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Research report

Making healthy food choices using nutrition facts panels. The roles of knowledge, motivation, dietary modifications goals, and age

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ABSTRACT

Nutrition facts panels (NFPs) contain a rich assortment of nutrition information and are available on most food packages. The importance of this information is potentially even greater among older adults due to their increased risk for diet-related diseases, as well as those with goals for dietary modifications that may impact food choice. Despite past work suggesting that knowledge and motivation impact attitudes surrounding and self-reported use of NFPs, we know little about how (i.e., strategies used) and how well (i.e., level of accuracy) younger and older individuals process NFP information when evaluating healthful qualities of foods. We manipulated the content of NFPs and, using eye tracking methodology, examined strategies associated with deciding which of two NFPs, presented side-by-side, was healthier. We examined associations among strategy use and accuracy as well as age, dietary modification status, knowledge, and motivation. Results showed that, across age groups, those with dietary modification goals made relatively more comparisons between NFPs with increasing knowledge and motivation; but that strategy effectiveness (relationship to accuracy) depended on age and motivation. Results also showed that knowledge and motivation may protect against declines in accuracy in later life and that, across age and dietary modification status, knowledge mediates the relationship between motivation and decision accuracy.

Introduction

Greater adherence to a healthy diet may reduce the impact of numerous diseases that increase in frequency in later life such as osteoporosis, obesity, high blood pressure, diabetes, heart disease, and certain cancers (Department of Agriculture, 2004; U.S. Department of Health, 2000). One of the goals of U.S. federal regulation of the 1990s was to expand the ability of food labels to communicate health information thereby improving dietary quality and reducing the incidence of chronic disease and related healthcare costs. The nutrition facts panel (NFP) was designed to help carry out these goals by communicating information on key nutrients, as well as other important information such as calories, serving size, and percent Daily Values. However, nutrition facts tables are common in many other countries as well. In the U.S. and abroad, researchers are concerned about food label communication and the extent to which food labels can improve diet and prevent chronic disease (Grunert & Wills, 2007; Mhurchu & Gorton, 2007; van Trijp & van der Lans, 2007). Consumers in 56 countries report misunderstanding and mistrusting food labels (Neilsen Company, 2012).

There is some evidence that NFP use is associated with healthy dietary behaviors. Individuals who use labels are more likely to seek nutrition information and to eat healthy foods (Choinière & Lando, 2008; Golan, Kuchler, & Krissoff, 2007; Lin, Lee, & Yen, 2004; Neuhouser, Kristal, & Patterson, 1999; Ollberding, Wolf, & Contento, 2010; Post, Mainous Iii, Diaz, Matheson, & Everett, 2010; Teisl & Levy, 1997; Variyam, 2008; Variyam & Golan, 2002). However, most studies rely on correlational data, making it unclear whether food labels are responsible for healthier diets. Indeed, some evidence suggests that NFPs fall short of their potential to impact behavior (Balasubramanian & Cole, 2002; Golan et al., 2007; Kristal, Levy, Patterson, Li, & White, 1998; Wills, Schmidt, Pillo-Blocka, & Cairns, 2009). According to one estimate, only 54% of consumers read a product's label when purchasing a food for the first time (Choinière & Lando, 2008) and proportions are comparable across age groups (Ollberding et al., 2010). Given these data are based on self-report measures, actual use could be far lower. In general, there appears to remain a good deal of opportunity to increase label communication and use. Although past research has increased our understanding of perceived and actual difficulty surrounding NFP use (Burton & Andrews, 1996; Byrd-Bredbenner & Kiefer, 2000; Levy & Fein, 1998), as well as our understanding of the frequency with which individuals report using NFPs (Lin et al., 2004; Post, Mainous, Diaz, Matheson, &

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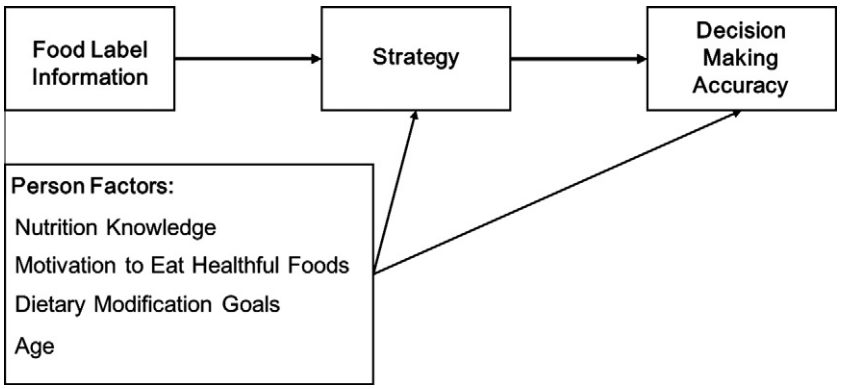

Fig. 1. Model of nutrition information processing as it pertains to decision accuracy.

Everett, 2010), we still know little about how NFPs are processed when making decisions.

The goal of the present study was to add to the literature by examining strategies that individuals use to make decisions based on NFP information and the extent to which strategies are influenced by person factors of age, dietary modification status, knowledge, and motivation. To assess strategies, we conducted a laboratory study in which we manipulated NFP information and tracked eye movements as individuals decided which of two NFPs was healthier. Eye tracking has been used to examine search behaviors of adults who are asked to make food purchasing decisions or locate information on food labels (Goldberg, Probart, & Zak, 1999b; Graham & Jeffery, 2011; van Herpen & van Trijp, 2011; Visschers, Hess, & Siegrist, 2010). Still, we know little about possible strategies used to evaluate NFP information and factors that affect strategy and accuracy. Eye tracking methodology is a useful way to measure strategies associated with NFP use because attentional processes can be assessed objectively as individuals evaluate and make decisions based on information in NFPs.

Knowledge and motivation have been identified as being important for nutrition information processing (Balasubramanian & Cole, 2002; Fitzgerald, Damio, Segura-Pérez, & Pérez-Escamilla, 2008; Grunert, Wills, & Fernández-Celemín, 2010; Miller, Gibson, & Applegate, 2010; Miller, Gibson, Applegate, & de Dios, 2011). Balasubramanian and Cole (2002) proposed a model in which nutrition knowledge and motivation to process nutrition information impact memory for nutrition information. We have built upon this general idea in our model, depicted in Fig. 1. The questions that we addressed are: How do food label manipulations affect nutrition information processing and decision making accuracy; How do person characteristics impact processing and decision making accuracy? In addition to knowledge and motivation, we consider two additional person factors, dietary modification status and age. Decision making strategies and person factors are described below.

Decision making strategies

Johnson's (1990) framework for decision making strategies distinguishes between noncompensatory and compensatory strategies. Noncompensatory strategies are those that consider one type of information across options, for example, comparing total fat content on NFP 1 with total fat content on NFP 2 to determine which of two foods is more healthful. In contrast, compensatory strategies are those that consider more than one type of information within each food option such that one option compensates for another, for example, considering total fat and fiber in one NFP compared to comparing total fat across both NFP 1 and 2. Johnson found that older adults were more likely to use noncompensatory decision making strategies when making a laboratory-based mock car purchase decision and argued that they did so because this approach is less effortful than compensatory strategies. Although noncompensatory strategies could be easier in situations in which there are a small number of possible comparisons, this strategy could be cognitively demanding when many comparisons available. When using noncompensatory strategies to decide which of two NFPs is the more healthful choice, one could potentially make a large number of comparisons (a comparison between each nutrient value, for grams [/milligrams] as well as percent Daily Value), making the task effortful. Thus, when using noncompensatory strategies, the effects of dietary goals may be important for older adults in particular, and may rely on prior nutrition knowledge or motivation.

Person-level factors

Knowledge

Knowledge, both declarative and procedural, plays a critical role in virtually all areas of information processing. It facilitates exchanges from short-term/working memory to long-term memory (Ericsson & Kintsch, 1995), aides conceptual integration (Sharkey & Sharkey, 1987) and increases efficiency (Miller, 2009). Not surprisingly, evidence suggests that nutrition knowledge is important for a variety of health and diet decisions (Worsley, 2002). In fact, past research has shown that prior levels of knowledge are positively related to dietary quality, even after controlling for sociodemographic factors (Variyam & Golan, 2002; Wardle, Parmenter, & Waller, 2000). Knowledge of nutrition is related to perceptions of food healthfulness (Aikman, Min, & Graham, 2006), accuracy of label use (Burton, Garretson, & Velliquette, 1999; Fitzgerald et al., 2008; Grunert et al., 2010; Moorman, 1996), careful shopping behavior (Fusillo & Beloian, 1977), as well as food choice (Fitzgerald et al., 2008; Guenther, Jensen, Batres-Marquez, & Chen, 2005). Knowledge eliminated the Black–White differences in cancer-prevention behaviors, including diet (Jepson, Kessler, Portnoy, & Gibbs, 1991). Research shows that individuals with more years of education experienced the greatest improvement in diet quality over the course of several years (Popkin, Zizza, & Siega-Riz, 2003) which may be due to an increase in nutrition knowledge (Beydoun & Wang, 2008). Similarly, higher levels of baseline knowledge were more predictive of weight loss among obese, low-income mothers than were increases in knowledge as a result of an intervention (Klohe-Lehman et al., 2006). Importantly, Howlett, Burton, and Kozup (2008) found that, among individuals who were interested in using label information, misinterpretation of nutrient informa-