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Back-of-pack information in substitutive food choices: A process-tracking study in participants intending to eat healthy

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ABSTRACT

People are increasingly aware of the positive effects of a healthy diet. Concurrently, daily food consumption decisions – choices about both the quality and quantity of food that is ingested – are steered more by what consumers consider healthy. Despite the increased aim to eat healthier, however, consumers often do not read or incorrectly interpret on-pack nutrition information, resulting in suboptimal food choices in terms of health. This study aims to unravel the determinants of such inadvertent food choices from these consumers. In an online process-tracking study, we measured the actual usage of available back-of-pack nutrition information during substitutive food choices made by 240 participants who had the intention to eat healthy. Using mouse-tracking software in a computerized task in which participants had to make dichotomous food choices (*e.g.*, coconut oil or olive oil for baking), we measured the frequency and time of nutritional information considered. Combined with demographic and psychosocial data, including information on the level of intention, action planning, self-efficacy, and nutrition literacy, we were able to model the determinants of inadvertent unhealthy substitutive food choices in a sequential multiple regression ($R^2 = 0.40$). In these consumers who intended to eat healthy, the quantity of obtained nutrition information significantly contributed as an associative factor of the percentage of healthy food choices made. Moreover, the level of correct answers in a nutrition literacy test, as well as taste preferences, significantly predicted the percentage of healthier choices. We discuss that common psychosocial determinants of healthy behavior, such as intention, action planning, and self-efficacy, need to be augmented with a person's actual reading and understanding of nutrition information to better explain the variance in healthy food choice behavior.

1. Background

People in Europe and other industrialized countries are becoming more conscious about factors influencing their personal health (Brannon, Feist, & Updegraff, 2014; Bugge, 2015). In addition to physical activity, the quality of the diet has become a well-known influence on a person's wellbeing, both by scientists as well as by the general population (Jallinoja, Niva, Helakorpi, & Kahma, 2014; Jankovic et al., 2014; Swinburn et al., 2011). Therefore, governments (e.g., the European Food Safety Authority, World Health Organization) as well as companies (e.g., Nestlé, Unilever) have made specific recommendations to help people make healthier food choices (Nestle, 2013; WHO, 2013). These healthier food choices are one of the keys in putting a halt to the sky-rocketing obesity rates (Ng et al., 2014), obesity-associated health problems (Forouzanfar et al., 2015), and other diet-related health problems (Francis & Stevenson, 2013).

However, despite the widespread attention to the diet and the abundant recommendations to eat healthier, even health-conscious consumers, estimated to be about 50% of the European population (Jallinoja et al., 2014), often make dietary choices that do not benefit their health (Mötteli, Keller, Siegrist, Barbey, & Bucher, 2016). According to a recent study (Mai & Hoffmann,

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2015), the level of health-consciousness has only a limited effect on improving one's diet – building on the fundamental premise that food choices are to a large extent driven by nonconscious processes. It appears that there is a mismatch between a person's health consciousness, their intention to eat healthier and their dietary behavior, partially explained by the conflict between eating enjoyment and health goals (Stroebe, Van Koningsbruggen, Papies, & Aarts, 2013). A complementing explanation for this mismatch can be found in ineffective heuristics that people develop to make their food choices (Wansink, Just, & Payne, 2009). Strikingly, for example, there is a trend in which consumers have recently substituted products containing fructose (Welsh, Sharma, Grellinger, & Vos, 2011) or products containing wheat (Brouns, van Buul & Shewry, 2013) with the intention of improving their health. However, the substitution products (*e.g.,* glucose-containing products or gluten-free bread) often do not result in an overall healthier diet in the general population (Missbach et al., 2015; Sievenpiper et al., 2014; Willett, 1994).

A major cause for this specific behavior is misleading information from food manufacturers, a widely studied phenomenon (Harris, LoDolce, & Schwartz, 2015). A lesser-studied reason in this context is the notion that consumers perhaps do not adequately process the available information and subsequently form maladaptive heuristics to reach their goals, while they actually perceive it as the right behavior (Mötteli et al., 2016). Given the increased emphasis on the consumer's responsibility in making healthy food choices (Hieke et al., 2015), we therefore feel that it is of crucial importance to understand what determinants play a role in substitutive food choices and food choice strategies in individuals who intend to eat healthy.

1.1. Theoretical background

A plethora of recent research is focused on finding effective interventions to increase the intention to eat healthy in individuals (often linked to low-socioeconomic (SES) consumers) (Escaron, Meinen, Nitzke, & Martinez-Donate, 2013). Such research builds on behavioral change theories that assume that the intention to change is the best predictor of actual change, such as the Theory of Reasoned Action, the Theory of Planned Behavior, or their successor the Reasoned Action Approach (Brannon et al., 2014). These theories offer limited guidance in explaining why people, despite intending to eat healthy, make unhealthy substitutive food choices. In these consumers who have a strong intention to change, actual behavior is sometimes not in line with this intention. As such, studying this particular group warrants a different theoretical approach to ensure the correct development of predictive models.

Fortunately, most stage-theories do acknowledge such a so-called intention-behavior gap (Sutton, 2005). In this respect, the health action process approach model (HAPA), a stage-theory based social-cognition model that describes the key stages and cognitions related to acting on an intention (Schwarzer & Luszczynska, 2008; Schwarzer, 1992), is of particular interest. The HAPA model emphasizes the particular role of self-efficacy, the extent of one's belief in one's own ability to reach goals, at different stages of health behavior change. As literature suggest that especially self-efficacy plays an important role in making healthy food choices made by people who already intend to eat healthy (Renner & Schwarzer, 2005; Richert et al., 2010), we opt to use this framework as a basis for our further study. A generic diagram of the HAPA model is depicted in Fig. 1.

Healthy food choices have been successfully modelled in studies using the HAPA model. For example, Wiedemann, Lippke, and Schwarzer (2012) predicted fruit and vegetable intake by including the level of memory performance and number of action plans made by consumers. In another study in which 700 internet users from Germany participated, the HAPA model was found to be useful in predicting healthy dietary patterns (Schwarzer et al., 2007). Through structural equation modelling, the authors found that 73% of the dietary behavior variance in their data could be explained jointly by planning and self-efficacy using the HAPA model. Important to note here is that the measure of dietary behavior was constructed using participant responses on a 4-point scale in which they (dis)agreed with three similar statements regarding their intake of at least 5 fruits and vegetables per day – a rather simplified measure. In a similar study with Swiss participants, where a more complex measure of nutrition behavior was used (*i.e.*, multiple items assessing ones adherence to an intended low-fat diet), only 34% of variance was explained by the change in HAPA-constructs including intentions, action planning and action control (Scholz, Nagy, Göhner, Luszczynska, & Kliegel, 2009). We therefore believe that dietary behavior should be measured close to the (complex) real-life behavior to ensure valid results.

1.2. Modelling inadvertently unhealthy choices in the volition phase

While earlier studies have looked at the fit of the HAPA model on deliberate healthy dietary behavior, in particular fruit and vegetable consumption (Godinho, Alvarez, & Lima, 2013; Radtke, Kaklamanou, Scholz, Hornung, & Armitage, 2014), only limited work has been done to understand how consumers intending to eat healthy inadvertently make unhealthy choices. To do so, clear operational variables that indicate the degree to which people process nutrition information when making food choices need to be combined with theoretically relevant variables such as nutrition literacy (Carbone & Zoellner, 2012), and other factors often associated with studies based on the HAPA model related to food choices (*i.e.*, self-efficacy, intention, planning, and taste preferences). Nutrition literacy, in this respect, is defined as the degree to which people have the capacity to obtain, process, and understand basic nutrition information (Zoellner, Connell, Bounds, Crook, & Yadrick, 2009).

In this context, it can be assumed that individuals who intend to eat healthy are able to perceive the risk of unhealthy food consumption, understand the expected outcomes of changing behavior and believe that they are capable to exercise control of their actions. They have surpassed the pre-intention phase, have the intention to eat healthy, and are thus in the so-called volition phase. In this volitional phase, the degree to which people process nutrition information needs to be included in a model to understand their concrete food choices. In a recent systematic review (Vaitkeviciute, Ball, & Harris, 2015), evidence on a positive association between the level of food information processing and adolescents' dietary intake was summarized. Although the available evidence was not conclusive, the authors posited that nutrition literacy – a relatively new concept, adapted from the term health literacy (Zoellner et al., 2009) might play an important role in shaping food intake decisions. Hence, Vaitkeviciute et al. (2015) concluded that nutrition literacy (termed food literacy in their review) needs to be included in models assessing food choices. According to them, rigorous research methods are required to effectively assess causality between food information processing and food choices. In addition to common demographic, socio-economic, and health psychological variables, models of food choices should therefore cover the quantity of information, and the capacity to apply this information when making food choices.