



Identifying users of traditional and Internet-based resources for meal ideas: An association rule learning approach



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ARTICLE INFO

Article history:

Received 30 July 2015

Received in revised form

6 April 2016

Accepted 6 April 2016

Available online 8 April 2016

Keywords:

Home cooking

Meal ideas

Internet

Social media

Association rules

Methodology

ABSTRACT

Increasing home cooking while decreasing the consumption of food prepared away from home is a commonly recommended weight management strategy, however research on where individuals obtain ideas about meals to cook at home is limited. This study examined the characteristics of individuals who reported using traditional and Internet-based resources for meal ideas. 583 participants who were $\geq 50\%$ responsible for household meal planning were recruited to approximate the 2014 United States Census distribution on sex, age, race/ethnicity, and household income. Participants reported demographic characteristics, home cooking frequency, and their use of 4 traditional resources for meal ideas (e.g., cookbooks), and 7 Internet-based resources for meal ideas (e.g., Pinterest) in an online survey. Independent samples *t*-tests compared home cooking frequency by resource use. Association rule learning identified those demographic characteristics that were significantly associated with resource use. Family and friends (71%), food community websites (45%), and cookbooks (41%) were the most common resources reported. Cookbook users reported preparing more meals at home per week ($M = 9.65$, $SD = 5.28$) compared to non-cookbook users ($M = 8.11$, $SD = 4.93$; $t = -3.55$, $p < 0.001$). Resource use was generally higher among parents and varied systematically with demographic characteristics. Findings suggest that home cooking interventions may benefit by modifying resources used by their target population.

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1. Introduction

One commonly recommended strategy for the prevention and treatment of obesity is to reduce the consumption of food prepared away from home (e.g., at fast food restaurants) by increasing the consumption of food prepared at home (Institute of Medicine (IOM), 2012; Smith, Ng, & Popkin, 2013; U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2010). However, little is known about the resources that individuals use to facilitate home cooking, such as where they obtain information about cooking skills, meal ideas, or recipes (Reicks,

Trofholz, Stang, & Laska, 2014). The information included in these resources could influence individuals' decisions about whether to eat at home or away from home, as well as the nutritional quality of foods prepared at home (Pope, Latimer, & Wansink, 2015; Schneider, McGovern, Lynch, & Brown, 2013). The rapidly evolving information landscape calls for new research on this topic; Internet-based resources such as websites, social media, and mobile applications may be emerging resources for information about home cooking (Doub, Small, & Birch, 2016; Schneider et al., 2013). In order for interventions to strategically disseminate evidence-based nutrition materials that promote healthy food preparation, research is needed on the prevalence of the use of both traditional (e.g., cookbooks) and Internet-based (e.g., Pinterest) resources and the demographic characteristics of the individuals who access them. Research is also needed on how engagement with different resources is associated with home cooking frequency to determine

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whether resources are used more for entertainment or implemented in home food preparation (Pope et al., 2015).

1.1. Background

Even though spending on food away from home has increased (USDA Economic Research Service, 2014), the majority of calories are still consumed at home (Smith et al., 2013). In 2007–2010 nearly half of adults in the United States reported that dinner was cooked in their household 6–7 nights per week (Wolfson & Bleich, 2014). The amount of time that individuals spend on food preparation each day has remained stable since the mid 1990's (Smith et al., 2013). Increased time spent on home cooking has been associated with better dietary quality (Larson, Perry, Story, & Neumark-Sztainer, 2006; Monsivais, Aggarwal, & Drewnowski, 2014; Wolfson & Bleich, 2014) and lower body mass index, particularly among individuals who are overweight (Kolodinsky & Goldstein, 2011). Higher cooking self-efficacy has been related to more vegetable purchases (Winkler & Turrell, 2010) and less consumption of processed convenience foods (e.g., frozen pizza) (Hartmann, Dohle, & Siegrist, 2013; van der Horst, Brunner, & Siegrist, 2011). However, a recent study of low-income Supplemental Nutrition Assistance Program participants found that fruit and vegetable consumption was low even within households that had a higher frequency of home food preparation, suggesting that not all foods prepared at home are highly nutritious (Wolfson & Bleich, 2015).

There is some evidence that the frequency of home food preparation varies by demographic characteristics. Even though women still spend more time on food-related tasks overall (e.g., grocery shopping, cooking; Bureau of Labor Statistics, 2013; Smith et al., 2013; Wolfson & Bleich, 2014) men have increased the amount of time they spend cooking while it has decreased among women (Khandpur, Blaine, Fisher, & Davison, 2014; Smith et al., 2013). Previous research suggests that the frequency of home food preparation varies by race, ethnicity, and cultural factors (Virudachalam, Long, Harhay, Polsky, & Feudtner, 2014; Wolfson & Bleich, 2014). Data from the 2007 and 2008 National Health and Nutrition Examination Survey (NHANES) indicated that Black households cooked 4.4 dinners at home per week, White households cooked 5.0 dinners, Hispanic households with a reference person born in the United-States cooked 4.9 dinners, and Hispanic households with a reference person born outside of the United States cooked 5.9 dinners (Virudachalam et al., 2014). Lower household income was associated with always (6 or 7 times per week) or never (0 or 1 times per week) cooking dinner at home, whereas having dependents or living with a partner was associated with cooking dinner at home at least sometimes (≥ 2 times per week; Virudachalam et al., 2014). The current study extends this previous research by examining whether there are demographic differences in the sources from which individuals obtain ideas about meals to prepare at home, which may in turn be associated with the frequency of home food preparation.

Few empirical studies have examined where individuals access information about home cooking (Pope et al., 2015). Even formal home cooking interventions have received limited evaluation (Reicks et al., 2014). This is an important area of research because previous studies found that having few meal planning resources or ideas about what foods to prepare at home were barriers to family meals (Fulkerson, Story, Neumark-Sztainer, & Rydell, 2008) and decreased adherence to dietary intervention recommendations among individuals at risk for Type 2 diabetes (Brekke, Sunesson, Axelsen, & Lenner, 2004). Limited data on where individuals access information related to home cooking and whether resource use leads to increased home cooking frequency prevents dietary

health professionals from effectively intervening with these resources (Bentley et al., 2014). The Internet has introduced new ways for individuals to access and share information. In 2015, 84% of all adults in the United States used the Internet (Perrin & Duggan, 2015). Although demographic divides in Internet use are decreasing, Internet use is still lower among individuals who are older, have lower household incomes, or are African American or Hispanic (Perrin & Duggan, 2015). The extent to which individuals from varying demographic backgrounds obtain meal ideas from Internet-based resources is currently unknown. Even though food is a popular topic on websites and social media such as Facebook (Freeman et al., 2014) and Pinterest (Gilbert, Bakhshi, Chang, & Terveen, 2013) the current study is among the first to examine the prevalence of use of online resources for meal ideas. In 2014, 71% of online adults used Facebook and 28% of online adults used Pinterest, many of whom reported daily or at least weekly use (Duggan, Ellison, Lampe, Lenhart, & Madden, 2015). Internet-based resources (e.g., food community websites, food blogs) may be widely used and potentially influential sources of meals ideas that could be leveraged for the dissemination of evidence-based information.

The mechanisms through which information about food and meal ideas is transmitted within various resource types may influence the contexts and contents of the information obtained. For example, cookbooks contain a finite set of recipes and are likely to be accessed at home, where as Internet-based resources such as food community websites (e.g., AllRecipes.com) and social networking sites (e.g., Facebook, Pinterest) allow users to continuously explore options and could be accessed anywhere that the user has access to an Internet-connected device (e.g., laptop, Smartphone). Table 1 contains potential mechanisms for obtaining food-related information and meal ideas from traditional and Internet-based resources. One purpose of the current study is to situate the use of newer, Internet-based meal idea resources such as food blogs and select social networking sites among traditional resources such as cookbooks and grocery store handouts to better understand where individuals currently obtain meal ideas.

1.2. Study aims

This descriptive study has three aims. First, it assesses the prevalence of use of traditional and Internet-based meal idea resources overall and by each resource individually. Second, it examines how the use of certain meal idea resources is associated with the frequency of home food preparation. Third, it explores how demographic characteristics are associated with the use of meal idea resources overall and by each resource individually.

2. Methods

2.1. Participant recruitment

615 participants were recruited between December 29, 2013 and January 2, 2014 by an external sampling company, Survey Sampling International, LLC, to complete an online survey on eating behavior and mobile technology. Participants were recruited to approximate the 2014 United States Census demographic characteristics (US Census Bureau, 2014) on sex, age, race and ethnicity, income, and geographic region. To be eligible for the study, individuals had to be 18 years of age or older and use a mobile device such as a smartphone or tablet computer. Recruitment priority was given to individuals who were at least 75% responsible for the grocery shopping and meal planning for their households. Participants who reported being at least 50% responsible for meal planning in their household were included in the current study.

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