children to consume balanced diets and that are contingent with children's developmental stage and hunger and fullness cues may promote children's self-regulation of eating behavior and help to prevent obesity (Paul et al., 2014). Efforts to improve mothers' child feeding practices to date have predominately focused on individual-level influences

(e.g., mothers' knowledge and attitudes about nutrition) rather than external social or environmental influences (Paul et al., 2014; Waters et al., 2011). Research exploring social and environmental influences on mothers' child feeding practices is needed to understand how to promote responsive feeding practices and prevent overtly restrictive and indulgent feeding practices throughout infancy and early childhood (Davison et al., 2013).

3. Theoretical and analytic frameworks that can inform research on child feeding practices and social media

3.1. Systems theory

Frameworks of childhood obesity risk that are based in systems theory emphasize the transactional nature of risk and protective factors that operate at numerous levels, ranging from genetics to national policies (Davison & Birch, 2001; Davison et al., 2013; Hall et al., 2014; Harrison et al., 2011; Skinner et al., 2013). Although child weight status is the outcome of interest, its determinants are multi-factorial and include interactions among individuals and their families, peers, communities, and cultures. As just described, mothers' child feeding practices are an important contributor to children's risk for obesity, particularly during the first few years of life. Systems frameworks propose mothers' child feeding practices are both influenced by, and contribute to, the norms that exist within their social groups (Davison et al., 2013). Individual-level attitudes and behaviors are impacted by social norms, which are formed through explicit and implicit social influences (Higgs, 2015; Higgs & Thomas, 2016). Explicit social influences are the observable beliefs, behaviors, and available opportunities in ones' social networks (e.g., awareness of others' public eating behaviors, expressed opinions, and opportunities to engage in certain behaviors). Implicit social influences are processes that are not explicitly cognitively processed and include mechanisms such as behavioral synchrony (e.g., eating when others are eating), adoption of implicit weight norms shared by ones' social group, or behavioral economic processes and biases. The media can also contribute to social norms through explicit and implicit mechanisms (Lapinski et al., 2005). Media influences on child feeding practices are included in existing systems frameworks, however, the rapid growth of *social media* may require these models to be revised to include social media as a novel media context that can facilitate family, peer, and cultural influences on social norms (Li, Barnett, Goodman, Wasserman, & Kemper, 2013).

Previous studies on the predictors of mothers' child feeding practices have primarily focused on individual-level factors including maternal demographic characteristics (e.g., education), mental health (e.g., depression, eating pathology), and weight status (Blissett et al., 2011; Cachelin et al., 2013; Francis, Hofer, & Birch, 2001; Haycraft & Blissett, 2008; McPhie, Skouteris, Daniels, & Jansen, 2014), or on children's weight status, appetitive traits and temperament (Blissett et al., 2007; Carnell, Benson, Driggin, & Kolbe, 2014; Haycraft et al., 2012; Webber, Cooke, Hill, & Wardle, 2010). Studies that have examined social and environmental influences on child feeding practices have mostly been limited to the breastfeeding period. These studies suggest mothers' understanding of breastfeeding and the messages they receive about breastfeeding from their partners, family members, and peers impact their initiation and duration of breastfeeding (Cameron, Hesketh, Ball, Crawford, & Campbell, 2010; Rempel et al., 2004; Street et al., 2013). One unique study examined the association between advertisements for infant “hand feeding” in a popular parenting magazine (i.e. advertisements for infant formulas, cereals, and other solid foods) and breastfeeding rates in the United States between 1972 and 2000. The results suggested that when the

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