



## Women's social eating environment and its associations with dietary behavior and weight management



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### ABSTRACT

As an unhealthy social eating environment is considered a risk factor for obesity, this study aimed to examine women's regular eating networks and the extent to which diet-related variables were associated with those of their regular eating companions. In Study Part I ( $N = 579$ ), an egocentric network approach was used to investigate women's perceptions of their eating networks. In Study Part II ( $N = 262$ ), the participants' most important eating companions responded to a similar survey, and the corresponding answers were matched. The results showed that women shared their meals most frequently with spouses and other family members. Women who dined more often with healthy eaters reported on average a higher diet quality and a lower body mass index (BMI), which were also significant after controlling for individual factors. Study Part II expanded these results by showing that different diet-related factors such as diet quality, eating styles and BMI were correlated between women and their most important eating companions ( $r = 0.16\text{--}0.30$ ,  $p < 0.05$ ). Moreover, an actor–partner interdependence model revealed that a higher diet quality of the eating companions was associated with a lower BMI in women, controlled for their own eating behavior ( $b = -0.45$ ,  $p < 0.05$ ). This study showed similarities and interdependence between women's dietary behavior and body weight and those of their regular eating companions. This might indicate that regular eating networks have a shared understanding of what constitutes a normal diet, which might be an important factor to consider in the promotion of healthy eating.

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Given the global life expectancy of 71 years (WHO, 2015), adults eat about 58,035 main meals comprising breakfast, lunch, and dinner in the course of their lives. The majority of people eat at least one or two of these meals in the company of others, primarily their spouses or other family members, depending on their age, work, and housing situation (Sobal & Nelson, 2003). Due to the frequency of eating with close relations, people's eating behavior is likely similar to that of their regular eating companions. Consequently, an unhealthy social eating environment might be a risk factor for obesity (Higgs & Thomas, 2016). Therefore, this study investigated with whom women in Switzerland most frequently shared their meals and to what extent the characteristics of their regular eating companions were associated with their dietary behavior and weight management to identify social promoters of obesity. Women were the focus of this study because compared to men,

they are generally motivated to adhere to a healthy diet (Leblanc, Begin, Corneau, Dodin, & Lemieux, 2015) and are more involved in controlling their body weight (Rolls, Fedoroff, & Guthrie, 1991; Wardle et al., 2004). Nevertheless, adherence to dietary recommendations is low for both women and men in Switzerland (de Abreu et al., 2013), and about 32% of women are overweight or obese (BFS, 2012). Thus, other factors, such as the social environment, might be associated with women's eating behavior over and above individual factors (Story, Kaphingst, Robinson-O'Brien, & Glanz, 2008).

Indeed, previous studies have shown that perceptions about what and how much significant others eat are predictors of people's own eating behaviors (Ball, Jeffery, Abbott, McNaughton, & Crawford, 2010; Pelletier, Graham, & Laska, 2014; Robinson, Blissett, & Higgs, 2013), while associations are stronger for closer relationships (Barclay, Edling, & Rydgreen, 2013). Additionally, longitudinal social network analyses have demonstrated that certain eating patterns converge among spouses, other family members, and friends over the years (Pachucki, Jacques, & Christakis, 2011; de

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la Haye, Robins, Mohr, & Wilson, 2013). Social convergence has been also established for other health behaviors, such as weight gain (Christakis & Fowler, 2007; Trogdon, Nonnemaker, & Pais, 2008), leading to the conclusion that people's health might be interconnected among their social networks (Smith & Christakis, 2008). However, only a few studies have examined aspects of both eating behavior and body weight together although unhealthy eating patterns are known as important predictors of obesity (Malik, Willett, & Hu, 2013; Sundararajan, Campbell, Choi, & Sarma, 2014).

From a social network perspective, three different mechanisms—social influences, homophily, and shared environments—can lead to similarities in eating behaviors, which act jointly and can only be disentangled by sophisticated longitudinal network analyses (Higgs & Thomas, 2016; Valente, 2010). More precisely, a substantial body of research has indicated that eating behavior is strongly influenced by other people in various ways (Higgs & Thomas, 2016). For instance, experimental research have found robust effects of social modeling, which describes the phenomenon of people using their co-eaters as immediate reference values for their own eating behavior (Cruwys, Bevelander, & Hermans, 2015; Vartanian, Spanos, Herman, & Polivy, 2015). This means that a person is likely to eat more or to select a certain type of food when his or her eating companion is doing so. For instance, people are less likely to choose healthy foods in the presence of an unhealthy eating companion (Robinson & Higgs, 2013). Generally, people tend to follow social norms about what and how much is appropriate or normal to eat, especially when they identify themselves with the norm referent (Higgs & Thomas, 2016). Social norms are kinds of implicit cues set by the behaviors of significant others, with the power to affect people's food choices (Higgs, 2015). In the context of regular eating networks, such as family meals, people aim to negotiate social norms and shared values through which they identify themselves as a unique group (Bove, Sobal, & Rauschenbach, 2003; Giacoman, 2016). Social norms then constitute an important force to keep up eating habits and structures of regularly shared meals, for instance, by defining the place, time, and components of a typical meal (Giacoman, 2016). Besides social influences, two other mechanisms might play a role in explaining the similarities in eating patterns among regular eating companions. First, similar individuals more likely tend to form relationships with one another, which is called homophily (McPherson, Smith-Lovin, & Cook, 2001). For example, women and their spouses may have had pre-existing similar attitudes and behaviors toward healthy eating before they dined regularly together. Second, a shared environment can lead to similar eating patterns. For instance, people who are exposed to the same food supply (e.g., dine in the same type of restaurant) make similar food choices (Barclay et al., 2013; Cohen-Cole & Fletcher, 2008; Sobal & Hanson, 2014).

Based on social norms, pre-existing similarities, and shared food environments, it can be assumed that women and their regular eating companions have similar eating behaviors, which might result in similar body weights. Therefore, this study investigated for the first time the extent to which women's dietary behavior and body weight are associated with those of their regular eating companions. More precisely, these authors investigated different factors of healthy eating such as nutrition knowledge, the goal of a healthy diet, diet quality, eating styles, body mass index and shared eating frequency. Insights about how women's social eating environment is related to their dietary behavior and weight management might contribute to a better understanding of how healthy eating and body weight can be promoted more effectively. Additionally, it might help clarify why some studies found a positive association between regularly shared meals (such as family meals)

and healthier eating patterns and a lower body weight, whereas other studies did not (Fulkerson, Larson, Horning, & Neumark-Sztainer, 2014; Sobal & Hanson, 2014).

This study included two parts. Study Part I investigated women's regular eating networks and whether these were associated with women's dietary behavior and body weight. Study Part 2 examined the interrelationship of dietary behavior and body weight between women and their most important eating companions.

## 1. Study Part I

The first part of the study applied an egocentric network approach (Valente, 2010) to investigate the participants' regular eating networks and their associations with the participants' diet quality and body mass index (BMI). A postal survey was conducted with a random sample of female adults from the general population in the German-speaking part of Switzerland. The participants answered the survey consisting of questions about themselves and the people with whom they most often ate their main meals. The outcome measures were the participants' diet quality and BMI as main determinants of health (Popkin, Kim, Rusev, Du, & Zizza, 2006). The independent variable was a calculated healthy-eating score reflecting whether the participants ate more often with healthy or unhealthy eaters. Additionally, the following control variables were assessed: age, nutrition knowledge, and motivation (goal of achieving a healthy diet and body weight) as prerequisites for behavioral changes (Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2003) and eating styles (restrained, emotional, and external eating) as influencing factors on food choices and body weight (Keller & Siegrist, 2015a). In line with previous research, it was expected that the participants ate most often with their spouses and other family members (Sobal & Nelson, 2003). It was also hypothesized that the participants who dined more often with healthy eaters would have a higher diet quality and a lower BMI than the participants who had meals more frequently with unhealthy eaters.

### 1.1. Methods

#### 1.1.1. Participants and procedure

A cross-sectional study design was used in which survey forms were mailed to 2000 randomly selected addresses with female or family names in the telephone directory ( $N = 1860$  valid addresses). Each accompanying letter was addressed to a female person over 18 years old whose birthday was coming next, informing the potential participant about the study's aim and requesting her to complete the questionnaire. The participants received no financial compensation, but the enclosed return envelopes were preaddressed and prepaid. After three weeks, each nonresponder received a reminder with an additional questionnaire. In total, 579 questionnaires were returned ( $N = 31.1\%$ ). Twelve cases had to be excluded from further analyses because of double participation ( $n = 2$ ), missing values over 50% ( $n = 9$ ), and a lack of all personal data ( $n = 1$ ). Of the remaining 567 respondents, 65 (11.5%) indicated having no regular eating companions, which was significantly associated with older age ( $r = 0.21, p < 0.001$ ) but not with other study variables of interest. For the purpose of this study, the participants with no eating companions were excluded. Thus, the final sample consisted of 502 female adults between 19 and 95 years old ( $M = 56.97, SD = 15.26$ ). Their educational levels ranged from supplementary school (8.8%), vocational or university preparation school (42.7%), and higher vocational school (27.3%) to a university degree (20.7%). The missing values of all study variables were between 0.4 and 4.2%. This study was approved by the ETH Ethics Committee, Zurich, Switzerland.

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