Lay Theories of Healthy Eating:

Insights from Cross-Cultural Comparisons

by

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ABSTRACT

Lay theories of healthy eating are a potentially important consideration for public health and nutrition efforts as perceptions and beliefs about "healthiness" are key determinants of dietary choices (Furst et al. 1996; Grunert, 2007). A rich body of social science literature has examined how people across cultures decide what counts as healthy eating, yet such work has focused mainly on *what* people think is good and bad to consume, overlooking another important aspect- *how* one eats. The ways one eats can include patterns and timing of meal intake, as well as mental and emotional states during eating (henceforth, "eating styles"). This dissertation aims to 1) examine whether beliefs on eating styles constitute a separate category of healthy eating perceptions, 2) describe American and Eastern European lay models of how both food characteristics and styles of eating shape health outcomes, and 2) investigate cross-cultural variation in the endorsement of eating styles as important for health in the United States and Eastern Europe. Aims 1 and 2 use pile sorts (n=48), in-person interviews (n=49), and online surveys (n=283) to elicit subjective perspectives on how different eating considerations impact health, and aim 3 involves two sets of questionnaires collected in the U.S. (n=50; n=42) and Eastern Europe (n=42; n=35) to test the hypothesis that levels of collectivism influence variation in endorsement of eating styles for health. Results demonstrate that "eating styles" is a separate category of beliefs in people's models of healthy eating and individuals in both cultures perceive a variety of important health outcomes from *how* one eats- weight management, energy levels, digestive health, and overall feeling of wellbeing. These perceptions are not uniform, as participants held contrasting models of how styles of food consumption can influence weight control, and Eastern European

respondents held additional views on how aspects of food timing can affect long-term health. Finally, results show that individual level of collectivism, not differences in nationality, accounts for variation in endorsement of eating styles for health. These results suggest that the holistic pattern of attention characteristic of the collectivist social orientation extends to the domain of diet.

DEDICATION

I first dedicate this work to those that had the foresight to send me in the right direction at a very early age: my grandmother, Nadezda Petrovna, and parents Konstantin and Victoria Voitiuk. The educational foundation they had worked hard to provide for me determined the rest of my life. I additionally dedicate this dissertation to my other families. My American host family- Deeh Hershey- welcomed me in the United States as an international exchange student and helped me during crucial stages in life. My Romanian family- husband Vlad and his parents Simona and Ion Vizireanu- have tremendously supported me as I finished graduate school. Thank you all.

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CHAPTER 1

INTRODUCTION

As crucial as it is to life and health, eating can be a source of great concern as people worry about what, how, and how much to eat (Rozin, 1999). Humans are remarkable in the diverse ways they make and consume food, and both anthropologists and other social scientists have documented numerous cultural and psychological tools that people use to make eating choices (Mintz & Du Bois, 2002; Messer, 1984), including dichotomizing substances into safe and unsafe (Douglas, 1966), using mental shortcuts to simplify eating decisions (Rozin, 2002), and relying on socially learned theories of food (Allen 2012). These tendencies to order and categorize eating are often instilled with moral, religious, and health-related meanings (Ochs & Schohet, 2006) that anthropologists have shown can vary dramatically both across and within cultures (Nichter 1981, Ho, 1985; Ludman & Newman, 1984, Sobo, 1997, Mu'Min Chowdhury et al., 2000; Fessler & Navarrette, 2003; Henrich & Henrich, 2010).

Such rich work on people's perceptions about what constitutes healthy eating, however, has described lay interpretations mostly in terms of *what* should be consumed (**food characteristics**), with much less emphasis on another important element of people's cultural models – eating styles or *how* the food should be consumed. This work refers to such aspects of *how* one eats as "**eating styles**". Chapter 6, which has already been accepted for publication, refers to considerations of eating styles as "eating context", a more general term for "how" one consumes food. We expect lay theories of eating to include beliefs about eating styles, since culture defines both what food *is* and

the proper ways or style of ingestion (Douglas, 1996). Indeed, healthy eating perceptions feature aspects of eating styles in a variety of countries (Akamatsu et al., 2005; Ares et al., 2015; Cakiroglu & Tangut, 2008; Fisher & Dube, 2011; Weller et al., 1993). These aspects include such concepts as variety, moderation, and balance, specifics of food intake patterns and timing (e.g. avoid meals late at night; do not snack between main meals), and the emotional, mental, and social aspects of food intake. Why and in which ways individuals consider these aspects of eating important for health has not been examined in-depth.

A limited set of studies suggests that cultures vary in the importance given to eating styles in their definitions of healthful eating (Akamatsu et al., 2004; Martinez-Gonzales et al., 2000; Ares et al., 2015). For example, the author's preliminary work in Eastern Europe and the United States has demonstrated that eastern Ukrainian respondents are significantly more likely than American respondents to describe healthy eating in terms of eating styles and find it a rather salient aspect of healthful diets. While a few other studies have demonstrated cross-cultural variation in the importance of consumption styles in shaping people's judgments of healthiness, such work has not proposed or tested any particular theories accounting for these cultural differences.

This dissertation work aims to contribute to the literature on cultural models of healthy eating by addressing these gaps and exploring eating styles as an essential yet often overlooked piece in lay mental representations or theories of food (Allen 2012). Building on the initial findings comparing respondents from Eastern Europe and the U.S., the goals of the proposed project are the following.

Research Goals

1. Examine "eating styles" as a separate category of lay beliefs about what constitutes healthy eating

2. Document subjective meanings of healthy eating- including both food characteristics and styles of eating- between participants in both United States and Eastern Europe

3. Propose and test a theoretical explanation for differences in the degree of eating style endorsement for health between participants in Eastern Europe and the U.S.

The next seven chapters address these goals. Chapter 2 summarizes social science literature on lay perceptions of healthy eating across cultures and what shapes people's beliefs. Chapter 3 provides an overview of the two field sites and reasons for their selection. Chapter 4 presents evidence that beliefs related to eating styles are a separate category of healthy eating interpretations. Chapter 5 discusses findings of in-depth interviews (n=49) conducted in the United States and Eastern Europe, describing how participants across these cultures explain the health implications of both food characteristics and eating styles. Chapter 6 presents results of two surveys that confirm cross-cultural variation in endorsement of eating styles between the United States and Eastern Europe and test the hypothesis that this variance is due to cultural differences in collectivism. Finally, chapter 7 summarizes findings and implications of this work.

While these chapters examine people's mental models of healthy eating, there is also a growing body of literature that examines actual health implications of eating styles (McCrory et al. 2016; Garaulet et al. 2013; Garaulet et al. 2014 Oike et al., 2014; Berg&Forslund 2015; Bellisle, 2014). For instance, research already indicates a number

of negative health effects associated with poor time of eating in humans, such as reduced glucose tolerance, increased blood pressure, and decrease in the satiety hormone leptin (Scheer et al. 2009). In addition, work on the way we eat and how much we concentrate on eating shows that people can overconsume by as much as 75% when certain distractions are present (De Castro & Brewer, 1992; Herman & Polivy, 2005). Thus, eating styles may be important factors in obesity as well as a range of chronic non-communicable diseases (NCDs). However, such work on health outcomes is not the focus of this dissertation, as the following chapters examine people's *perceptions* of various aspects of eating and lay beliefs on how these aspects influence health and wellbeing.

CHAPTER 2

BACKGROUND

As members of a cultural species with an omnivorous diet, humans are remarkable in the diverse ways they make and consume food. With this diversity of choice comes a key challenge—how to decide what, how, and how much to eat to sustain oneself and stay healthy (Rozin, 1999). Allen (2012) suggests that as humans think about food and eating, they do so with an implicit theory of food (ToF) - an "internal, cognitive representation of diet in our minds" shaped during a critical period of childhood by both genetic and environmental factors. It is likely that an implicit ToF would have evolved because food is crucial to survival, thus omnivores like ourselves need to learn what and how to eat. We can expect people's theories of food to encompass a multitude of meanings given to eating- such as what is pleasant, healthy, socially acceptable, and morally correct to consume. This review will focus on the healthfulness aspects of people's ToFs.

What does healthy eating mean to the public? Individuals relate foods to numerous aspects of health - not only physical considerations (e.g. disease), but also social, spiritual, intellectual, and emotional aspects of wellbeing (Ares et al., 2016). When making healthy eating choices, people's decisions also do not only focus on *what* to eat, but involve other types of concerns such as when, how much, where, and with whom to eat (Wansink 2004, Stroebele & de Castro, 2004) since food consumption is embedded in context. Thus, we can expect people's theories of healthy eating to include both considerations of food characteristics (what to consume) and ways or styles of eating (how to consume). Considerably more research has focused on the first aspect-

what makes *foods* good or bad for health- thus we know more about how people evaluate various food characteristics for health than how they evaluate aspects of eating styles.

This review summarizes the state of knowledge on both categories of beliefs, with the first lengthier section focused on lay perceptions of healthy food characteristics: specifically, how people categorize foods into good or bad to eat, and why they tend to be biased in certain ways when judging food healthiness. Section 2 summarizes what is known about the ways people think about healthy eating styles. Finally, the review will discuss possibilities for future work.

Beliefs on Healthy Food Characteristics

This section discusses how people determine food healthiness- mainly, the tendency to form simple categories which guide healthiness judgments. It further examines why people are biased towards such categorization and how cultures inform popular healthiness categories. The section ends by summarizing what shapes people's judgments of how foods can pose risks to health- the biases and heuristics that determine most harmful aspects of what one eats.

What guides people's judgments of food healthiness?

Deciding what is good and bad to eat for health is a complex choice and people tend to use mental shortcuts- cognitive heuristics- to simplify this decision making process (Rozin, 2002). Food categorization is one popular heuristic or "rule of thumb" employed across diverse cultures in making healthy eating decisions, with a tendency for creating the simplest classifications: dichotomies. One of the most richly documented dichotomies is the yin-yang category in Chinese culture, loosely translated into English as cold-hot. Ludman & Newman (1984) explored how individuals make food choices

based on this category for restoring or maintaining health, considering that disease was perceived as an excess of either hot or cold characteristics. Thus, respondents used yin foods if a health condition was categorized as yang or hot (e.g. fever) and vice versa (with variation among geographical groups in which foods represented these characteristics). The yin-yang dichotomy is only one of many cultural distinctions used for navigating healthy eating, with English translations of them including wet, irritating, poisonous (Ho, 1985), strong-weak, and digestible-indigestible (Mu'Min Chowdhury et al., 2000). For example, Mu'Min Chowdhury et al. (2000) discovered two dichotomies among Bangladeshi immigrants in Britain: digestible-indigestible and strong-weak. Because the yin-yang classification is considered characteristic of south Asia, the authors were surprised when respondents instead relied on the digestibility and strength characteristics of foods. Using these classifications led to remarkable differences in perceptions among the immigrants and British citizens: Bangladeshi viewed baking and grilling as unhealthy cooking methods because they make food harder to digest, while Westerners often consider them some of the healthiest ways to cook (e.g. unlike frying).

In the United States and other high-income western countries, good-bad (Rozin, Ashmore & Markwith 1996) and healthy-unhealthy are particularly popular categories in lay discussions of healthy eating (Carels et al., 2006; Carels et al., 2007; Oakes & Slotterback, 2001). The types of food qualities that inform these dichotomies include aspects of nutrient profiles and degree of human involvement in the production and processing of these foods. As both the sophistication of the scientific understanding of nutrition and technological aspects of human involvement in food production increase, new cultural models of healthiness emerge around concepts of processing levels (e.g.

ultra-processed “junk” foods), production methods (e.g. genetic modification), and use of human-created “artificial” components in foods (Rozin et al., 2012). We know that the most stereotypically good foods from such Western industrialized cultures appear to be fruits and vegetables (Paquette, 2005), which are both considered nutritionally rich (Maillot et al., 2007) and most natural (Rozin et al., 2012). Less positive or conflicting health implications are associated with animal products (which often involve nutritional concerns, such as high saturated fat content) and negative associations are often made for processed foods high in fats and sugars (Oakes, 2006; Oakes & Slotterback, 2001).

Advances in nutrition science, however, might not make healthy eating decisions easy for individuals. Due to the overwhelming amount of detail provided by such research as well as many conflicting results, healthy eating might be even more confusing to people that are exposed to scientific information. For instance, Diekman and Malcolm (2009) examined consumer perception of dietary fat in 16 countries including North and South America, Europe, South Africa, and Asia. They showed that 64% consider information on various dietary fats contradictory and thus about half of respondents are confused which fats are good or bad to eat. Such confusion might make reliance on simple dichotomies more likely- respondents appeared to adopt the all-or-none message, with low-fat categorized as generally good and high-fat as bad, without nuanced attention to the type of fat consumed.

What leads individuals to dichotomize?

Anthropological work has documented the human tendency for categorizing the world around them, pointing out that provision of ready-made categories for storing and retrieving information is one of the functions of the cultural process (Douglas, 1966).

Empirical research on why people are prone to creating *simple* dichotomies mostly comes from work in the United States and other western high-income countries (e.g. Western Europe, Australia). People studied in such cultures appear to be generally inclined towards "dose-insensitivity" when it comes to food: they categorize something as bad or unhealthy despite the amount consumed. Rozin and colleagues (1996) define doze insensitivity as a belief that if something is harmful in large amounts, it must also be harmful in very small ones. The authors demonstrate this bias with American college students, a substantial minority of which considered diets with a daily pinch of salt unhealthier than a completely salt-free diet. Rozin and colleagues comment that the "monotonic mind" belief pattern- the general reluctance to accept the idea that low and high doses can have opposite effects- can explain such extreme views. While monotonic thinking can be a useful heuristic in some instances (such as with avoiding strong toxins) it is not effective in the domain of food where low amounts are often necessary for functioning- e.g. while high levels of salt might be unhealthy, some amount is essential. The monotonic heuristic is evident in popular healthy eating advice as well. For instance, online bloggers often refer to gluten, a protein in wheat that has received much negative attention from the media, as "toxic" and thus unhealthy at *any* level (see "9 steps to perfect health" article on www.chriskresser.com). The use of such dose-insensitive language is not a strictly lay phenomenon, as academics use these terms as well (e.g. "Public Health: The toxic truth about sugar"- Lustig et al., 2012). Lastly, strict good vs. bad definitions are exemplified in the worldwide phenomenon of food taboos- prohibitions or unwritten social rules on avoiding certain unacceptable foods completely. Specific taboos can involve any type of food- whether plant or animal, hot or cold, wet or

dry (Meyer-Rochow, 2009). While taboos lack clear health rationale (and instead feature religious and moral origins), individuals can also hold beliefs on how their ingestion can cause harm to health: e.g. among Papua New Quinea tribes, if a woman eats a forbidden food her husband can become ill with cough and even die (Schieffelin, 1976).

How do cultural aspects shape food categories and their use?

The relevant food dichotomies of course depend on which food characteristics and health concerns are culturally relevant, as well as local models of health and significance of various life events. As mentioned earlier, in the industrialized western world reliance on technology and access to nutrition knowledge produced by scientific studies makes nutritional aspects of foods and concerns over food technology highly relevant. Anxieties about how science and technology can affect personal health are referred to as "modern health worries" (Petrie et al., 2005) and "tainted food" is one type of such worries in industrialized societies. Various modern components and processes can taint food: pesticides, hormones, antibiotics, additives, and genetic modification (Chen, 2013); presence of these aspects can inform food healthiness categories along the naturalness dimension.

Conceptualization of what is good and bad to eat depends on the local models of health and wellbeing as well, and these models and beliefs include the nature of health, causes of illness, and prevention and treatment strategies (Foster & Anderson, 1978). For instance, the "nutritionism" discourse is popular in western cultures (Mudry, 2006), and its focus on specific food components and which diseases they are associated with (e.g. saturated fat intake and heart disease) can inform dichotomies based on the presence and amount of certain nutrients. The humoral theory popular in Latin America (Rubel, 1990),

on another hand, relies on the hot-cold equilibrium for health, and healthy eating dichotomies are informed by balancing both hot and cold foods as discussed earlier. Even among high-income western cultures that are exposed to the same nutrition science, etiology belief result in differences: low concern with fats and sodium among the French, in comparison to Americans, may be partly due to the American emphasis on individual causes and cures for health problems, while the French emphasize societal factors more (Rozin, 1999). Another example of how health beliefs shape the concept of healthy eating is body size preferences: in rural Jamaica, where plumpness is positively viewed and weight loss is considered a signal of social neglect and bad physical health, the wet-dry dichotomy is applied to choose and value drinks and warm/moist/cooked foods because they are thought to fatten, while overnight and cold foods, as well as "dryers" (e.g. store-bought crackers), are devalued (Sobo, 1997). In high-income countries, where thinness is preferred, people generally perceive "good" foods as something that promotes slenderness, while a "bad" food is one that lacks nutrients and promotes weight gain (Oakes & Slotterback, 2005).

Food can also take on a new meaning for health specifically in a new culturally relevant context- such as with pregnancy. Nichter & Nichter's (1983) work in south India illustrated how beliefs about health and pregnancy determined food choice based on the heat and toxicity categories of foods. Since pregnancy was considered a time of increased body heat, certain foods identified as heating were limited to prevent abortion (including fruits, certain vegetables and grains). Foods that were considered highly toxic were also avoided, such as jackfruit and some of the most valuable sources of protein (e.g. several fish varieties), which could potentially lead to serious dietary deficiencies. Qualitative

work in high-income countries (U.S., Canada, European countries, Australia, New Zealand, Japan) shows that a range of life events can influence one's meaning of healthy eating, including marriage, pregnancy, parenting, aging, and disease onset (Bisogni et al., 2012). These examples demonstrate that the perceived beneficial qualities of foods are manifold and are incorporated in complex ways into diverse food cultures, as people perceive both harm and health benefits from different foods aspects.

What shapes people's judgments of how foods can harm health?

As food dichotomies define what is "good" and thus beneficial to health, they also define what is potentially harmful or can carry risks to health. A number of studies has focused on understanding why people perceive various dietary risks to health differently (Kirk et al., 2002; Ohtsubo & Yamada, 2007; Cunha et al., 2010; Fife-Schaw & Rowe, 1996). Such work has been done in industrialized countries (Hungary, Norway, Poland, France, Hong Kong) examining a variety of "unhealthy" foods- from high fat content and use of pesticides to salmonella contamination and genetic engineering. This research has identified two factors that influence the degree of perceived risk: technology/knowledge of the food product, and it's dreadfulness (Finucane and Holup, 2005, Fischhoff et al., 1978 and Gaskell et al., 2004). The technology/knowledge factor represents unknown threats with unfamiliar and delayed consequences, while the dread factor represents how uncontrollable and potentially catastrophic these consequences are (Ueland et al., 2012). The cumulative empirical findings have led to two key generalizations about these factors, at least for cultures at similar industrialization and modernity stages:

1. People's perceptions of food risks are systematically biased: they exaggerate risk from food hazards considered rare, catastrophic, and involuntary, yet underestimate risk of frequent, familiar, and voluntary ones.
2. While experts rely on quantitative aspects, the lay public emphasizes qualitative product features when determining risk.

According to the first generalization, when something is more known to the public and scientists, it is viewed as less harmful. Song and Schwarz (2009) show that familiarity is indeed important: when participants are presented with novel (made up) food additive names, those that are harder to pronounce are rated as riskier to health than those easier to pronounce. Consequently, information that enhances feelings of familiarity reduces the sense of threat and produces positive feelings (Zajons, 1980). Wansink & Brumberg (2014) demonstrated this by providing participants with the history and numerous food industry uses of high fructose corn syrup, which reduced people's risk ratings for this novel sweetener. Such results are consistent with the assumption that perceived familiarity or novelty of an item can be a heuristic cue in intuitive judgments of risk.

With the increasing use of technology in foods, familiarity and knowledge also greatly depend on trust in authority. Humans might be good intuitive toxicologists- we rely on senses of sight, taste, and smell to detect bad or unsafe foods- but these senses are not adequate to assess dangers of pesticide and hormone use or genetically engineered ingredients (Kraus, Malmfors & Slovic, 1992). Thus, trust in regulatory agencies, government, and scientists is crucial when dealing with risks in the modern world, especially in the absence of a clear understanding behind the technological processes

involved (Earle, 2010). Importantly, trust is easier to destroy than create (Slovic, 1993) as people appear to hold a negativity bias. Siegrist and Cvetkovich (2001) show that people give more value to negative information and have more confidence in it in comparison to positive information. This bias may be due to negative evidence being more diagnostic and informative in decision-making (Skowronski & Carlston, 1989).

According to the second generalization, people tend to rely on familiarity and other qualitative aspects of foods (how uncontrollable and potentially catastrophic) more than on factual information, such as calculated risk assessments. In other words, people rely on emotions and not facts when reasoning- a decision simplification strategy termed the "affect heuristic". The naturalness quality of foods exemplifies this heuristic particularly well, because foods categorized as "unnatural" evoke both negative emotions and are considered novel and insufficiently understood by the public and science in general. "Tampering with nature" is a concept important to many cultures and is associated with universally moral intuition (Graham et al., 2011). Negative feelings related to technology use in foods which diminishes its naturalness, have also been recorded across cultures (Rozin et al., 2009, Rozin et al., 2012; Bearth et al., 2014; Varela & Fiszman, 2013). Arguably, one of the most technologically sophisticated types of human intervention is genetic engineering and people's feelings about genetically modified organisms (GMOs) are indeed strongly negative: Backstrom et al. (2003) find that some consumers even associate GMOs with metaphors of death and terrorism. The types of emotionally laden images elicited might be particularly important for judgments of food risk: Zajonc (1980) argues that as individuals make judgments in general, affective (emotional) reactions to stimuli are *first* automatic, and thus *precede* cognitive

processes of information processing. Therefore, the emotional associations that certain foods evoke in our minds are crucial to how unhealthy and risky they might seem, despite what objective information we are given. Indeed, people do appear to evaluate health hazards by how they *feel* about them instead of what they *know* and think about them (Slovic & Peters, 2006). For GMO products, this appears to be also true as public worries persist despite scientific consensus on the safety of such foods (American Association for the Advancement of Science, 2012).

Other examples of food attributes commonly classified as "unnatural" and therefore "bad" include ingredients such as high-fructose corn syrup (HFCS), mono sodium glutamate (MSG), sodium benzonate or other additives and consumers try to avoid products containing them (Ayoob, 2014; Wansink & Kim, 2000). We might expect that a product classified as "bad" due to unnaturalness would be seen as riskier than a product categorized as "bad" due to other health reasons (e.g. fat is fattening), because "unnaturalness" would score higher on both the technology/knowledge and dread factors. Some work supports this expectation: individuals appear to exhibit "optimistic bias" with food risks related to lifestyle (high-fat and high-salt diets) and tend to view *others* as more at risk than themselves (Miles & Scaife, 2003). The authors suggest that this bias is due to people seeing lifestyle risks as something under personal control and thus easily modifiable. Technological hazards, on another hand, tend to be associated with lack of control, unknown consequences, and threats to future generations, making them appear riskier (McCarthy et al., 2006).

While the fear of novel unnatural foods is apparent in industrialized countries, people exhibit an innate affinity with the natural world across the world (Wilson, 1984; Rozin et al., 2004), and we can attribute such preference for natural or "biophilia" to feelings about the superiority of the natural order. Novel engineered foods, which feature a high and technologically sophisticated involvement of humans, produce anxiety as they are seen to violate boundaries of naturalness. Douglas (1966) writes that society's main role is to impose order on the natural world with the help of cultural categories, as "ideas about separating, purifying, demarcating and punishing transgressions have as their main function to impose system on an inherently untidy experience". Thus, categories help us make sense of the environment, as well as determine what is good, moral, pure and what is not. These concepts can be important in understanding why certain modern foods are opposed yet others are welcomed. Unlike GM foods- categorized as unnatural and thus bad- other products are not met with opposition despite using advanced technology and even elicit positive associations. For milk products containing probiotics, for example, the beneficial bacteria are seen to clean up the "inner pollution" of the body and restore the gut balance disrupted by modern living (Collins, 1988). Thus, probiotics can be perceived to restore naturalness- consequently, strong public opposition to probiotic yoghurts has not been recorded.

Beliefs on Healthy Eating Styles

This section focuses on people's beliefs related to eating styles or "how" the foods should be eaten. I will discuss the different types of eating styles featured in lay models of healthful diets, though the limited work on this topic does not allow for a discussion of *why* perceptions of styles might differ individually or cross-culturally.

In addition to defining what "food" is, culture also defines the proper context or ways of eating (Douglas, 1996). The simplest example of such eating aspects is whether an eating occasion is a formal meal or a snack, where meals are structured events organized according to rules defining time, place, and sequence of action, while snacks lack order. Aspects of "how" one eats or eating styles can include a number of eating considerations unrelated to specific food choice: the daily rhythm of eating such as pattern and timing of meals and snacks, how much to eat, where, and with whom (Wansink 2004, Stroebele & de Castro, 2004).

Research on lay perceptions of healthy eating demonstrates that people hold beliefs related to healthy eating styles across cultures: American respondents discuss norms about eating regular meals, consistently having breakfast, not rushing, and avoiding snacks between meals (Fisher & Dube, 2011); British respondents endorse such aspects as sitting down to eat and eating regularly; Turkish participants place high importance on avoiding late night meals, keeping regular food hours, and importance of a morning meal (Cakiroglu & Tangut, 2008); Japanese respondents mention the significance of "eating styles and habits"- enjoying the foods, having light meals, and not eating late in the evening (Akamatsu et al., 2005). How individuals view these styles of eating in terms of their healthiness has not been sufficiently explored across cultures. We do have sparse examples: in Guatemala, individuals believe that a number of both foods and eating styles can lead to "empacho" (a gastrointestinal disorder), including eating at the wrong time and missing a meal (Weller et al., 1993). In United States, an examination of popular health literature (blogs, magazines) indicates that some of eating styles beliefs are popular presumptions about weight gain (Casazza et al.,2013), including importance

of regular food intake, avoiding food close to bedtime, and not snacking. Survey work in Britain focused on breakfast consumption indicates that individuals also perceive weight control benefits from this particular behavior, as well as improvements in other aspects of wellness- e.g. having consistent energy (Reeves et al., 2013). People may not even recognize that considerations of "how" they consume food shape their judgments of a food's healthiness: the same product can be seen as good or bad depending on the way it is consumed. For instance, Danish consumers viewed chips (a stereotypically "bad" food) as healthier when part of a meal, but less healthy when consumed as an additional snack (Ronteltap et al., 2012).

Other concepts related to "how" one eats include such frequently used yet vague terms as "balance" and "moderation" (Akamatsu et al., 2005; Chan et al., 2009; Lake et al., 2007; Paquette, 2005; Bisogni, 2012), and the expression "balanced diet" itself is an internationally common theme for eating well (Croll et al., 2001). These concepts can have a variety of meanings: "balance" can be contrasted with "excess" (Paquette, 2005) or it can signify eating less "bad" food and more "good" food (Lupton, 2005); the purpose of "moderation" appears to be related to not overconsuming, though confusion as to the specific meaning of this term is common (Paquette, 2005). While this lack of clarity makes such concepts potentially useless in terms of dietary advice, it may be useful in appeasing psychological tension related to guilt associated with eating the "wrong" unhealthy kinds of foods (Delaney & McCarthy, 2014).

Lastly, while eating styles can include the times, patterns, and manner in which food is consumed, they also include the absence of consumption altogether. Fasting (either abstinence from all foods or certain types only) has the purpose of adjusting the

body in many religions- not only spiritually but also for its healthful conditioning, such as during the special festivals in Malaysia that require vegetarianism (Tong, 1996). Restricting food intake for health reasons has a following among westerners as well: one society for people following such a plan is based in the U.S. (www.calorierestriction.org), with perceived health outcomes ranging from lower risk of various chronic diseases to increased longevity.

To the author's knowledge, there is no work with an in-depth focus specifically on perceptions of healthy eating styles, thus most studies reviewed here discuss the subject on the surface level. However, there is evidence that importance of eating styles for health might vary across cultures. For instance, Japanese participants focus more on "eating styles and habits" when discussing healthful eating (e.g. time and pace of food intake) than American respondents, who mostly discuss nutrients and other food qualities (Akamatsu et al., 2005); French participants define healthy eating in terms of balance, variety, and moderation concepts more than participants in other European (Rozin et al., 1999) and south American countries (Ares et al., 2015). While Rozin and colleagues speculate why the French might differ- traditional culinary focus, aesthetic concerns, emphasis on food quality, and type of dominant religion- neither they nor others test any specific hypothesis for observed differences.

Conclusions and Future Research

There appear to be pan-cultural similarities in how people perceive healthy eating: individuals in different countries tend to categorize foods as good or bad for health according to a variety of locally meaningful considerations. The tendency to use simple categories- dichotomies- is apparent across cultures, and local meanings of health and

disease etiology, as well as salient dietary hazards create a variety of relevant categories that guide healthiness judgments: hot/cold, digestible/indigestible, natural/unnatural, and so on. Work in industrialized countries also shows that food categories appear to be driven by emotional responses towards different dietary hazards. Two aspects of dietary hazards invoke particularly negative emotions: lack of familiarity and how dreadful/uncontrollable the hazard is perceived to be. These factors make foods considered "unnatural" particularly harmful, as people generally tend to perceive "natural" as good and thus healthy.

Unlike the literature on lay perceptions of food characteristics, work studying beliefs on eating styles is limited in its range and depth. We do know, however, that different aspects of "how" one should eat- balance, variety, moderation, time and pattern of eating- are part of lay models of healthful diets, and people can perceive health risks from unhealthy styles of eating (e.g. as with wrong eating times causing empacho in Guatemala) as well as benefits (e.g. weight management associated with eating breakfast). The importance of eating styles within lay models of healthy eating also appears to differ across cultures, though examples are sparse and explanatory theories are not clearly presented and tested to account for observed variation. Such gaps in the literature – lack of in-depth study of how people perceive health importance of eating styles and why cultures might endorse such believes differently – are an important step in further work on lay perceptions. Understandings of "healthy eating" plays an important role in people's food preferences and subsequent choices (Grunert, 2007; Furst et al., 1996), and examining all aspects of people's narratives is crucial for developing

successful public health interventions and educational campaigns, effective dietary recommendations, and relevant health policy.

Why study perceptions of healthy eating styles?

Other scholars have also brought up the importance of studying such beliefs: in their paper, De Ridder and colleagues (2013) argue that social standards around food consumption are a crucial determinant of eating behavior because they are shaped socially and culturally, are internalized into everyday routines, and become influential due to their ingrained nature. The authors hypothesize that a person's self-regulation of eating (how much one consumes) can become compromised by a lack of clear, shared eating appropriateness standards (EAS) that guide what, how much, and where/when we eat. In other words, lack of standards about eating styles can lead to overconsumption. Since EAS function as a type of simplifying decision-making heuristics or behavioral scripts guiding eating behaviors, they do not involve active self-regulation. *Lack* of these norms, therefore, might result in uncertainty about how to behave in various eating situations and possible overeating. Additionally, eating decisions can become increasingly complicated in light of constantly changing and often-contradictory information on which food characteristics should inform our judgments of healthiness. Having a set of beliefs about what constitutes healthy eating styles might therefore be protective against fluctuations in nutrition information.

In support of De Ridder and colleagues' hypothesis that such norms might influence weight status, self-reported behavioral adherence to a subset of beliefs on eating styles was found to be significantly related to lower body mass index (BMI) among American respondents (Fisher & Dube, 2011). These beliefs included eating

slowly, not using food to allay a negative emotion, managing the number of size of portions, and eating only until content. These reported correlations with BMI were rather weak (~ 0.14 – 0.32), but other work supports the proposition that "how" we eat has implications for weight management. A growing body of literature suggests that the pattern, timing, and mindfulness of intake might indeed result in changes in weight or important health markers (e.g. insulin sensitivity and release of satiety hormone getting deregulated with night-time eating) (Garaulet et al., 2014; Wansink et al. 2014; Gallant et al., 2014; Leech et al. 2015).

While more experimental work needs to be done to test whether endorsing beliefs related to eating styles can help avoid overconsumption, there is evidence that the heuristic to dichotomize foods into good or bad can be problematic for weight management. For example, Provencher et al (2009) demonstrates that American female college students eat about 35% more cookies when they rated the snack as healthy than when they perceived it as unhealthy. Indeed, people might consider "healthy" choices to be less problematic for weight gain, even when presented with information to the contrary: individuals judge a cookie labeled "organic" as less fattening than an identical cookie without the label, despite being shown the same nutritional profile for both (Schuldt & Schwarz, 2010).

What accounts for cross-cultural differences in endorsements of eating styles?

The study comparing American and Japanese beliefs on healthy eating demonstrated that U.S. respondents discussed aspects of eating styles less (Akamatsu et al., 2005). The authors note that among the Japanese sample, those that had recently seen

a dietitian also focused on styles less than those who had not. Akamatsu and colleagues thus propose that higher endorsement of eating styles is due to the traditional belief in Japan that "how" you consume food is important for good health. Those that sought nutrition information from health experts, however, were exposed to western nutrient-based messages instead. Defining food healthiness in terms of nutrients is termed "nutritionism", and this ideology is particularly popular in the United States. According to Scrinis (2008), nutritionism has a reductive focus on foods and their nutritional profiles. Thus, individual products are evaluated in isolation from other foods, diets, and contexts. This view of eating might explain why American respondents (as well as others exposed to nutritionism) see eating styles as less important in considerations of healthy eating.

Individuals across cultures may endorse importance of eating styles not only due to differences in information, but also because they organize and process information differently. Ronteltap et al., (2012) showed that people can interpret healthy eating at different levels, and it appears that any individual can perceive something at both the low representation level (focus on specific features- e.g. this item is high in fat and tastes good) and high representation level (focus on abstract features- how does this food fit into an overall diet). Information-processing levels can be linked to culture via the psychological dimension of collectivism and individualism- one that describes the perceived relationship between the self and others in society. Hofstede (1980) defined individualism as emotional independence from "groups, organizations, and other collectivities". Members of collectivist cultures, however, are more likely to value group membership and respect group processes and decisions. Studies also show that

collectivist cultures possess holistic patterns of attention (Kuhnen et al., 2001). Thus, people in more collectivist societies tend to perceive situations more holistically and attend to features of context (the big picture involving eating styles; high representation level), while the analytic thinkers are highly attuned to the details and central features of an issue (low representation level). The author's pilot study on perceived food risks in Ukraine and the United States (2013) hypothesized that Ukrainians, who are expected to possess a more holistic cognitive style due to higher collectivism in Eastern Europe (Kolman et al., 2003), would place more importance on the healthy eating style statements. Ukrainians indeed emphasized such statements *more* both in open-ended interviews and surveys, and the difference with the American respondents was statistically significant ($p<0.001$; Cohen's $d=0.84$). We may argue that the holistic thinking pattern extends to the domain of food and health, though individual levels of collectivism and holistic thinking need to be measured (not assumed from the literature) to make such a claim.

In conclusion, research on people's theories of food- specifically those focused on healthy eating- needs to incorporate work on lay perceptions of healthy eating styles. This aspect of lay models is currently a gap in the literature and prevents full understanding of people's narratives of what it means to eat well. Consequently, this dissertation will focus on such lay models of healthy eating styles, documenting how people describe and justify their importance for health and wellbeing, and how and why beliefs on eating styles might differ across cultural settings.

CHAPTER 3

FIELD SITES

Few examples of cross-cultural variation in endorsement of eating styles are available in the literature, with some evidence of variation between Japanese and U.S. participants (Akamatsu et al., 2005), French and other Europeans (Rozin et al., 1999), and French and south Americans (Ares et al., 2015). This dissertation work has focused on two field sites – United States and Eastern Europe- to examine beliefs on healthy eating styles for the following reasons:

1. The author's pilot interview work found that participants in Eastern Europe (urban eastern Ukraine) discussed healthy eating styles to a greater extent than American respondents, suggesting cross-cultural difference in healthy eating perceptions for these two regions.
2. As most human behavior and psychology research has been performed on Western, educated, industrialized, rich and democratic (WEIRD) societies, with Americans (and particularly U.S. undergraduate students) being some of the most psychologically unusual people studied (Henrich et al., 2010), the author aims to compare perceptions between both the well-studied "WEIRD" and other populations using identical methods. Eastern Europe contrasts WEIRD societies as this area is not considered "western" or "rich".
3. Americans have been proposed to have a nutritionism-focused approach to eating (where healthy eating is viewed specifically in terms of nutrients), therefore viewing food products in isolation from styles of food consumption and other relevant considerations (Scrinis, 2008). Current work thus makes an assumption

that participants from the U.S. might endorse eating styles the least in comparison to other cultures. Even though Americans might potentially find such aspects of eating least important, we do know that people's models of healthy eating from United States include beliefs about healthy styles of eating.

4. Lastly, there are established differences in levels of collectivism between the two cultures- the United States is consistently ranked as one of the least collectivist countries in the world (Triandis, 1995), while a number of studies demonstrate that Eastern Europeans have more collectivist values (Kolman, Noorderhaven, Hofstede, & Dienes, 2003). This distinction is theoretically important for current work, as collectivist orientation is also related to differences in cognition. Collectivist societies possess a holistic pattern of attention that emphasizes the importance of "context" or the entire field of a situation. Thus, holistic thinking might also influence endorsement of eating styles in the domain of diet.

The author collected data in large urban cities in both regions: Phoenix, Arizona for U.S. participants; Dnepropetrovsk (Ukraine) and Bucharest (Romania) for Eastern European participants. Romanian participants were interviewed in English due to their comfort with the language, while Ukrainian respondent interviews were conducted in Russian- the dominant language of Eastern Ukraine. Data collection in each country consisted of in-person interviews and surveys. As the dissertation consists of three stand-alone articles (each will be submitted for publication in a peer-reviewed journal), every article contains a detailed method section outlining sampling procedures. Table 1 summarizes key characteristics of the two field sites- United States and Eastern Europe (Ukraine and Romania).

Table 1
Summary of Country Statistics

Region	North America	Eastern Europe	
Country	United States	Ukraine	Romania
Population (thousands) (2012)[1]	317505.3	45529.9	21754.7
Urbanized population (%) 2012[1]	82.6	69.1	52.8
Literacy rate- adult (2008-12) [1]	99.0%	99.7	97.7
Life expectancy at birth (2012) [1]	78.8	68.4	73.7
Individualism Score[4]	91	25	30
GNI per capita (US$) 2012[1]	50120	3500	8420
Democracy Index (2016) [2]	8	5.7	6.6
Overweight 18+ (male; female) [3]	72.8; 62.9	57.4; 51.5	63.9; 49.5
Obesity 18+ (male; female) [3]	33.6; 34.9	17.6; 22.1	20.9; 20.2
Food Security Index[5]	87	55	65

[1] United Nations www.Unicef.org.
[2] Economist Intelligence Unit, 2016.
[3] Global Health Observatory Data (www.WHO.int)
[4] Geert Hofstede Center www.geert-hofstede.com
[5] Global Food Security Index. www.Foodsecurityindex.eiu.com

Key differences between the U.S. and Eastern Europe (Ukraine and Romania) include large differences in wealth as measured by Gross National Income (GNI) per capita and collectivism as measured by scores on an individualism scale (higher individualism scores correspond to lower collectivism scores). Eastern European countries, in comparison to United States, are also lower on the democracy index.

Dietary recommendations in the two field sites have many similarities. In the United States, current dietary recommendations take the form of "MyPlate" (U.S. Department of Agriculture, 2011) that emphasize consumption of fruits, vegetables, whole grains, low-fat protein foods and dairy. Recommendations suggest limiting such nutrients as saturated and Trans fats, as well as added sugars and sodium. Eastern Europe's recommendations differ by country (Food and Agriculture Organization of the United Nations). Romania's dietary recommendations take the shape of a food pyramid,

which emphasizes eating plenty of fruits and vegetables, low-fat foods, and plenty of cereals. Limited are highly processed foods high in sugar and alcohol. Finally, Ukraine's nutrition recommendations use World Health Organization's guidelines: eating more fruits and vegetables and limiting fats in the diet (http://www.moz.gov.ua/ua). Ukraine's recommendations do not have an official graphical representation such as the pyramid in Romania or plate in the United States. Despite these differences, key recommendations in each country are quite similar: all encourage eating more plants and avoiding high-fat products. Lack of major differences in dietary recommendations are important in comparing perceptions, as it reduces the likelihood that beliefs differ cross-culturally mainly due to official recommendations.

Lastly, Ukraine and Romania are combined when analyzing healthy eating perceptions of Eastern Europeans due to similarities in traditional and current dietary practices. While Ukraine and Romania have differences in linguistic and historical background, the two neighboring nations share many cultural commonalities, including traditional cuisine that features a strong emphasis on animal foods, grains, and a variety of vegetable-based dishes influenced by cuisines of neighboring states (Poland, Turkey). Analysis of European diets from 1991 combines Romania and Ukraine into a cluster characterized by similarities in dietary profiles: high reliance on cereals and similar consumption levels of animal fats and milk products (Gerolimetto & Mauracher, 2013). Later consumption data from 2009 demonstrates that Romanian and Ukrainian diets still shared major features of their national diets, though Ukraine had higher consumption of alcohol and sugars (Gerolimetto & Mauracher, 2013).

CHAPTER 4

LAY INTERPRETATIONS OF HEALTHY EATING STYLES: YOU ARE HOW YOU EAT

Abstract

Understanding what constitutes "healthy eating" to the public is an important step for effective dietary recommendations and interventions. "Healthiness" is one of the key factors influencing eating preferences (Grunert, 2007), and numerous studies have examined what people count as healthy eating (Bisogni, 2012; Paquette, 2005). The majority of such work, however, focuses on what people think is good to eat, rather than on the "eating styles" or how one eats. Eating styles can include such elements as the patterns and timing of food intake, as well as mindfulness during eating—aspects of food consumption that are also increasingly investigated as important factors in obesity and related health conditions (Garaulet et al., 2014; Wansink et al. 2014; Gallant et al., 2014; Leech et al. 2015). This study uses pile sorting interviews (n=48) and online surveys (n=283) to examine what role eating styles plays in American participants' perceptions of healthy eating. Results show that "eating styles" is a distinct domain in people's mental models of healthful diets, and individuals view it as important for a number of health-related outcomes, including weight management. We discuss how such lay perceptions are important considerations for health promotion strategies aimed at modifying the timing, pattern, and other aspects of food intake styles.

Introduction

Perceived "healthiness" is one of the most important factors shaping eating preferences (Grunert, 2007). While health research has often approached healthy eating

as a concept that is clear and uniformly understood by both health professionals and the public, consumers' views can differ in their interpretations of what counts as healthy eating (Povey, et al., 1998). Marketers frequently attempt to shape such perceptions about specific products to increase sales, and numerous studies have examined people's lay theories of what counts as healthy eating (Bisogni, 2012; Paquette 2005). Such lay theories are sufficiently important for policy- the U.S. Food and Drug Administration (FDA) recently requested public comments on definitions of "healthiness" in food labels as they develop guidelines that reflect both the current science and public concerns on the topic (see FDA document #2016-23365 at www.federalregister.gov).

The majority of work on perceptions of healthiness has focused on what people think is good to eat, rather than on how one should eat it. Eating, however, is a patterned activity embedded in context, translating into different styles of eating. These eating styles include such aspects of food consumption as the pace of intake, patterns and timing of meals and snacks, and presence of distractions. Wansink & Sobal (2007) study the effect of these two aspects on eating behavior (what and how), terming them "food environment" (factors relating directly to food), and "eating environment" (factors independent of food such as time of day, atmosphere, social interactions, and distractions that might be taking place). The present study refers to these two domains as food characteristics and eating styles. Healthy eating styles beliefs are particularly not focused on specific food choices, but the ways in which foods should be consumed.

While considerably less work is available on how the public thinks about eating styles, we know that such considerations are part of people's mental models of what a healthy diet entails (Ochs & Schohet, 2006, Bisogni, 2012). Bisogni et al. (2012) review

a number of qualitative studies in North America, Europe, and Australia and note several such beliefs: importance of regular meals, having balance, and practicing moderation in one's diet. These concepts tend to have loosely defined interpretations that vary among individuals- for example, balance can be contrasted with excess (Paquette, 2005), mean less "bad" and more "good" foods (Lupton, 2005), or be expressed in amounts of nutritional components consumed (Akamatsu, 2007). A number of other beliefs on "how" one should consume food appear to be salient: an inventory of norms and rules about eating among American respondents (Fisher & Dube, 2011) features beliefs on the pacing of eating (eat slowly), proper food intake patters (e.g. avoid snacking, always have breakfast), and social and emotional considerations (e.g. limit the amount you eat in social situations, don't eat to alleviate negative emotion). The significance of these norms is two-fold: they can be considered to have both health-related and social implications (e.g. having good manners). However, it is not clear why lay beliefs of healthy eating styles are less prevalent in work on people's beliefs about healthy diets. It is possible that within lay theories, aspects of eating styles are less salient for health or do not have as many health implications as do aspects of food characteristics.

We thus know that "eating styles" are indeed a consideration in the ways people conceptualize healthy eating, but it is not clear whether they form a distinct category of beliefs within lay models of healthful diets and in which ways they are perceived to affect health. The main goals of the current project include 1) determining how individuals view eating styles in relation to food characteristics when judging healthy eating, and 2) providing health-related reasons for the importance (or lack thereof) of various aspects of healthy eating styles. This study recruited respondents from South-Western United States

(Phoenix metropolitan area) for the pile sorts and online U.S. participants for Internet surveys to answer the following research questions:

RQ1. Is "eating styles" a separate category of healthy eating beliefs?

RQ2. How do people judge the importance of the styles of healthy eating for health?

RQ3. How are different aspects of eating styles perceived to affect health?

Materials and methods

To address RQ1, we recruited 48 participants for pile sorting interviews to determine dimensions of healthy eating beliefs and another 70 participants for online surveys to validate these dimensions. Recruitment for the interviews was completed via social media (study participation posts on Facebook, Twitter, Instagram), and snowball sampling through eight research assistants at Arizona State University assigned to the project. The participant sample consisted of U.S.-born citizens residing in the Phoenix metropolitan area and included a large portion (48%) of undergraduate students at Arizona State University (Tempe, Arizona). The interview pile sorting activity used 42 statements printed out on cards- these statements were derived from previous interviews (Voytyuk & Hruschka, in press), and other work (Fisher & Dube, 2011; Akamatsu et al. 2005) with the goal of reflecting variation in opinions of what constitutes healthy eating. This variation included statements representing different aspects of foods such as focus on nutrients (e.g. eat foods low in fat) and aspects of wholeness and naturalness (e.g. eat foods that are natural, not made by humans); statements representing eating styles focused on pattern of meals and snacks (e.g. eat breakfast, avoid snacking), time of eating (e.g. avoid eating late), and pace/focus during eating that we term "mindfulness" (e.g. don't be distracted, don't rush when you eat). In addition, the cards included statements

that represented low interest in dietary monitoring (e.g. don't worry about what you eat) to capture variation in the degree to which respondents were interested in healthy eating overall. We designed the unconstrained pile-sorting task to examine whether participants naturally categorize healthy eating statements into food and eating style domains. Respondents were asked to place the cards in as many mutually exclusive piles as they wished so that statements that were more similar to each other were in the same pile and statements that were least similar to each other were in different piles (Burton & Romney, 1975). Analysis (RQ1). To map statements in relation to each other based on how people sorted them into similar piles, we used multidimensional scaling (MDS)- a visualizing technique for representing the overall perceived similarity and difference between statements in a two-dimensional space (Kruskal, 1964). The MDS was applied to a statement-by-statement similarity matrix that averages the number of times a pair of items was placed in the same pile. The goodness-of-fit for the MDS solution is evaluated with a stress statistic- the lower the stress value, the better the MDS representation. The cutoff stress value appropriate for 42 items in two dimensions is 0.35 (Sturrock & Rocha, 2000), above which the fit of the MDS solution to the data is considered unacceptable.

To assess the meaning of the dimensions derived from MDS, we recruited online survey participants (n=70) via Amazon's Mechanical Turk (Mturk) - a crowd sourcing system where tasks are given to anonymous "workers" for a small completion fee ($0.35 for the survey 1 and $0.45 for survey 2). MTurk data has been shown to have comparable reliability and apparent validity to data collected with traditional recruitment methods (Buhrmester et al., 2011). The goal of the survey was to assess whether dimensions identified with the multi-dimensional scaling procedure aligned with

perceptions of food and eating style dimensions. To do so, participants were asked to read the same 42 statements used in pile sorts and rate to which degree they thought each statement represents: (1) eating styles, (2) food characteristics, and (3) sound advice about healthy eating (5-point Likert scales: from 1= "not at all" to 5= "a great deal"). Analysis: We analyze the responses with a property fitting technique, PROFIT (Chang & Carroll, 1968), which allows for dimensional verification through comparing independently obtained judgments to the MDS dimensions (Kruskal and Wish 1978). According to Kruskal & Wish (1978), judgments that have high correlations with MDS dimensions (>0.9 correlation coefficients) or those significant beyond the 0.01 level are considered reliable in interpreting the MDS structure. The results we report include a correlation between the online participants' rating of each statement on perceptions of eating styles, food characteristics, and sound advice, and the MDS dimensions. We run correlation analysis in SPSS (version 23) and PROFIT analysis in UCINET (Borgatti et al., 2002).

To address RQ2 and RQ3, we conducted another online survey via Mturk (n=300). We asked respondents to read a number of statements about food characteristics (n=13, selected from the two left quadrants of the MDS map) and statements about styles of eating (n=13, selected from the two right MDS quadrants), indicating whether each statement was important for four health outcomes derived from prior qualitative work on healthy eating beliefs (Bisogni et al., 2012).). These outcomes included having a healthy weight, preventing chronic health problems, feeling energetic, and having good digestion; respondents could select as many as applied to a specific statement. While we expected healthy eating to be mostly related to weight control and reducing the risk of chronic

diseases- two major outcomes studied in nutrition research- it was important to capture people's perceptions related to other considerations of wellbeing, such as how they feel physically. Avoiding digestive issues and feeling energetic are two such outcomes that individuals might consider important for their daily quality of life. The MTurk surveys included an attention test, indicating whether participants are reading each statement carefully- if participants failed to pass it, their surveys were excluded from analysis.
Analysis: To answer RQ2, we calculate the percentage of statements about eating styles endorsed as important for each of four health outcomes. As a point of comparison, we also compare these percentages with the percentage of statements about the characteristics of foods endorsed as important for each of the four health outcomes. To address RQ3, we focus on the 13 statements about the styles of healthy eating only and group them into three themes: pattern of food intake (5 statements), time of intake (4 statements), and mindfulness during food intake (4 statements). These three themes were identified via factor analysis in previous survey work with online U.S. participants (Voytyuk; dissertation). We then present the proportion of statements in each major eating styles theme endorsed as important for various health (see appendix for a detailed table of respondent endorsements of individual statements on healthy eating styles).

Results

Table 1 contains demographics for each data collection method. Online participants are on average older than pile-sorting participants, and almost half of them have tried to lose weight in the last 3 months (while only 29% of the in-person sample did). For Survey 1, 70 out of 73 were analyzed as three participants were dropped due to unrealistically fast completion times (<3 minutes). For Survey 2, 283 (out of 300) were

analyzed as 17 respondents failed the attention check. For this sample, 58% had a college degree or higher. For the pile sorting sample, 50% of interviewees were undergraduate students at Arizona State University; the rest held a college degree or higher.

Table 1
Sample demographics

	Pile sorting	**Survey 1**	**Survey 2**
N	48	70	283
Age M (SD)	29.3 (14)	34.7 (11.8)	35.8 (11.5)
Females	52%	55%	55%
BMI M (SD)	24.6 (5.3)	26 (10.7)	26.7 (7.3)
Try to lose weight	29%	49%	50%

Is "eating styles" a separate category of healthy eating beliefs.

The MDS visual representation of the pile sorting results aggregated over all 48 respondents reveals the hypothesized distinction along the horizontal axis: the statements on the left appear to represent food characteristics, while the statements on the right appear to be examples of eating styles. The vertical axis appears to represent endorsement as sound healthy eating advice. The two-dimensional solution is adequately precise with the stress level of 0.157, which is considerably below the 0.356 cut-off point (Sturrock & Rocha, 2000).

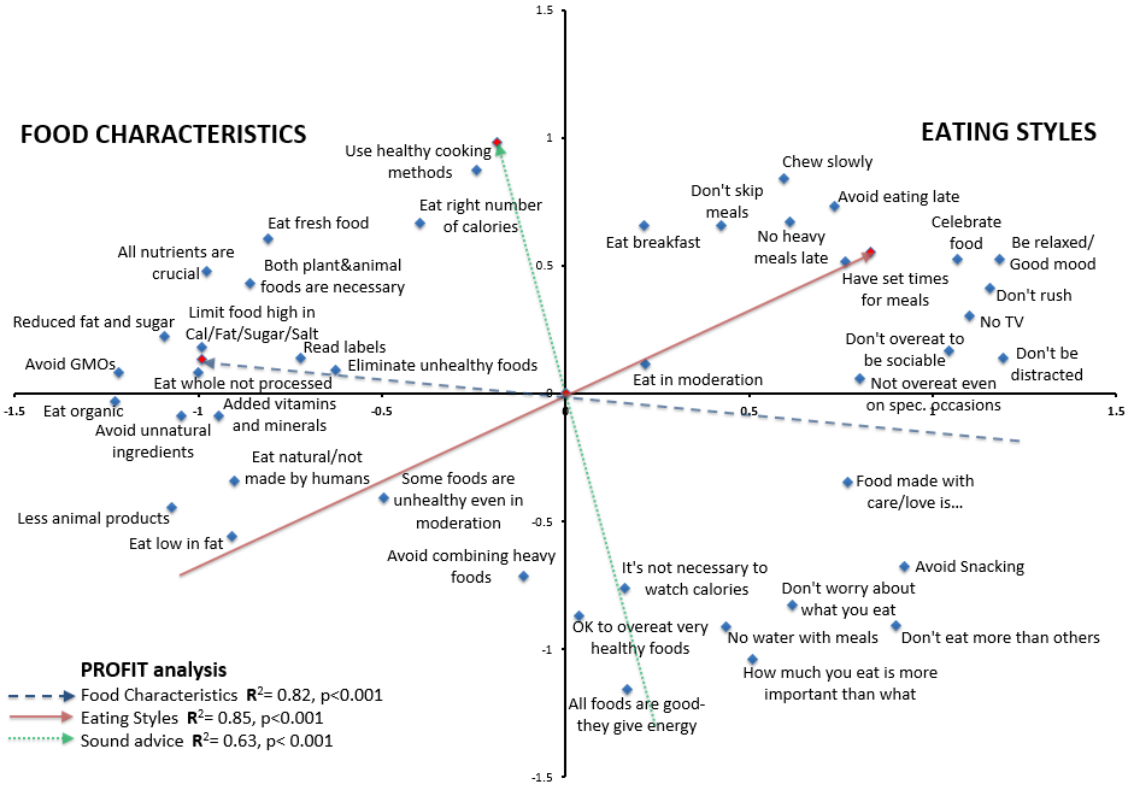


Chart 1. Non-metric Multidimensional Scaling representation of the similarities and distances between the 42 statements on healthy eating.

The three arrows on the 2-dimensional MDS map are results of the property fitting analysis. The first vector, which represents MTurk participants rating of the statement as pertaining to food characteristics, begins on the right with statements least focused on specifics of the foods, and ends on the far left with statements strongly focused on what one eats (R2= 0.82, p<0.001). The second vector – which represents MTurk participants' rating of statement as pertaining to eating styles – begins in the lower left quadrant with statements least representing how one eats foods, and ends in the top right with statements most focused on styles of eating (R2= 0.85; p<0.001). Finally, the last vector- "sound advice"- begins with the least sound healthy eating advice at the bottom and the best advice on the top (R2=0.63, p<0.001). Importantly, in this sample

the ratings of eating styles were strongly and negatively correlated with the ratings of food characteristics ($r = -0.72$, $p < 0.001$).

To summarize, the top left quadrant represents sound advice on what one should eat, while the bottom left quadrant is food statements that participants rate as less sound advice. The top right quadrant is sound advice on how one should eat, while the bottom right includes statements individuals considered to represent poor advice on eating styles. In conclusion, the PROFIT analysis demonstrates reliable fit to the MDS structure, and indicates that these are dimensions of discrimination and classification of healthy eating considerations for our sample. These analyses validate the existence of the distinct food characteristics and eating styles categories in our participants' mental models of healthy eating.

How people judge the importance of the styles of healthy eating for health.

Chart 2 illustrates how frequently people endorsed statements on eating styles as important for four kinds of health outcomes. It compares these proportions with how frequently people endorsed statements about the characteristics of food as being important for four kinds of health outcomes.

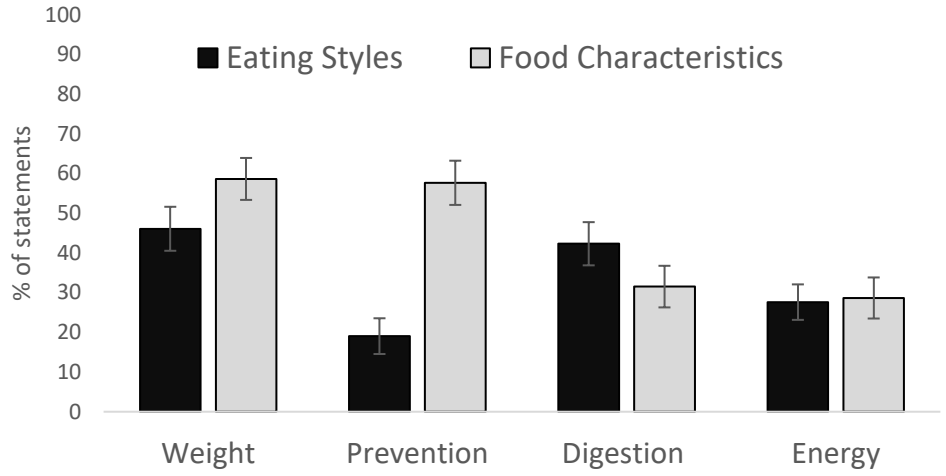


Chart 2. Proportion of statements in each category (13 on food; 13 on styles) endorsed as important for various health outcomes (weight, prevention, digestion, energy). (CI 95%)

While for food characteristics, respondents view weight management and disease prevention as the top two health benefits, for eating styles the top two outcomes are weight management and digestive health. Apart from disease prevention, a comparable number of participants endorsed each outcome for both groups of statements (food and styles). A substantial proportion of eating styles statements were endorsed for both weight management and digestion and to a lesser extent energy. Moreover, these were roughly comparable with the proportion of food-related statements endorsed for these health issues. By contrast, styles-related statements were infrequently endorsed for prevention, and far less than food-related statements. This result is not surprising, considering nutrition research has traditionally focused on studying specific nutrients and their role in developing particular health conditions- especially associations of specific foods and nutrients with cancers, cardiovascular disease, and diabetes (Ezzati & Riboli, 2013). We can thus conclude that aspects of eating styles are less salient for disease

prevention in lay models of healthy eating, yet they are just as salient as food considerations for weight control and quality of life (avoiding digestive issues, feeling energetic).

How are different aspects of eating styles perceived to affect health.

Chart 3 shows the proportion of statements in each main eating styles theme (pattern, time, mindfulness) that were endorsed as important for the four health outcomes (weight management, disease prevention, good digestion, feeling energetic).

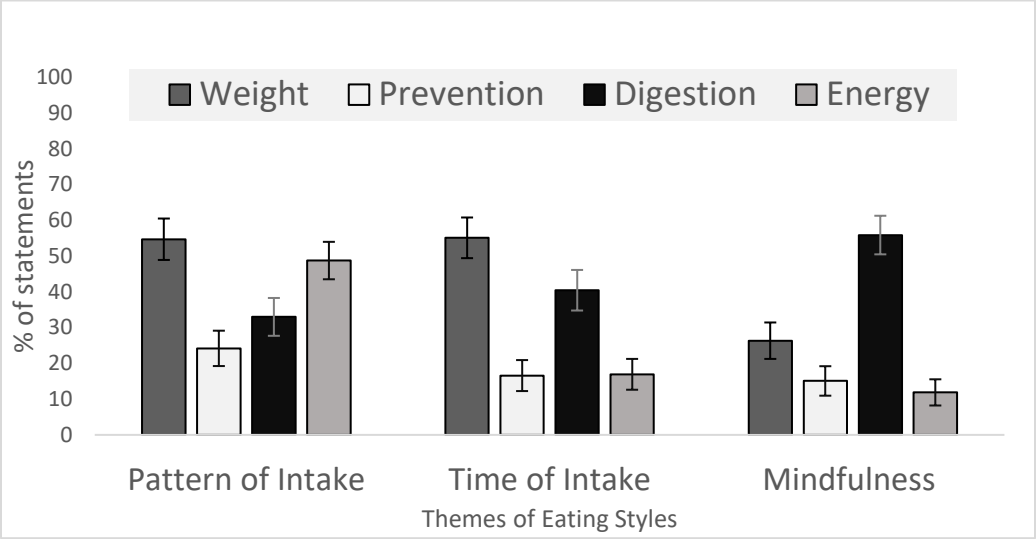


Chart 3. Proportion of statements in each major eating style theme endorsed as important for various health outcomes (weight, prevention, digestion, energy). Bars represent confidence intervals (CI 95%).

As already noted, disease prevention was not endorsed as an important outcome of eating styles considerations and its endorsement is low across all three themes. The "pattern of intake" theme contained five statements and includes beliefs about how one should arrange one's meals and snacks: eat breakfast, don't skip meals, eat small meals often, eat three main meals, and don't snack between meals. Weight management (55%)

and feeling energetic (49%) were the top two important health outcomes reported for these aspects of eating styles. “Time of intake” includes beliefs specific to the time at which one should eat and includes four statements: do not eat before bedtime, do not eat late in the day, have set times for meals, and do not snack in the evenings. These statements were most endorsed for weight management (55%) and, to a lesser extent, for good digestion (40%). The fact that a majority of participants endorsed avoidance of eating late in the day as important for weight control confirms Casazza and colleagues’ (2015) proposition that people widely believe in the idea that eating close to bedtime contributes to weight gain- a proposition that was based on examining health-focused web sites. Statements in the “mindfulness” theme included: do not rush when eating, chew food slowly, be relaxed/in a good mood, and do not be distracted while eating. Having good digestion was most endorsed for this group of statements (56%). For a more detailed overview of individual statement endorsements, see supplementary materials.

Conclusions

People’s mental models of healthy eating include two distinct categories of beliefs: food characteristics or “what” one should eat, and eating styles or “how” one should eat it. Considerations of foods include beliefs about the healthiness of foods and their various characteristics (e.g. caloric and nutritional content, naturalness, etc.) and they are the primary focus of the official healthy eating recommendations as well as nutrition research. Our sample of U.S. respondents also views this type of eating beliefs as highly salient for weight management and disease prevention. Eating styles, on another hand, focuses on considerations unrelated to foods. Instead, it encompasses the ways one’s diet is organized, such as the pattern and timing of meals and snacks throughout the

day. In addition, it includes other aspects of eating such as pacing and having distractions during eating occasions. While aspects of eating styles are not commonly featured in health promotion messages, our work demonstrates that the public does perceive the salience of styles of eating for health both in terms of weight management and quality of life. Aside for preventing disease, equivalent proportions of respondents consider both food and eating styles aspects of nutrition as important for weight control, good digestion, and feeling energetic. A more nuanced look at different themes within beliefs on healthy eating styles (pattern of intake, time of intake, and mindfulness during intake) shows that different types of eating behaviors are perceived to influence various aspects of health differently- e.g. while considerations of mindfulness during food intake are most important for digestive health, the way one patterns their meal and snack intake is perceived as more important for weight management and having energy.

Limitations and Future Directions. This work has a number of important limitations: first, these results may not be generalizable to the United States population, as our samples are limited to highly educated online participants and Phoenix area residents selected via convenience sampling. Lay beliefs among respondents with more racial and socioeconomic diversity should be studied in future work to generalize findings. In addition, health perceptions of other aspects of eating styles should be explored such as influence of social situations (e.g. when eating with family and friends) as we expect lay models of healthy eating to include such elements as well.

This work does not examine whether beliefs translate into behaviors, and whether acting in accordance with the beliefs on healthy eating styles has any benefits, such as with weight management. Future work should address these questions, considering an

emerging body of health research already suggests that certain aspects of "how" one consumes food (i.e. irregular eating and how energy is distributed during the day) might play a role in the rising trends of obesity and NCDs (McCrory et al., 2016). Other authors have already proposed that certain beliefs about eating norms and behaviors might be contributing to the obesity epidemic: De Ridder and colleagues (2013) write that in an environment of plentiful calories, a relaxation of the traditional meal pattern can lead to weight gain as consumption is no longer limited by clear norms of when, where, and how much to eat. Two specific beliefs related to the style of eating (see supplementary material) might be of interest for future work: perceived benefits of the "small but frequent" eating pattern over the more traditional three-meal model, and lack of perceived significance of avoiding distractions during food intake. A small number of studies shows evidence that frequent eating might not have benefits for weight management: for example, Kahleova et al. (2014) demonstrate that eating breakfast and lunch, instead of breaking down the same caloric and macronutrient intake into six smaller meals, is more beneficial for reducing body weight and improving a number of metabolic indicators (e.g. insulin sensitivity). Other works show that different types of eating distractions can increase intake by up to 60% (Herman & Polivy, 2005), or even as much as 75% (De Castro & Brewer, 1992). Such studies suggest that aspects of eating styles might be worthwhile additions to dietary recommendations and public health interventions. More work, however, needs to be conducted on various populations to determine whether certain beliefs related to eating styles might indeed be detrimental to weight management efforts.

Supplementary Materials

Statements on Eating Styles	Weight	Digestion	Energy	Prevention
Pattern of Intake				
Eat breakfast	51.4	28.0	76.2	22.7
Not skip meals	52.5	33.0	58.5	32.3
Eat small meals often*	63.5	51.8	52.5	23.0
Eat 3 mail meals*	48.6	36.5	44.7	27.3
Don't snacks btw meals	57.4	15.6	11.7	15.6
Time of Intake				
Don't snacks in evenings*	65.6	30.1	11.3	14.9
Not eat before bedtime*	62.1	51.1	14.9	19.5
Not eat late in the day	54.3	39.7	16.0	14.9
Have set times for meals	38.3	40.8	25.5	17.0
Mindfulness during Intake				
Don't rush when eating	32.6	72.0	13.1	20.2
Chew slowly	33.0	74.5	6.7	16.3
Be relaxed/in good mood	18.1	45.7	19.9	14.9
Not be distracted while eating	21.6	31.2	7.8	8.9

Table 2: Percentage of participants (n=283) endorsing each statement as important for the four health outcomes. Shaded areas signify top two outcomes endorsed for each statement, provided at least a quarter of respondents endorsed them.

*Meal and Snack Patterns***.** While respondents highly endorsed each statement (49% and higher) as important for managing weight, eating breakfast was also especially crucial for having energy (76% endorsed this activity as important for energy). We already identified that "do not skip meals" is considered sound healthy eating advice (see MDS results), having regular meals can take different forms: the traditional three-meal pattern can be contrasted with eating more frequent but smaller meals. Thus, we added two new statements in the present survey to examine which pattern may be favored. More respondents perceived smaller frequent meals as important (vs. 3 main meals) for each

outcome- weight loss (63.5% vs. 49%), digestion (52% vs. 36.5%), and having energy (52.5% vs. 44.7%). These results suggest that respondents give preference to the "smaller meals often" pattern for structuring daily eating in a healthy manner. Such preference may result from news coverage of research investigating the effect of meal frequency on weight status: while overall results are mixed, some studies provide support that eating more times a day is inversely associated with excess weight (Mesas et al., 2011).

Time of Intake. We added a new statement on snacking in addition to one used in pile sorts - "avoid snacking in the evenings"- as we expected the attitudes to snacking to differ by time. Specifically, as people consider eating late to result in weight gain, we expected higher endorsement of evening snacking for weight management. Results support our expectation- avoidance of evening snacks received higher endorsement (66%) than avoidance of between-meal snacks (57%). Because people can be inconsistent in whether they classify small eating occasions as meals or snacks (Wadhera & Capaldi, 2012), between-meal snacks might be viewed as a component of the healthy "small meals often" pattern. Mid-day snacks might also be viewed more positively because the content of snacks may differ: consumer trends show higher preference for less healthy snack choices the later it is in the day (DataMonitor, 2015).

Mindfulness. Most participants (>72%) viewed pacing considerations (don't rush and chew slowly) as important for having good digestion. Avoiding distractions and being relaxed/in a good mood when eating were least endorsed. This reflects findings of consumption monitoring work, which demonstrates that people underestimate the role of eating situations on weight control. For example, people are not aware of the fact that they overconsume when certain distractions are present (Wansink & Chandon, 2014).

CHAPTER 5

PERCEPTIONS OF HEALTHY FOODS AND EATING STYLES IN THE UNITED STATES AND EASTERN EUROPE

Abstract

Understanding what constitutes "healthy eating" to the public is an important step for effective dietary recommendations and interventions. "Healthiness" is one of the most important attributes for eating preferences (Grunert, 2007) and much work has studied people's perceptions on the topic (Bisogni 2012; Paquette 2005). Most research has focused on what is good to eat and provides considerable detail on lay perceptions of food characteristics that are healthy or unhealthy. However, such literature has not addressed another important aspect of a healthy diet- the eating styles, or *how* one eats. Eating styles encompass the patterns and timing of food intake, as well as mindfulness during eating- behaviors that are increasingly investigated as important factors in obesity and related conditions (Garaulet et al., 2014; Wansink et al. 2014; Gallant et al., 2014; Leech et al. 2015). Previous work (Voytyuk & Hruschka, in press) has demonstrated cross-cultural variation in the perceived importance of healthy eating styles, although this work did not examine how participants from both cultures discuss why these styles of eating are important for health. Using semi-structured interviews, the current study provides an in-depth look at the ways participants from the United States (N=17 student, N=16 non-student) and Eastern Europe (N=16) describe how aspects of both food characteristics and eating styles influence health and wellbeing. Results show that respondents perceive a range of relevant health outcomes resulting from both aspects of eating: weight management, disease prevention, and quality of life (feeling well, having

energy, avoiding digestive issues). While characteristics of foods appear more important for disease prevention, the relevance of eating styles is discussed in terms of weight management and quality of life. Results also indicate that individuals can hold contrasting models for how styles of eating influence weight management efforts: while some view snacking as an aid in weight control through diminishing hunger, others may see it as a factor in overeating and thus weight gain. Lastly, results show that Eastern European participants hold additional models of how eating styles influence weight and long-term health: specifically, respondents noted the importance of proper time of food intake in relation to the body's own internal schedule.

Introduction

Perceptions of "healthiness" and "healthy eating" play a crucial role in people's food choices and preferences (Grunert, 2007; Furst et al., 1996). Thus, understanding people's narratives about healthy eating, as well as why they might differ from current scientific models, plays an important role in building better public health intervention programs and nutrition policy. Literature on lay perceptions of healthy eating has provided much knowledge on how individuals decide what makes foods good or bad to eat. Lay beliefs appear to reflect official dietary recommendations in many ways: people discuss healthful diets in terms of consuming more fresh fruits and vegetables and less processed foods high in calories, fat, sugar, and salt. Additionally, people tend to categorize foods into simple dichotomies, such as good/bad or healthy/unhealthy (Carels et al., 2006; Carels et al., 2007; Oakes & Slotterback, 2001). People perceive "good" foods as something that contains high levels of nutrients and promotes health and slenderness, while a "bad" food is one that promotes weight gain, lacks nutrients, and

contains bad nutrients or ingredients (Oakes & Slotterback, 2005). Dietary fat is one such important "bad" nutrient and respondents in the U.S. frequently mention its negative effects on health (Lupton, 2005; Oakes and Slotterback, 2005). This is unsurprising, considering that the U.S. federal government has embraced a low-fat ideology for heart disease prevention and weight loss since the 1970s. Aside from macronutrients, people focus on other food characteristics and the ways they affect health. For example, individuals perceive health risks from foods they consider new, unknown, and uncontrollable such as the technology of genetic engineering or antibiotic use in animals (Kirk et al., 2002; Ohtsubo & Yamada, 2007; Cunha et al., 2010; Fife-Schaw & Rowe, 1996), Lastly, in the Western developed world, a preference for food products labeled as "natural" is well documented (Rozin, et al., 2004) and this preference appears to be attributed to perceived superiority of the natural order and health risks resulting from human intervention. Lastly, lay models of healthy foods show considerable variation across individuals, across cultures, and across historical time (Miljkovic & Mostad, 2007). Recognizing this diversity, the US Food and Drug Administration is now looking to update its standards for "healthy" food labels by eliciting both lay and scientific comment on the meaning of the term (see FDA's document 2016-23365 at www.federalregister.gov).

When making healthy eating choices, people's decisions do not only focus on *what* to eat, but involve other types of considerations such as when, how much, where, and with whom to eat (Wansink 2004, Stroebele & de Castro, 2004). The current study terms these aspects of "how" one should eat or "ways" of eating as *eating styles,* while we refer to "what" one should eat as *characteristics of foods*. Much less work has

examined lay perceptions on eating styles, though we do know that people's models of healthy eating include beliefs related to "how" food should be consumed. Fisher and Dube (2011), for instance, created and validated an inventory of eating rules and norms held by Americans, which contained norms related to how one eats. Such statements included considerations of patterns of intake (e.g. always eat breakfast, avoid snacking), speed of eating (e.g. chew food slowly), and minimizing distractions (don't eat in front of a TV). There is also evidence that the importance of styles of eating as an element of healthy diets may differ cross-culturally: a small number of studies suggests that American respondents might focus less on styles of eating when compared to respondents from other cultures (Akamatsu et al., 2005; Voytyuk & Hruschka, in press). Akamatsu and colleagues' work in Japan demonstrated that while healthy eating interpretations in the U.S. and some European countries were predominantly based on the types and characteristics of foods, Japanese participants discussed an additional theme: "eating styles and habits". This theme featured norms on when and how the food is eaten, for example avoiding late-night eating and enjoying the foods. Akamatsu suggests that this theme reflects traditional Japanese concepts, as importance of how food is eaten (in addition to the importance of what is eaten) is featured in health writings from three centuries ago. Work in Turkey, while not comparing cross-culturally, demonstrated that Turkish participants give higher agreement scores to statements related to healthy eating styles (termed "behavior" statements- eating breakfast, avoiding late night meals, keeping regular eating hours) than statements related to nutrition (Cakiroglu & Tangut, 2008). Lastly, the author's own work in United States and Eastern Europe (Voytyuk & Hruschka, in press) showed a cross-cultural difference in the salience of eating styles: in

two separate surveys, Ukrainian respondents rated eating style statements significantly higher in importance for weight loss than American participants.

Though suggestive, current work on eating styles does not investigate the explanatory models underlying these lay beliefs—how and why people believe the specific aspects of "how" one consumes foods matter for health. Considering that our previous work demonstrated differences in endorsement of eating styles in Eastern Europe (Ukraine) and United States, the current study expands this work to provide an in-depth look on how individuals from United States and Eastern Europe understand the health importance of both food characteristics and styles of eating. While this work aims to address the literature gap on eating styles perceptions specifically, we also devote attention to food characteristics as an integral part of healthy eating models. The two main research questions are:

RQ1: What do people see as the most important elements of foods and eating styles for different kinds of health outcomes?

RQ2: How do individuals explain the role played by different aspects of eating styles in promoting different health outcomes?

Methodology: Recruitment

The study recruited 49 respondents for an in-person one-hour interview: 16 US-born citizens residing in the Phoenix metropolitan area, 17 U.S.-born citizens that are currently undergraduate students at Arizona State University, and 16 Eastern European (EE) respondents. We selected these sample sizes according to Bertaux (1981, pg. 35), who suggests that a size of at least 15 should be used for qualitative research, though other work demonstrates that a sample as small as n=6 can be sufficient for development

of meaningful themes and useful interpretations (Guest et al., 2006, pg. 78). There are also particular reasons for sampling from the aforementioned groups. First, most human behavior and psychology research has been performed on Western, educated, industrialized, rich and democratic (WEIRD) societies, with American undergraduate students being some of the most WEIRD and psychologically unusual people studied (Henrich et al., 2010). Thus, in studying lay theories of eating, we want to compare perceptions between both the well-studied "WEIRD" and other populations using identical methods. Second, our previous work (Voytyuk & Hruschka, in press) has demonstrated that Ukrainian participants are both more collectivist in their cultural orientation than U.S. respondents and endorse eating styles for health more. However, individual differences in collectivism predicted endorsement of eating styles above nationality- thus, an individual who scored higher on collectivism endorsed these statements higher regardless of where they lived (Ukraine or U.S.). To represent healthy eating beliefs from Eastern Europe as a region, we have added Romania- a neighboring culture that is also considered to be a collectivist society (Hofstede 1980, 2002) and shares many similarities in traditional cuisine to Ukraine. The E.E. group included 8 Ukrainian interviewed in Russian (residing in Dnepropetrovsk, Ukraine) and 8 Romanian citizens interviewed in English (residing in Bucharest, Romania); the PI recruited these respondents via personal contacts and snowball sampling. American respondents were recruited in one of two ways: by posting details of the study on social media (Facebook, Twitter), and snowball sampling through the apprenticeship researchers at the PI's lab.

Methodology: Interview protocol

The interview protocol consisted of two activities: 1) the interviewer asked an open-ended question probing the respondents' most salient definition of healthy eating, and 2) participants were asked to read 42 statements on various aspects of healthy eating, indicate personal agreement, and explain their position. While the first activity aimed to capture the most relevant beliefs about healthy eating, the second task elicited detailed opinions of specific considerations of both food characteristics and styles of eating. In addition, each respondent filled out a short survey that collected demographics, dieting status, and self-reported healthiness of one's diet.

Activity 1. The first open-ended question asked participants to describe "what comes to mind when you hear the words healthy eating". Initial answers were followed by one prompt: "if you were to describe healthy eating to someone else, what would you say?" The question aimed to elicit images and ideas evoked in everyday life by the words "healthy eating". Respondent answers were audio recorded, transcribed, and uploaded for analysis in the MaxQDA software (version 12). To identify key words used in describing healthy eating, we performed a word frequency analysis. MaxQDA provided the most frequently used words for each sample (EE, US student, and US non-student) and we compiled lists of top 10 words for the three groups and recorded the proportion of respondents that used each key word. Because word search tends to capture nutrition elements more (e.g. specific food nutrient or quality), in order to measure how many respondents mention eating styles as part of their initial healthy eating definition all responses were also coded for presence of themes on eating styles. The PI developed a

codebook, which guided coding of open-ended answers for the three such themes: meal/snack pattern, time of intake, and mindfulness during food intake.

Activity 2. In the second activity, the interviewer presented participants with 42 statements on various aspects of eating being important for health (e.g. it is important to eat foods low in fat). These statements were derived from our past work (Voytyuk & Hruschka, in press) as well as other studies (Fisher & Dube, 2011; Akamatsu, 2005) with the goal of capturing variation in beliefs on both the aspects of foods and styles of eating. Some food statements focused on nutrients (e.g. it is important to eat foods low in fat and sugar) and others focused on naturalness aspects (e.g. it is important to avoid unnatural ingredients, eat organic). Beliefs concerning eating styles included several major themes: patterns of food intake (it's important to eat breakfast, don't skip meals, avoid snacking), time of intake (don't eat late in the day, have set times for meals), and attentiveness or mindfulness during intake (take time to eat, don't rush, avoid distractions such as TV). We asked participants to read the statements and rank them in terms of personal agreement from most agree (+4) to most disagree (-4). Afterwards, the interviewer prompted respondents to explain their agreement levels for statements with strongest agreement (ranked +3 and higher) and strongest disagreement (ranked -3 or lower) - items of highest psychological importance. All interviews were audio recorded, transcribed, and coded in MaxQDA software. After an initial review of interview content, the PI created a codebook of health outcomes discussed during interviews. We coded participant responses based on the presence of each specific health outcome mentioned: weight management, good digestion, energy levels, feeling well, preventing disease, and preventing harm to health. We use the "weight management" code for references to how

various aspects of eating might lead to weight gain or help with weight loss; we use "good digestion" code for references to how eating affects the digestion process- causing digestive distress or making digestion easier; we use the "energy levels" code for references to how eating influences one's energy levels throughout the day; we use "feeling well" for references to how eating affects one's general physical and mental state. The two codes related to avoiding future illness- "preventing harm" and "preventing disease" differ in specificity. We used the code "prevent disease" if participants mentioned specific health conditions- e.g. diabetes, cancer, heart disease, and high blood pressure. We used "prevent harm" for instances where respondents mentioned vague or unknowable risk (e.g. food additives can cause health issues down the road). All kappa scores were above 0.8, indicating very good strength of agreement between coders: Weight = 0.87; Energy= 0.96; Feel well= 0.83; Digestion= 0.92; Disease= 0.86; Harm= 0.86.

Results

Eastern European and American (non-student) samples are closest in characteristics including age and gender distributions, proportion of respondents losing weight and rating their diet as healthier than that of others. The U.S. undergraduate student sample is significantly lower in age, has more males, and a much lower percent of participants that rank their diet as healthier. Table 1 summarizes key demographics for each group.

Table 1
Sample Demographics

	USA	**USA student**	**Eastern Europe**
N	16	17	16
Age M(SD)	36 (13.1)	19 (5.9)	36.7(14.6)
Females	50%	41%	53%
BMI	25.5(6.6)	24.4(4.7)	21.6(3.5)
Try to lose weight	44%	29%	46%
Diet: healthier	68.8%	11.8%	66.7%

We provide results for the three groups separately as we expect the student sample, where the majority of respondents reside on campus, to differ from the significantly older U.S. group, while the E.E. group is expected to possibly differ from both. We present interview results in sections by healthy eating topics: food characteristics and eating styles. Each section summarizes results from the two interview activities. Lastly, results of activity 2 are further divided into major themes representing the main category: food characteristics include nutrients and naturalness themes, while eating styles include pattern, time, and mindfulness themes.

How do participants talk about healthy food characteristics?

Table 2 lists most frequently used words to describe "healthy eating" in the first activity. For each key word, the table shows a percentage of respondents in each group that used it at least once.

Table 2
Key Words Used to Describe Healthy Eating and Proportion of Interviews Using them

Rank	US (n=16)	*%*	Rank	US student (n=17)	*%*	Rank	East. Europe (n=16)	*%*
1	Vegetable	*44*	1	Vegetable	*71*	1	Vegetable	*56*
2	Processed	*38*	2	Fruit	*59*	2	Meat	*38*
3	Fruit	*31*	3	Balance	*47*	3	Fat	*38*

4	Protein	*25*	4	Protein	*35*	4	Fruit	*38*
5	Sugar	*25*	5	Sugar	*35*	5	Sugar	*31*
6	Balance	*25*	6	Meat	*29*	6	Fresh	*25*
7	Meat	*25*	7	Processed	*29*	7	Balance	*25*
8	Organic	*19*	8	Calories	*29*	8	Fried	*19*
9	Natural	*19*	9	Fats	*18*	9	Bread	*13*
10	Packaged	*19*	10	Breakfast	*18*	10	Natural	*13*

The lists show an expected pattern reflecting official healthy eating advice and existing research on lay models of healthy eating: have a balanced diet, eat more fruits and vegetables, and minimize processed foods high in fat, sugar, salt, and calories (US Department of Health and Human Services, 2015; WHO, 2003). The student group exemplifies current dietary recommendations the most, with fruits and vegetables on top of the list and a mention of watching calories. In comparison, the list for the older U.S. group features concepts outside of such recommendations: eating organic and natural. Dietary recommendations within the E.E. group are similar to USDA's guidelines: the Romanian food pyramid emphasizes a varied diet with an emphasis on fruits and vegetables, while limiting processed foods high in sugar and products high in fat (Food and Agriculture Organization of the United Nations, 2016). Ukraine does not have a graphic representation of nutrition recommendations, but advices a varied diet and relies on the WHO's guidelines of eating more fruits and vegetables and less high-fat foods.

As respondents described what healthy eating meant to them personally, they mentioned various aspects of food characteristics: amount and type of nutrients (e.g. sugar and fat), food groups (vegetables, meats), and food qualities related to naturalness and wholeness (natural, organic, fresh, unprocessed). In discussions of nutrients, while sugar was used exclusively in negative terms (e.g. reduce or avoid sugar or high-sugar

foods) references to dietary fat were more diverse. In the 17 total open-ended questions that mentioned dietary fat, 41% recommended limiting or monitoring fat consumption, 35% said that fat was an important part of a balanced diet, and 24% differentiated between good and bad types of fat with only the "bad" kinds (e.g. trans, saturated) requiring limitation or avoidance. U.S. participants discussed protein as an entirely positive nutrient (e.g. satiating, essential) and thus an important element of a balanced diet. Lastly, only the student group's list features "calories", as these respondents noted the importance of watching calories for healthy eating.

In terms of food groups, vegetables and fruits are unsurprisingly on the top of each list. While "meat" is also a commonly mentioned word, its role in health is more diverse than that of fruits and vegetables (F&V)- while the latter are stereotypically healthy items, people's judgments of meat are less clear (Paquette, 2005). Students that discussed meat (n=8) were divided between those who talked about its importance in a balanced diet (n=4) and others that specified that only lean (vs. red) meats are good. Among eastern European participants discussing meat (n=6), all referred to it as an important part of a healthy diet, with half noting that meat is good as long as it is not fried. Lastly, respondents mentioned food qualities related to naturalness and wholesomeness- e.g. avoiding or limiting processed foods and eating more natural products. "Processed" did not have an equivalent common word in Ukrainian interviews (conducted in Russian), and "fresh" denoted wholesomeness instead.

These results support past studies- when listing foods harmful to wellbeing, survey respondents from a number of countries (Brazil, France, Portugal, Uruguay) refer mainly to foods with specific nutritional characteristics (particularly that high in fat,

sugar, and salt), as well as certain food groups/types (meat, sweets, junk food, fried foods), and processing methods (processed/ready-to-eat and genetically modified products) (Ares et al., 2014). Also, “balanced" diet” is an internationally common theme for eating well (Croll et al., 2001) and interest in and preference for natural products has been well recorded among consumers (Dickson-Spillman et al. 2011; Evans, de Challemaison, & Cox, 2010).

How do respondents discuss the role of food characteristics in health?

In the second activity, participants were prompted to discuss their opinions of the 42 statements on healthy eating. In their answers, respondents related aspects of food characteristics to a number of health outcomes – weight management, preventing harm to health or disease, as well as improving quality of life (avoiding digestive issues, having energy throughout the day, feeling generally well). At least half of each study sample provided opinions on how aspects of foods can affect these health outcomes: 87% of U.S. non-students, 53% of students, and 81% of Eastern European respondents.

Statements on food characteristics included two a-priori themes: 1) aspects of naturalness, and 2) focus on nutrients. Chart 1 illustrates the types of health outcomes that respondents endorsed for each theme. A total of 28 participants discussed the health significance of food nutrients, with more than half endorsing weight management and disease prevention as important outcomes. Among participants that talked about food naturalness (n=13), preventing harm to health received the most endorsement (70%).

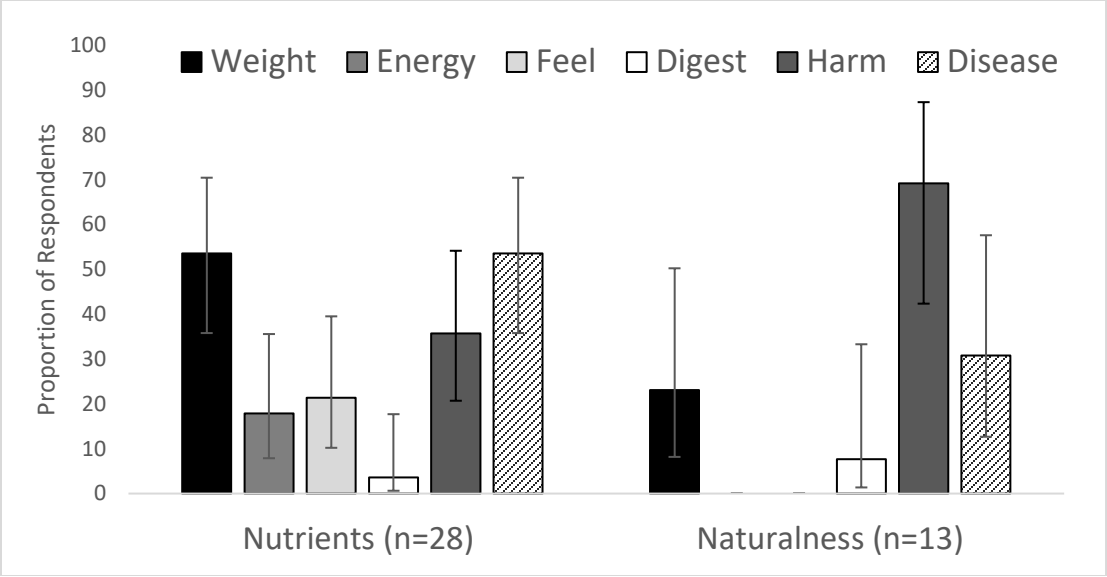


Chart 1. Proportion (%) of respondents endorsing various health outcomes for each of the two food characteristics themes (nutrients, naturalness).

It appears that respondents perceive aspects of food's nutritional profile to have more varied health outcomes. Naturalness, while an important aspect of healthy foods, appears less important for weight management or quality of life, but quite important for avoiding harm to one's health. This difference may be due to the more obscure aspects of "naturalness" as a concept discussed later.

Nutrients. When discussing health effects of the nutritional profile of foods, respondents focused mainly on two macronutrients: sugar and fat. In judgments of healthiness, people tend to dichotomize foods and their characteristics into "good" and "bad"- a simple cognitive heuristic that aids in making eating decisions. Indeed, both sugars and fats can be good/healthy or bad/unhealthy. For sugar, fruits are a healthy source of the nutrient, while "added" sugars are bad in a variety of ways:

"*One of the things I noticed that really helped out [with my health] was reducing my sugar intake. By doing that alone I already feel better [and] I've lost weight. I think bad sugar is a killer- bad sugar being soda, ice cream. Your body is just going to store that*

and turn it into fat. It's the road to diabetes. [And] good sugar being fruits- which helps the body function"- U.S. male, 36 yrs. old.

"*I think sugar is more related to weight problems than fat itself. Because it has no good calories in it. It doesn't feed you-really feed you. It's just artificial and it gives you in the brain an idea that you ate something. I really feel sugar is a drug which we can live without. Our body doesn't need sugar*. […] *and it leads to weight gain because you eat a lot. The more you eat sugar, the more you want sugar*" – E.E. female, 29 yrs. old.

Aside from weight gain and diabetes, respondents mentioned other potential health issues related to sugar consumption: cancer, heart disease, and anxiety. Moreover, participants talked about the addictive nature of sugars, as something one craves and might find extremely hard to minimize in their diet. As with sugars, dietary fat can also be dichotomized into good/healthy (e.g. nuts, fish, olive oil) or bad/unhealthy (trans fats, saturated fats in red meats). Fat, however, is perceived not nearly as detrimental to health and wellbeing as is sugar and less participants focused on the significance of dietary fats. In discussions of weight management, 59% (n=10) participants mentioned avoiding or minimizing sugar, while only 29% mentioned reducing fat. In discussions of disease prevention, the proportions were similar: 33% mentioned sugars and 29% mentioned fats. Disease risk related to fat was more often attributed to frying foods than to the intrinsic fat quality of the product (e.g. saturated fat content of red meats): 5 out of 8 respondents who mentioned possible harm to health talked about fried foods and the other 3 recommended choosing lean meats over red meat due to healthier fat content. Once again, fat was not considered as problematic as sugar and respondents mentioned that their agreement with the statement "it is important to eat foods low in fat and sugar" was in fact due to the sugar portion of the card, as "low-fat" is not synonymous with health. One participant summarized her lack of concern with dietary fat in the following way:

"*I totally disagree [with eating food low in fat]. We've had this war on fat for the last 30 years, so what happened is food companies started making things that were low fat and high in sugar- and that just did not help the population. We have so much diabetes now and we still have heart problems. I think a good natural fat- whether it's avocado, nuts or even fat from grass-fed animals- that's much more important to eat. Those are good calories and we've also learned that your brain needs fat, you need it to think and grow*" – U.S. female, 52 yrs. old.

The third major macronutrient- protein- received less attention from respondents. Unlike fat or sugar, protein is not considered inherently bad since it is not generally known to be implicated in either weight gain or disease risk. Yet the source of protein can still be categorized as good or bad depending on the salient concerns of an individual: for example, vegetarian respondents (n=8: 5 US, 1 US student, 2 EE) differentiated between animal protein (bad) and plant protein (good), while those who emphasized the importance of eating organic considered conventional animal protein sources as bad. For Eastern European respondents in particular, animal sources of protein appeared to be especially superior for health. Unlike United States, where animal-based dietary fat (particularly saturated fat in red meat) has been a major focus of health improvement public health strategies since the 1970s (Reedy, 2016), E.E. participants might place more importance on animal products as an integral part of traditional cuisine. One Ukrainian respondent stressed the necessity of animal proteins in the following way:

"*Animal proteins are very important so that a person can be healthy. If there is no animal protein, the person even starts aging faster and I have seen this with my [vegetarian] friend. You can tell by the face- the [increased] wrinkles around the eyes, it immediately tells you there is a lack of protein in the organism. So protein- when boiled, not fried- is good*" – E.E. female, 53 yrs. old.

Views of Ukrainian participants might be further influenced by a strong focus on meat and dairy as a necessary aspect of a proper diet in the former Soviet Union (Ministry of Health Care of the USSR, 1991). Indeed, dietary guidelines in Ukraine

emphasize the significance of animal protein and Ukrainian culture (as many other neighboring eastern European countries, including Romania) values animal foods highly, considering them healthy and nutritious (Biloukha & Utermohlen, 2001).

Naturalness. Food naturalness is a highly salient quality of healthy eating: 70% of all respondents mentioned the importance of eating natural foods at some point in the interview. Aside from being "natural", other terms used to denote this quality included wholesome, fresh, organic, unprocessed, real, not in a package, and not made in a lab (e.g. lab-made additive). However, the definition of naturalness or how unnatural foods might affect health were often unclear as participants found it hard to give specific examples of outcomes or explain what exactly made "unnatural" foods so not natural. The concern with foods considered unnatural, on the other hand, had a clear reasoning: respondents were unsettled with uncertainty associated with human intervention. Human "meddling" with foods, especially ones based on modern advanced technologies (such as genetic modification), was perceived to cause unknowable yet serious health issues. Other types of negative human influence included use of preservatives or other additives (often referred to as "chemicals") and addition of "artificial" ingredients (e.g. calorie-free sweeteners, Trans fats). These results support past research, which shows that to consumers, human intervention destroys naturalness whether it involves food additives (Valera & Fiszman, 2013), high levels of certain added nutrients (Lupton, 2005) or genetic engineering (Rozin et al., 2012). Human intervention can be negative even when it aims to improve nutritional value- some respondents noted that low-fat products and foods with added vitamins and minerals indicate unnecessary processing, because humans add and remove these nutrients, not nature. Thus, the process (processing)

matters more than content (increased nutritional value) - an aspect of naturalness perceptions found in previous work (Rozin, 2005). Perceived harm to health associated with these processes rests on an intuition that human technology creates novel dangers and cannot be superior to natural processes, to which we had time to adjust and with which we co-evolved:

"*I've heard that splenda causes heart disease or cancer... Because it's made out of things humans are not meant to have inside their body at all- it's very chemical. Not only your body doesn't need it, but it's also bad for you. As much as technology has advanced and we've evolved, these are still things that are going to harm you no matter what*"- U.S. female, 25 yrs. old.

In judging a food's naturalness, U.S. respondents mentioned labels as important for determining naturalness- e.g. by checking the list of ingredients for unfamiliar or unpronounceable content or looking for an organic label. Eastern European participants appeared less interested in label checking for two reasons: 1) distrust of labeling, especially in Ukraine where regulatory law is considered weak, and 2) stronger focus on the overall product type (the "essence" of what the product is, as one respondent put it) instead of its nutritional details. The following comment from another E.E. participant exemplifies this perspective further:

"To approach each food and read [the label]- it's not necessary. Generally, it is already clear what's what: if you're looking at corn chips, it's understandable [that they aren't healthy]. I feel like "natural" is a market where some grandmother, obviously on her own, raised a chicken. Anything in a store a-priori can't be natural. It's all from farms with antibiotics and additives... half-artificial, let's say. […] And there is a law that forbids GMOs in Ukraine- without such a little label you simply can't sell these products, so in this country it's not a fact that the presence of the label means anything!"- E.E. male, 26 yrs. old.

Lastly, concern with naturalness was not universal, as some challenged both the usefulness of the term itself and the supposed superiority of its healthiness or assumed

dangers of human technology. In fact, respondents who challenged naturalness as an important criterion for healthiness also expressed support for genetic engineering- arguably the most unnatural type of human involvement due to the novelty of such technology. Out of 25 total respondents that expressed a stance on genetic engineering in foods, 24% supported it (56% were cautious or against it; 16% were neutral) and simultaneously expressed criticism of organic agriculture or the use of the term "natural" to denote beneficial health consequences.

How do participants talk about healthy eating styles?

When defining "healthy eating" in activity 1, about one-third of the E.E. and U.S. student samples mentioned some aspect of eating styles as part of a healthy diet (31% and 29% respectively), while only one out of 16 non-student American participants did (4%). We coded open-ended answers to the first interview question for presence of three eating style themes: patterns of meal and snack intake, time of eating, and mindfulness during intake. Eastern Europeans mentioned pattern and time of intake equally (n=4 for each theme), while all US participants discussed only pattern (eat breakfast, don't skip meals).

How do respondents discuss the role of eating styles in health?

While few total participants included eating styles in their initial descriptions of healthy eating, when asked to read and reflect on statements relating to various aspects of "how" one consumes food, the majority of respondents did express beliefs on the ways it influences health. Most Eastern European respondents (94%) and majority of U.S. respondents (62.5% non-students and 65% US students) discussed how they think eating styles affect a number of health aspects: controlling weight, preventing disease, and having good quality of life.

Chart 2 illustrates the types of health outcomes that participants endorsed for each of the three eating style themes. Unlike discussions on food characteristics, where few participants discussed aspects of quality of life (less than 20% for nutrients), in discussions of eating styles these outcomes are mentioned by more participants for pattern of intake (40% mention energy, 36%- feeling well, 21%- digestion), time of intake (40%- digestion, 26% feel well), and mindfulness (61%- digestion). Overall, weight management appears to be an equally important health outcome for both aspects of eating (food and styles of eating), and reducing harm/disease risk is more relevant for characteristics of foods while quality of life is more salient to styles.

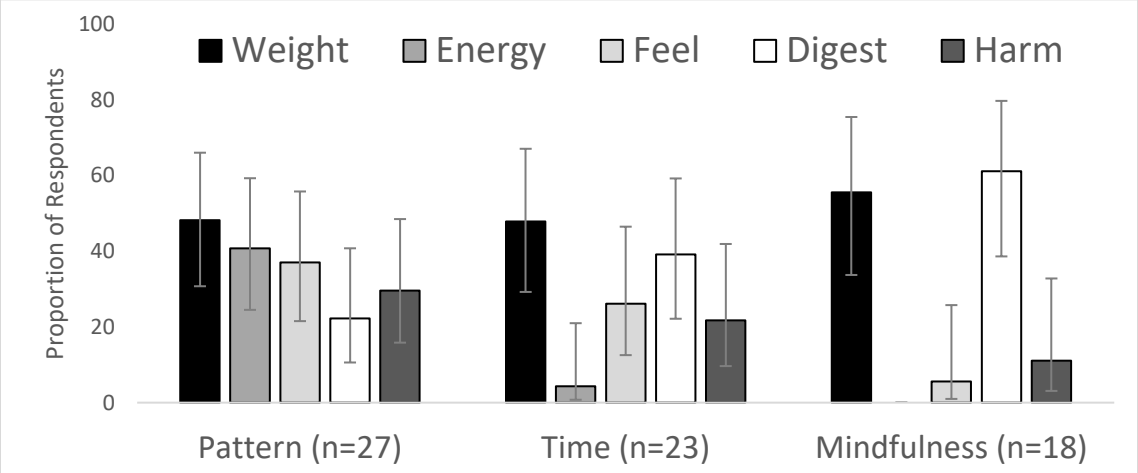


Chart 2. Percentage of respondents endorsing health outcomes for statements in the three eating style themes.

How do participants discuss importance of intake patterns?

The first theme of eating styles- pattern of intake- includes statements on number and regularity of meals and snacks- e.g. it's important to always eat breakfast, not skip meals, and limit snacking. In terms of pattern affecting one's energy, eating frequently was considered particularly important for keeping consistent levels of energy throughout the day. This frequent eating pattern was characterized by eating smaller meals more

often throughout the day (vs. sticking to 2-3 major meals), which included snacking between meals. Benefits of such "small but frequent meals" patterns also concerned digestion (eating larger meals less often could lead to stomachaches and other digestive issues, such as feeling "heavy" or bloated), and weight management. In terms of weight management, participants held contrasting views: six respondents considered "small but frequent" pattern as good for *preventing* weight gain, while three considered it a factor in weight gain. The more popular view (n=6) held that frequent eating (via smaller but more numerous meals and snacks) and not skipping meals helps control hunger levels, which helps one avoid overeating. Participants commented that frequent food intake would "keep blood sugar at an even level" so a person does not "binge eat later" or overeat at the next main meal. In addition, respondents mentioned that frequent eating would keep "metabolism going" at a fast pace, which was perceived as good for successful weight control. The contrasting view (n=3) suggested eating *fewer* main meals and avoiding snacks for a healthy weight instead:

"*To snack between meals- that's bad! That's the worst you can do- it's the way to put on weight. You know, they say it's a smarter idea to skip meals, because your body has a chance to use the fat in storage*"- E.E. female, 64 yrs. old.

This perspective held that frequent eating causes overconsumption, not prevents it. Aside from health considerations, the frequent eating pattern might be simply easier to implement, as participants with long work hours and students living on campus mentioned how hard it can be to sit down and have a larger meal. Snacking and eating more often, on another hand, is a pattern that helps them get through the busy day without going hungry, having low energy, and feeling more stressed and unable to focus on the tasks at hand.

How do participants discuss importance of food intake times?

The time of intake theme included statements on the importance of having set times for meals and avoiding eating late in the day. Generally, participants considered late eating as something undesirable for one's weight management goals and digestion. Respondents pointed out that one's metabolism "slows down" or is less effective in the late hours, which is why eating late (especially close to bedtime) can result in digestive problems throughout the night, poor sleep, and resulting feelings of heaviness and unease the next morning- an outcome most would prefer to avoid. In terms of weight gain, participants commented that eating close to bedtime would not give the body enough time to "burn off" and use up what is consumed, as the body is inactive and the metabolism is inefficient. The extra calories consumed then would be stored as fat, while the person experiences discomfort associated with poor digestion:

"*I've seen this with myself and a number of people- eating like four hours before going to sleep makes you very tired the next day, that's not great. You're going to have a bad sleep, you're not going to feel well the next day, and you will get fat, because your body can't handle that kind of [metabolic] activity while you're sleeping*"- E.E. male, 30 yrs. old.

While the above quote exemplifies a perspective shared among groups, the eastern European sample also held an additional belief of how time of eating affects wellbeing. Specifically, some E.E. participants (n=4) noted that food intake should be "regimented" and fit the body's working schedule to maintain health. For instance, one E.E. respondent stated that having set times for meals is good as eating needs to match the "bio-rhythms" of the body and a "regimented" food intake will help it function better overall. Another noted how late eating interferes with the body's scheduled maintenance hours and can eventually manifest in health issues:

"*Why overwhelm your body [with eating late]? The organism needs to rest. When we sleep and our body is not burdened by food- not busy digesting- then it's healing itself, doing maintenance. So if you're going to bed [not feeling full]- all the signals that might be coming from the tissues in the body go straight to the brain, and the brain directs more energy there to fix those issues. But if a person overate before bed, he starts getting sick after some time because he does not regenerate at nighttime. Doesn't give his organism the ability to self-restore.*" –E.E. female, 52 yrs. old.

"Regimented" intake has implications for weight management as well, as several E.E. respondents (n=3) explained that *not* having a predictable daily schedule would stress the body into storing energy as fat instead of using it for fuel. Thus, weight gain would result *not* from an overabundance of unused calories, but a change in the body's metabolism strategy due to unpredictable food supply. References to "bio-rhythms" and body schedule resemble the science of circadian rhythms- the self-sustained 24-hour fluctuations in metabolism, physiology, and behavior that allow organisms to effectively respond to daily changes in the light-dark cycle. The time of food intake is indeed one known factor that can affect the phase of various internal clocks found in the liver, muscles, and adipose tissues- this in turn can lead to disruptions in the normal eating cycle and might have a variety of negative health effects (Mattson et al., 2014). It is not clear why beliefs regarding circadian rhythms and food intake times were present solely in the Eastern European sample.

How do participants discuss importance of mindfulness during food intake?

The third theme of eating styles- mindfulness during food intake- included statements on the importance of pacing, taking the time to eat without rushing, and avoiding distractions to focus on the meal at hand. Despite generally low perceived importance, respondents across groups pointed out that such aspects might indeed have some implications for both weight and digestion. Avoiding rushing or having

distractions, for example, would help keep track of portions and give time to reach satiety before one overeats; taking longer to eat and chew the food well would aid digestion by breaking down foods better. However, respondents were rather skeptical of how much such considerations can truly influence weight gain, as they were confident in their personal ability to watch how much they eat:

"I don't think much of it [avoiding TV], because as long as you're monitoring what you're eating or how much you're eating, it's fine! Not everybody slips into a trance when they watch TV and eats 80 pounds of food!" U.S. male, 21 yrs. old.

Research, however, shows that individuals are in fact rather poor at self-monitoring their food intake (Wansink, 2010), and watching TV can lead up to an 18% increase in consumption without a corresponding impact on hunger or satiety (Bellisle et al. 2004; Hetherington et al. 2006). Yet socializing and entertainment associated with eating held importance for another aspect of wellbeing to participants- emotional health. Participants commented that enjoying a good movie or socializing with friends during a meal is pleasant and thus important for their daily lives.

Discussion

People's models of healthy eating include both considerations of foods as well as considerations of eating styles- *how* one eats such foods. Respondents described healthy foods as those that are natural and unprocessed, while also not containing too much sugar and certain fats (e.g. saturated as in red meat, or fat resulting from frying). These findings support elements of past work which found that 1) individuals often rely on nutrient profiles to judge healthiness and tend to pursue low carbohydrate/low sugar, high protein, and low fat foods (Gao et al., 2012), and also 2) people generally consider processed foods less desirable to more "natural" alternatives (Rozin et al., 2004). Our work

demonstrates an important nuance in such tendencies, however: “low-fat” might indicate healthiness to some, while signaling unnecessary human processing to others and thus diminishing the product’s naturalness. As for eating styles, few initial healthy eating definitions provided by respondents included aspects of “how” one consumes foods (ranging from 4% in the U.S. non-student sample to 31% among eastern Europeans). However, as respondents read statements on different aspects of eating styles, they supported the importance of many such aspects for health.

In terms of why both aspects of foods and the way one consumes these foods are believed to be important for health, study participants perceived a variety of relevant health outcomes: weight management, risk of specific disease or unknown illness, as well as important considerations of quality of life such as having consistent energy levels and good digestion. Respondents discussed food characteristics mostly in terms of preventing future health issues, with more specific examples of diseases given for nutrient considerations of foods rather than naturalness. This may be the case because nutrition research has traditionally focused on specific links between nutrients and disease risk, while “naturalness” does not have a single definition that can be studied in relation to specific illnesses. While naturalness plays an important role in people’s models of healthy eating, participants are less sure of what exactly “natural” means and how unnatural foods can pose risks to health. For styles of eating, harm to health is discussed less, while quality of life aspects receive more attention: *how* you eat food has implications for one’s digestion, energy levels, and general sense of wellbeing. Weight management was also an important aspect of eating styles, as respondents commented on how patterns, time, and mindfulness during food intake can lead to weight gain. Our

results show that people's models of weight gain can differ dramatically, as some participants considered snacking beneficial for weight control yet others believed this behavior to do the opposite- increase weight gain. Lastly, results show cross-cultural variation in perceptions: only Eastern European respondents perceived the importance of food intake times (referred to as "regimented" food intake) for the body's internal "clock" and thus both weight management and long-term maintenance.

In conclusion, as perceptions of "healthiness" play a role in shaping eating behaviors, public health workers and policymakers should consider not only lay beliefs related to healthy foods, but also the role of perceptions of healthy eating styles in the way individuals make eating decisions. A growing body of literature suggests that the pattern, timing, and mindfulness of intake might indeed result in changes in weight or important health markers (e.g. insulin sensitivity and release of satiety hormone getting deregulated with night-time eating) (Garaulet et al., 2014; Wansink et al. 2014; Gallant et al., 2014; Leech et al. 2015). Current work is, to the authors' knowledge, the first attempt to examine in-depth lay perceptions of healthy eating in terms of eating styles. Future work should assess whether such beliefs translate into behaviors, and whether acting in accordance with these beliefs results in beneficial health outcomes, such as decreased body weight.

CHAPTER 6

ACCOUNTING FOR CROSS-CULTURAL VARIATION IN PERCEPTIONS OF HEALTHY EATING

Abstract

What counts as healthy eating varies both within and across cultures. While people often focus on specific food characteristics, ways and styles of eating ("how" one eats, or eating context) can also be salient considerations in lay beliefs. The importance of these latter considerations appears to vary cross-culturally, though the reasons behind the phenomenon are not well-studied. One possible explanation for such variation is differences in basic cognition, with holistic thinking in collectivist populations favoring contextual factors. We assess this hypothesis by examining perceptions between two cultural groups that vary in collectivism.

In study 1, we investigate whether Ukrainian participants place more importance on "eating context" than respondents in the U.S. In study 2, we test whether this between-country difference is due to the mediating effect of individual differences in collectivism. Ukrainian participants consistently placed more importance on context (Cohen's $D = 0.71$ to 0.84; $p < 0.01$) and were more collectivist (Cohen's $D = 0.95$, $p < 0.001$). A mediation analysis shows that collectivism significantly mediates the effect of nationality on context importance, and renders the effect of nationality on context non-significant ($p > 0.05$). These results suggest that the holistic pattern of attention might extend to the domain of nutrition, accounting for some cross-cultural differences in perceptions of healthy eating. Lastly, we briefly discuss potential benefits of food health perceptions focused on the context of eating, such as decreased burden of self-regulation in a food-rich environment.

Keywords: holistic cognition, collectivism, food perceptions, eating context.

Introduction

What counts as healthy eating can vary within and across cultures (Povey, Conner, Sparks, James, & Shepherd, 1998). While healthy eating is mostly interpreted by Americans in terms of the foods and nutrients eaten (Lake et al., 2007; Croll, Keumark-Sztainer, & Story, 2001; Povey et al., 1998), there is evidence that people in other cultures also have a strong focus on non-food aspects of the diet in addition to concerns about dietary content. Martinez-Gonzalez et al. (2000) show that Spanish respondents focused on the concept of "balance and variety" more than respondents in other traditional Mediterranean countries (Greece, Italy, and Portugal). The authors propose that lower prevalence of the "balance and variety" definitions may be due to lower nutrition education in these other countries. Akamatsu et al. (2005) report that Japanese respondents' models of healthy eating include two factors: "food and nutrition" and "eating styles and habits". The authors suggest that the latter sub-factor may be attributed to more traditional beliefs, where eating behaviors (not only content of the diet) are important for the promotion of good health.

We group these considerations of "how" one eats (ways of eating or habits) into a separate domain of "eating context". It contrasts the "content" domain, which is focused on the intrinsic qualities of foods - nutrients, additives, caloric content, production and processing methods. Individuals, thus, have two ways of perceiving healthy eating: a context view that takes into consideration the whole diet and *how* we eat, and a content view that centers on the specific foods and their qualities (Ronteltap, Sijtsema, Dagevos, & de Winter, 2012). Focusing on context may modify people's judgments of foods, as

well as their behaviors. For example, Ronteltap et al. (2012) shows that individuals who focus more on context judge unhealthy (chips) and ambiguous (chocolate) products to be healthier. De Ridder et al. (2013) propose that norms about the context of eating—how much, when and where it is appropriate to eat (termed eating appropriateness standards or EAS)—can be important for eating behavior. The authors propose that a lack of clear EAS can compromise self-regulation in a food-rich (or obesogenic) environment, leading to overconsumption.

Although there appear to be between-individual and between-cultural differences in the degree to which people focus on context in determining healthy eating, no work to the authors' knowledge has examined the factors that make one more likely to focus on the context of eating. One possible explanation for differences in focus on context is based on the cognitive differences related to collectivism- a well-studied dimension of cultural variation. As one of the most recurring distinctions in social science research, this dimension describes the perceived relationship between the self and others in society. Members of societies where individuals tend to be more collectivist are more likely to value group membership and respect group processes and decisions (Triandis, 1995). This distinction also maps onto deeper cognitive differences, whereby individuals in more collectivist societies tend to perceive situations more holistically and attend to features of context, rather than focusing on specific items in a situation (Nisbett, Peng, Choi, & Norenzayan, 2001).

The purpose of our work is to test whether collectivism can account for individual differences in the importance of eating context (see Figure 1). The United States is consistently ranked as one of the least collectivist countries in the world (Triandis, 1995),

while a number of studies demonstrate that central and eastern Europeans have more collectivist values (Kolman, Noorderhaven, Hofstede, & Dienes, 2003). Some researchers have proposed that a history of communism may have played a role in these differences in collectivism (Varnum & Bowman, 2007). As expected from the known cognitive influences of collectivism, eastern Europeans are more holistic in their thinking than western Europeans: Russians tend to have a more holistic pattern of attention (Kuhnen, Hannover, & Roeder, 2001), categorize more thematically, and make more situational attributions for behavior than Americans (Grossmann, 2008). As Ukraine has been influenced by both western and eastern Europe (Varnum et al., 2008), globally it fits in the middle of the analytic-holistic continuum with West Europeans and North Americans being most analytic and East Asians being most holistic.

We hypothesize that Ukrainian participants will place higher importance on statements about the context of eating due to a stronger collectivism orientation than American respondents. We do not have expectations about cross-country differences in perceived importance of dietary content, as our context and content dimensions do not necessarily form a single dimension whereby higher importance on context would decrease the importance of content. However, we include content-based views of healthiness as well as an additional scale- importance of food naturalness- as a check on differences in acquiescence bias (the tendency to agree with all questions) between the U.S. and Ukraine (Smith, 2004). In study 1 we conduct in-person interviews to collect statements that reflect both the content and context of a diet. We then measure perceived importance of these statements for weight loss. In study 2 we additionally measure

individual-level collectivism level and test for mediation to assess if collectivism predicts perceived importance of context above differences in nationality.

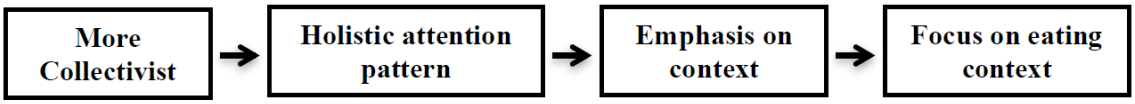


Figure 1. Hypothesis: Individuals who score higher on collectivism also have a more holistic pattern of attention, characterized by emphasizing the context of a given situation; they thus place more importance on the context of eating.

Study 1

Sampling

U.S. survey participants (n=50) were recruited by disseminating study information via various online interest groups (e.g. outdoor activity, music, local food on www.Facebook.com and www.Meetup.com) and providing the survey link to graduate and undergraduate students across a number of departments (linguistics, kinesiology, music) at Indiana University and Arizona State University. Ukrainian respondents (n=41) were recruited at local small businesses and stores (respondents included both owners and employees) in eastern Russian-speaking Ukraine (Dnepropetrovsk, Harkiv, and Odessa). The mean age for the U.S. sample was 32 (SD= 11.9; 60% female) and 34.2 for Ukraine (SD= 12.9; 64% female). All participants received an information letter with study details; agreeing to the interview or completing the survey constituted informed consent. The study was approved by the Arizona State University IRB (#1304009147).

Procedure and materials

Surveys. Surveys were collected during June-July 2013 in both the U.S. and Ukraine and recorded demographic information (age, self-reported weight and height, family income, and education levels) in addition to the main measures discussed further.

After piloting the surveys on several American and Ukrainian respondents, the final version was translated (and reverse-translated) into Russian for the Ukrainian sample (Russian is the dominant language in Eastern Ukraine).

Eating Context and Content Scale. The Eating Context Scale was developed with information derived from open-ended interviews on healthy eating perceptions in the U.S. and Ukraine. Interviews were conducted during May 2013 (Phoenix, Arizona) and June 2013 (Dnepropetrovsk, Ukraine) on American (n=5) and Ukrainian (n=5) respondents. MV interviewed the respondents in their native languages (English and Russian). The semi-structured interviews included questions on healthy eating topics, such as "what does healthy eating mean to you" and "what and how should one eat to stay in good health". The specific goal of the interviews was to elicit statements about eating context or the ways one eats (in addition to *what* one eats) that may lead to poor health. These statements were used to construct the "content" and "context" statements for the surveys, in addition to the beliefs collected by Fisher and Dubé (2011) on American eating norms. Fisher and Dubé created a list of 18 norms of what Americans typically believe were appropriate or desirable when eating. Based on the interviews and the Fisher and Dube items, thirteen contextual statements comprised the final Context Scale (Cronbach's alpha = 0.77) and eleven intrinsic food statements comprised the Content Scale (Cronbach's alpha = 0.74).

Respondents were asked to rate how important each practice described in the statements was in contributing to weight loss (from not important at all to very important). We chose weight loss as the outcome because other health-related issues (e.g. chronic) appeared harder for respondents to discuss.

Table 1
Statements Comprising the Context and Content Scales

Context	Intrinsic
Avoid snacking between meals*	Reduce foods high in sugar
Always eat breakfast*	Reduce foods high in fat
Not eat more than others around you*	Include more vegetables
Not eat in front of the TV	Reduce meat consumption
Chew food slowly*	Avoid food high in sodium
Avoid combining meat and grains	Avoid foods with a long shelf life
Avoid eating protein late in the day	Eat more fish
Eat small meals often through the day	Include more dairy
Have set times for meals	Avoid GMO foods
Avoid foods fried in oil	Keep away from fast food places
Eat all foods but in moderation*	Replace sugary beverages with water
Eat sweets only in 1st half of the day	
Eat at home rather than at a restaurant*	**-Fisher& Dubé (2011)*

Analysis

For all analysis in this work we use SPSS Version 22. To assess the inter-item reliability of the two scales we use Cronbach's alpha. For assessing the difference between perceived importance of contextual statements for Ukrainian and American respondents, we conduct a student T-test. To assess the effect of age and gender on context scores, we run a linear regression with nationality, gender and age as predictors. We use an alpha of 0.05 as the cut-off for statistical significance and Cohen's D as a measure of effect size.

Results

Ukrainian means for context and content are M=2.73 (SD= 0.56) and M=3.07 (SD= 0.56), respectively. American means are M=2.31 (SD= 0.55) for context and M=2.94 (SD= 0.51) for content. There is a significant correlation between content and context ($r = 0.65$, $p < 0.05$) which indicates that content concerns and context concerns

are not opposite poles of a single dimension. There is a statistically significant difference and a strong effect size between the context means for the two countries ($p < 0.001$; Cohen's $D = 0.84$), while no significant difference between content means is observed ($p > 0.05$), suggesting that the national differences in context concerns is not simply due to acquiescence bias. In the full sample, neither age nor gender are a significant predictor for contextual scores, and does not eliminate the effect of country on the importance of contextual statements.

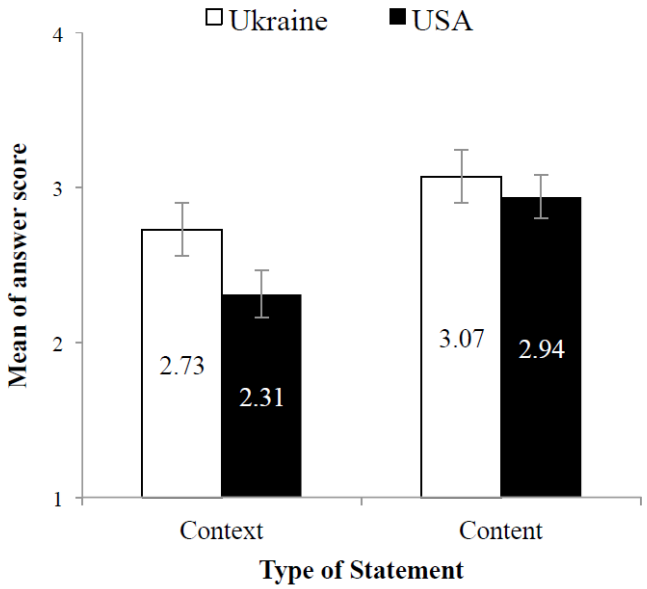


Figure 2. Mean importance scores for each scale between Ukrainian and American sample (Study 1). Bars indicate 95% confidence intervals.

As hypothesized, Ukrainians place more importance to contextual statements in our question on the significance of eating practices for weight loss. This difference might be due to more collectivist cognition in the Ukrainian sample as studies have shown that collectivist cultures possess a more holistic pattern of attention (Kuhnen et al., 2001). However, since individual levels of collectivism were not measured in this study, it is not

possible to determine if these differences are due to variation in collectivism or other factors. Study 2 addresses this concern by assessing individual-level collectivism.

Study 2

Sampling

Ukrainian participants (n=35) were recruited via convenience sampling at various businesses in Dnepropetrovsk, Ukraine (grocery stores, small business firms, factories). American participants (n=42) were obtained via Amazon Mechanical Turk (MTurk), a crowd sourcing system where tasks are given to anonymous "workers" for a small completion fee ($0.45 for the present survey). MTurk data has been shown to have comparable reliability and apparent validity to data collected with traditional recruitment methods (Buhrmester, Kwang, & Gosling, 2011). Surveys on MTurk included a test question indicating which online survey takers did not pay attention to survey instructions- those responses were eliminated from analysis. Sample characteristics are summarized in Table 2. Ukrainian and U.S. respondents did not have significant differences in education levels, BMI, age, and gender distribution.

The study was approved by the Arizona State University IRB (#1304009147). All participants received an information letter with study details; agreeing to the interview or completing the survey constituted informed consent.

Table 2
Sample Descriptives for Studies 1 and 2

	Summer 2013		Autumn 2014	
Descriptives	**Ukraine**	**USA**	**Ukraine**	**USA**
N	41	50	35	42
Age (mean)	34.2	32	40.1	42.4
SD	12.9	11.95	16	12
Females	64%	60%	54.3%	66.7%
BMI (all)	23.5	26.5	25.1	27.3
Male	25.4	27.2	25.8	27.3
Female	22.4	26.1	24.5	27.3

Procedure and Materials

Survey data collection took place during October 2014. The survey contained identical context and content scales from Study 1; it also measured naturalness- one's preference for natural foods, as an additional check on whether acquiescence bias can account for the cross-cultural differences.

Collectivism level was assessed via the Culture Orientation Scale (Triandis & Gelfand, 1998) measuring two dimensions of collectivism (vertical and horizontal). The scale consists of 16 items and respondents are asked to indicate how well each statement describes them with 1 being "never/definitely no" to 9 being "always/definitely yes". Triandis' method allows for differentiation between subtypes of collectivism- horizontal (HC) and vertical (VC). Vertical collectivists accept more inequality while horizontal perceive all members of the group as equal. However, a single scale including items from both scales had a higher reliability than either scale individually (HC: Cronbach's alpha =0.71; VC: Cronbach's alpha =0.59; Full scale: Cronbach's alpha =0.74*).* Thus, we used a single scale based on all 16 items.

Analysis

We assess national differences in the main outcome, context scale, the key predictor, collectivism, as well as the content and naturalness scales using student T-tests. To assess the inter-item reliability of scales we use Cronbach's alpha. For assessing the degree of collectivism on the individual level, we use the mean score for the cultural orientation scale. To test whether Ukrainian participants endorse context more due to higher levels of collectivism, we use a formal bootstrap mediation analysis (using PROCESS in SPSS; Hayes 2013) with Ukraine as predictor, collectivism as mediator, and the context scale as outcome. To assess whether the effect of collectivism is uniform across Ukrainian and American samples, we test an interaction between nationality and collectivism. To assess whether the relationship between collectivism and context is confounded by other covariates, we run a linear regression including age, gender, and BMI as independent variables in the regression to test whether collectivism remains a significant predictor after controlling for these factors. Finally, to assess whether the mediation by collectivism is not due to increased acquiescence bias, we test whether two other scales, which should suffer from similar acquiescence bias (content and naturalness), mediate the relationship between nationality and context (Smith, 2004). We use an alpha of 0.05 as the cut-off for statistical significance and Cohen's D as a measure of effect size.

Results

The key findings from Study 1 were replicated. The context and content, as well as the naturalness scales are moderately reliable—Cronbach's alpha is 0.77, 0.74, and 0.82 respectively. Once again, there is a significant correlation between content and

context (r = 0.68, p < 0.05) as well as naturalness with content (r = 0.31, p < 0.05) and with context (r = 0.24, p < 0.05). As before, Ukrainians place more importance on contextual statements (M= 2.96; SD= 0.57) than Americans (M= 2.61; SD= 0.37). There was a statistically significant difference and a strong effect size between the context means for the two countries (Cohen's D= 0.71; p< .005). There was no significant national difference between content or naturalness means (p> 0.05).

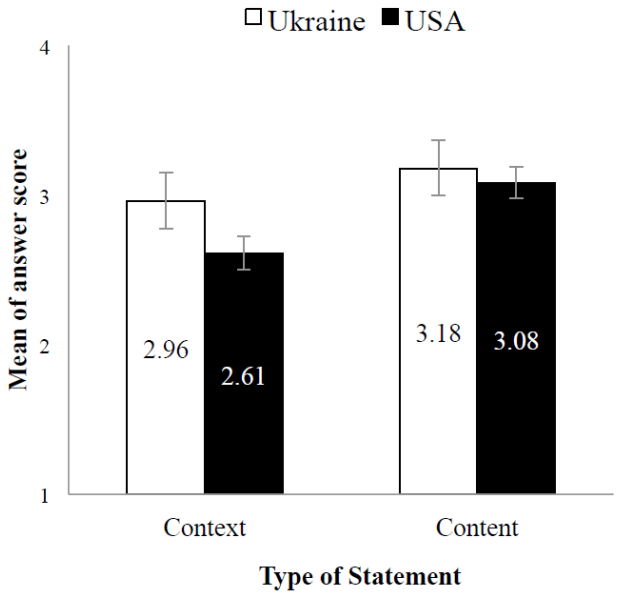


Figure 3. Mean importance scores for each scale between Ukrainian and American sample (Study 2). Bars indicate 95% confidence intervals.

Ukrainian respondents also score higher on collectivism (Cohen's D= 0.95; p < 0.001), and higher scores on collectivism accounted for 18% (R^2 = 0.18, p< .001) of the variance in the context scale. The interaction between country and collectivism are not significant (p > 0.10) which indicates the effect of collectivism is uniform in both societies, and the effect of collectivism on context remains significant when controlling for BMI, age, and gender in a regression model.

A formal mediation analysis shows a statistically significant indirect path of nationality on the context scale via collectivism (coefficient = 0.14, 95% CI = (0.05, 0.28), $p < 0.05$), with 41% of the effect mediated through this path. The same analysis with content and naturalness scales as potential mediators do not show statistically significant indirect paths, suggesting that mediation is not simply the result of acquiescence bias on Likert scales (see Figure 4).

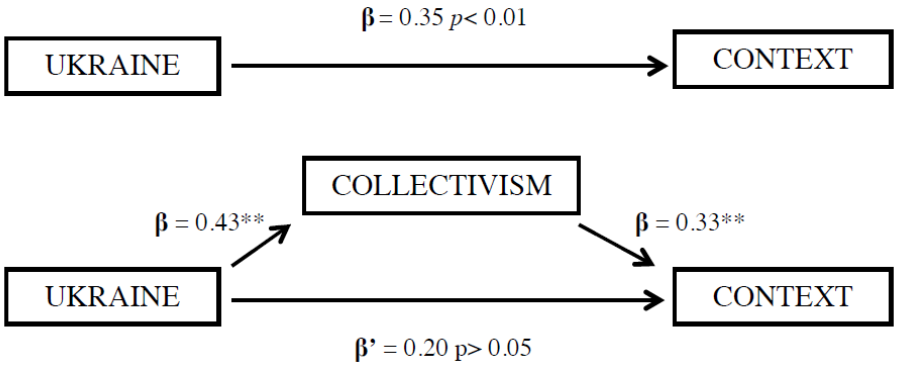


Figure 4. Mediation analysis. β: Direct effect of nationality on context scores. β': Direct effect of nationality on context after controlling for collectivism.

Discussion

The two studies show that Eastern Ukrainian respondents place more emphasis on the context of eating than American respondents in judgments about reducing weight. This effect of nationality is largely mediated by individual-level differences in collectivism with more collectivist respondents placing more importance on the context of eating. The results are consistent with prior work in other cognitive domains showing that individuals with higher collectivism pay more attention to context. We suggest that holistic thinking pattern associated with collectivism extends to the domain of food, where consideration of the total diet, the timing and "regimen" of eating, as well as

proper combination of foods become more important for those that think more holistically.

The contextual statements derived from our interviews and work by Fisher & Dubé (2011) are conceptually related to eating norms. These norms concerning styles, timing, and place of eating are termed "eating appropriateness standards" or (EAS) by De Ridder and colleagues (2013), who argue that such standards are a crucial determinant of eating behavior. EAS are shaped socially and culturally, internalized into people's everyday routines, and are influential due to their ingrained nature. The authors present a novel hypothesis that self-regulation of eating in a food-rich environment is compromised by a lack of clear, shared eating appropriateness standards that guide what, how much, where, and when we eat. It is worthwhile to further test whether attention to context might have beneficial outcomes (such as a lower BMI or decreased food anxiety). Having a set of contextual ideas about what healthy eating constitutes may be protective against fluctuations in nutrition information, thus lessening confusion and anxiety about eating healthily and lessening the burden of self-regulation amidst conflicting dietary advice on specific ingredients and nutrients. Lastly, future studies need to test the mechanism through which collectivism might affect judgments- specifically, the holistic thinking style of collectivist societies.

A potential alternative explanation for lower importance of eating context in the U.S. is differences in nutrition discourse styles between and within cultures- specifically, higher nutritionism among Americans. Scrinis (2008) writes that the ideology of nutritionism- a reductive approach to food that replaces other ways of engaging with it- has a strong presence in the US. The author also suggests that a nutritionism perspective

leads one to evaluate particular food products in isolation from other food items, diets, and contexts. This view of eating might explain why American respondents see context as less important. However, food content was highly important also for respondents in Ukraine (as evident in high content means for both countries), indicating that Ukrainians emphasize nutrients and individual foods just as much as Americans. In addition, the effect of collectivism on higher context endorsement was consistent in both cultures. It is thus unlikely that higher nutritionism among US respondents is responsible for lower endorsements of context statements.

Limitations of our studies include a small sample size and the non-representativeness of the samples. The lack of dietary measurement is also a constraint - it is unclear if Ukrainians in fact practice the food context norms they emphasize; thus we cannot make comments about the weight benefits of focusing on eating context. Lastly, while we assume that individuals who are highly collectivist also hold holistic thinking styles (as suggested in the literature), cognition styles need to be measured directly in future work.

Conclusion

Ample social science research shows that what counts as healthy eating varies both within and across cultures. These differences in people's interpretations not only focus on *what* one should eat (dietary content), but include considerations of *how* food should be consumed (eating context). However, there is little understanding of the reasons underlying such variation in lay beliefs. In this paper, we report on two studies: our first work demonstrates that Eastern Ukrainian respondents endorse considerations eating context significantly more than American participants. The second study tests a

hypothesis for such cross-cultural variation: specifically, we examine whether this difference can be attributed to variation in collectivism- a key dimension of cultural variation. Based on a mediation model, our findings suggest that Ukrainian respondents' greater endorsement of eating context as a factor in weight loss is largely mediated by individual-level variation in collectivism. More generally, these findings suggest that the holistic pattern of attention characteristic of the members of collectivist societies may extend to the domain of nutrition, resulting in a stronger focus on eating context.

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CHAPTER 7

CONCLUSIONS

This work set out to address the following gaps in the literature on lay perceptions of healthy eating: (a) lack of research examining the role of eating styles within lay models of healthy eating, (b) how beliefs about healthy styles of eating relate to beliefs about healthy food characteristics, and (c) lack of proposed explanations for why endorsement of eating styles (referred to as eating context in chapter 6) might vary across cultures.

RQ1 results confirm that beliefs on eating styles and on food characteristics are independent categories of beliefs within lay models of healthy eating, as participants naturally categorized statements along the food-style of eating distinction. In addition to treating eating style beliefs as a separate category of healthy eating, respondents also endorse such eating aspects as important for health at levels comparable to food-related beliefs for many health outcomes. These include weight management, avoiding long-term harm, good digestion, energy levels, and feeling well overall. On another hand, preventing specific chronic conditions or "disease" is a relevant outcome only for concerns about food characteristics.

Results from **RQ2** demonstrate that both Americans and Eastern Europeans endorse styles of eating for a range of health reasons: successful weight management, having good digestion and high energy levels, feeling well overall (both physically and mentally) and avoiding long-term harm to the body. Findings also show that individuals can hold contrasting models of how aspects of eating styles can affect health: for

instance, both American and Eastern European respondents held opposing views on whether skipping meals leads to weight gain or loss.

Finally, results from **RQ3** suggest that a key predictor of endorsement of eating styles (eating context) for health is a collectivist value orientation, and that this factor can account for differences between U.S. and Eastern European respondents. This further suggests that the holistic pattern of attention characteristic of highly collectivist cultures may extend to the domain of nutrition. Thus, an individual with a holistic cognition style may endorse healthy eating styles to a higher degree regardless of where this individual resides.

Implications

Social Science Research. This dissertation set out to examine the types of healthy eating perceptions that are *not* featured prominently is social science research. While prior work on lay beliefs indicated that aspects of "how" you consume food are indeed part of people's healthy eating models (Bisogni et al. 2012, Fisher & Dube, 2011; Akamatsu et al., 2005; Cakiroglu et al., 2008), there has been little effort for their in-depth examination in the literature. This may be due to the prevalence of the "nutritionism" paradigm in not only lay beliefs but also those of researchers, or because this nutritionism-dominated discourse on healthy eating has made it particularly hard to elicit and study other types of beliefs. Scrinis (2008) describes nutritionism as an understanding of food in terms of nutrients and its biochemical composition- a "reductive approach to food [that] has come to dominate, undermine, and replace other ways of engaging with food and of contextualizing the relationship between food and the body". Scrinis criticizes this view of eating as one that ignores broader diet and

contexts, promotes nutritional confusion, and fails to translate into meaningful dietary advice to the lay public. Journalist Michael Pollan has further popularized the concept of nutritionism, suggesting that it is a limiting view of healthy eating that confuses the public on how to eat well due to constantly changing and contrasting findings on which nutrients are "good" or "bad" (Pollan, 2008). Other scholars further suggest the importance of considering other "ways of knowing food" than those based on modern science alone: valuing the importance of how eating affects our body and senses, thus relying on personal expertise on what "feels" good to eat other than expert knowledge based on nutrition science (Murdy et al., 2014).

As chapter 5 confirmed, few respondents mention styles of eating when first defining "healthy eating" as a concept (15% of U.S. and 30% of Eastern European participants), while all participants mention aspects of food. However, the in-depth interviews helped reveal the different ways of "knowing" what healthy eating is and they were able to highlight the salience of eating styles for long-term wellbeing. Notably, discussions of how one consumes foods were rarely related to disease prevention- a major focus in nutritionism and beliefs about healthy food characteristics. Instead, participants mentioned how "the way" one eats influences one's quality of life— digestive health, levels of energy and resulting ability to "focus" and be productive, as well as general ability to live in a positive physical and mental state. These ways of personally "knowing" healthy eating in contrast to the expertise of nutrition science were central in everyday lives of respondents, supporting Murdy and colleague's (2014) point that different ways of knowing food can be important.

Survey methodology or even open-ended interviews might not capture this less salient yet important category of beliefs on healthy eating, which is perhaps why perceptions of healthy eating styles have not been researched as much as healthy food beliefs. A traditional anthropological approach, on another hand, can tap into such dimensions more successfully. For instance, the pile sorting techniques used in chapter 4 and prompting people's rationale for a variety of diverse statements in chapter 5 have allowed for an in-depth look into the two types of beliefs – food and eating styles- that comprise healthy eating. Existence of these two separate categories may indicate that people's internal representations of eating, or theories of food (Allen, 2012), hold information on not only the foods that one can and should consume, but also the ways in which one should consume them ensure health and wellbeing.

Health Promotion and Policy. As already mentioned, a "nutritionism" approach to healthy eating has received criticism as a simplified view that ignores other ways of engaging with food. Others have also suggested that a focus on aspects of food- such as nutrient profiles- and a decreasing focus on "how" we eat can be detrimental for health. De Ridder et al. (2013) write that having stronger social norms regulating eating styles and behaviors- when, where, and how much one eats- could help prevent overconsumption and thus be instrumental in obesity prevention. Authors suggest that certain eating style norms in particular (snacking and erosion of the traditional three set meals) are an important factor in the obesity epidemic, as a relaxation of the traditional meal patterns in an environment of plentiful calories removes limits on what a proper meal is and at what times it should be consumed. Health research shows that people are indeed rather ineffective at paying attention to how much they eat, termed

"consumption monitoring" (Wansink & Chandon, 2014). Thus, eating more often (even in the form of smaller meals or snacks) might result in overall excess of calories simply due to increase in the number of eating occasions. This concern with changing norms about proper eating styles is not new- Booth (1988) also suggested that "grazing" rather than traditional three-proper-meal pattern is an important factor in growing obesity rates. Chapter 4 survey results (chart 2 and supplementary material) show that American participants indeed might underestimate the importance of certain aspects oh "how" one eats for successful weight management, especially aspects relating to pacing and focus during meals.

Results also show that lay models do not appear to currently hold views on how eating styles can play a role in preventing disease. Since nutrition research has traditionally focused on nutrients in studying disease prevention, this is to be expected. However, recent focus on aspects of eating styles (e.g. patterns of meal intake, time of eating) in nutrition science demonstrates that "how" we eat may be a factor in obesity and related non-communicable diseases (McCrory et al. 2016; Garaulet et al. 2013; Garaulet et al. 2014 Oike et al., 2014; Berg&Forslund 2015; Bellisle, 2014). While more human research will be necessary to indicate aspects of eating styles with most potential for successful weight management and other health improvements, dietary recommendations and nutrition policy should begin considering the role of "how" people consume foods for health. One implication of this dissertation's findings is to incorporate advice on the importance of "mindful" food consumption, such as avoiding distractions while eating. Studies show that getting distracted during eating indeed makes us eat more, remember less of what we did eat, and consider ourselves as less

full (Bellisle et al. 2004; Hetherington et al. 2006). Eating with others increases consumption even more- by 30-60% (Herman & Polivy, 2005), and up to 75% when those others are friends and family (De Castro & Brewer, 1992). Thus, distractions appear to interfere with how well we monitor our food intake (Wansink & Chandon, 2014), the fact most respondents found unimportant.

Another possible implication is increasing emphasis on time of food intake, discouraging eating late in the evening not only as a good weight management strategy but also an important element of good quality of life (feeling well and avoiding digestive distress)- a relevant aspect of wellbeing that can motivate one to make changes in eating routines. While participants in both interviews and online surveys are aware of the belief that time of food intake can be important for weight control, it is not clear *to what extent* they believe this aspect of eating matters for preventing weight gain as such information is not provided via dietary recommendations or nutrition education efforts. Yet, such information is already available: research on time of food intake already indicates a number of negative health effects associated with poor time of eating: reduced glucose tolerance, increased blood pressure, and decrease in the satiety hormone leptin (Scheer et al. 2009). Such information can to be integrated in education on healthy eating strategy aside from advice on nutritional aspects of proper diets.

In conclusion, it appears that nutrition research is already taking note of how aspects of eating styles (referred to as “ways of eating”, “eating behaviors” or “pattern of intake”) are important considerations for weight management in addition to the specific foods consumed. As health studies examine to what extent and in which ways these different elements of eating might influence weight management and related health

outcomes, understanding people's narratives on the topic will help prepare successful policy and intervention strategies aimed at improving dietary behaviors. As this work has demonstrated, people's models of healthy eating can contain contrasting theories- e.g. some view snacking as beneficial for weight loss yet others see it as a factor in weight gain. Thus, understanding nuances of lay beliefs is crucial for effective and targeted public health efforts.

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APPENDIX A

INTERVIEW PROTOCOLS

1. Pile Sorting Activity (Chapter 4)

INTERVIEWER INITIALS: _____ Mapping Lay Theories of Healthy Eating- PROTOCOL

Hello.
Thank you for agreeing to be part of this study! Our work examines how people from different cultures think about food, eating, and health.

This interview takes about 1 hour and has 3 questions or activities. First, we will talk about your thoughts on healthy eating; then I'll have you read a number of cards that have opinions and thoughts about healthy eating from different sources- past interviews, other studies, from the media. I want to mention that we are simply interested in how people think, so there are no right or wrong answers.

I would like to record the interview so I could go over it later and catch any details I might miss today. Would that be ok? [Press record on your device; make sure it's recording]

Do you have any questions before we start? OK, let's begin.

1. OPEN-ENDED QUESTION

We all might have heard or read that how you eat is important for health. When *you* hear the words "healthy eating", what comes to mind for you?

[INPUT DATA] 

Prompt: OK, so let me summarize- you said...[read back what they just said] ... is there anything else you can think of? For example, how would you explain healthy eating to someone else?

[INPUT DATA] 

Great, thank you for your answers.
Now I will give you different statements about healthy eating that we collected from previous interviews, other studies, and mass media. These statements were printed out and put on cards. You'll see numbers on these cards- they don't mean anything and we just use them for administration purposes.

2. PILE SORTING

So, take the deck of cards and read them carefully. Once you're done, I'll ask you to sort the cards into piles.

Cards in one pile should be similar to each other and different from cards in other piles.

It is completely up to you how you sort them and there are no right or wrong ways to do it. For example, the number of piles is up to you (it could be 2 or 8, etc.) and you can take as much time as you need. The only other rules is that you do:

1. Not sort all cards into 1 pile. 2. Not sort every statement as its own pile 3. Not sort an item into more than 1 pile.

Also, please assign a title or main topic for each pile using the labels provided.

[Do you have any questions? *If they are confused, try not to bias respondent with examples. Just repeat – you have 42 cards here and you simply need to sort them into different piles (as many as you want) based on some similarity. Cards in 1 pile need to be somehow similar to each other and different from cards in other piles.]*



Take photo of pile sorts with titles

[Let respondent pile sort]

1. So, let's start with this pile (pick any and give it #1).
2. Why did you sort these cards together?
3. How would you name this pile?
4. Lastly, which card you think best represents this pile?

[INPUT DATA] 

Great, thank you. So now we have the last part of the interview left and it will be similar to the activity we just did. We will use the same cards with statements for this activity.

2. In-depth Prompts and Codebook (Chapter 5)

INTERVIEWER INITIALS: _____ Mapping Lay Theories of Healthy Eating- PROTOCOL

In-Depth Prompts *[check that your recorder is still recording!]*

Step 1

We are using the same 42 cards for this next activity. This time, I will ask you to sort the same cards into only three piles: a pile for statements you tend to disagree with (on the left), a pile for cards you tend to agree with (on the right), and a pile for the rest (in the middle). Please use the three labels "AGREE", "NEUTRAL", and "DISAGREE".

Ok, great. So I will ask you a couple of questions about your decisions:

1. Please explain why you agree most with the statements you have placed under Agree
   a. Why did you agree? How is this important for healthy? In which way?
2. Please explain why you disagree most with the statements you have placed under Disagree
   a. Why did you agree? How is this important for healthy? In which way?
3. Were there any other interesting statements that you would like to comment on?

[INPUT DATA] 

Extra Prompts *[check that your recorder is recording!]*

OK great, thank you. I asked you about the statements you most agree and disagree with, not I'll just ask you to comment about some of the other cards.

[if respondent placed one of these cards under +3 or -3 and already discussed, you can skip. If they didn't go into much detail on "why" they placed them, feel free to use these prompts]

#	Statement on Card	IF AGREE	IF DISAGREE
39	It's important to have a diet that is balanced and has a lot of variety in it	1. What does a "balanced" diet mean? [...] Can you give an example of a balance diet or meal? 2. What does it mean to "have a lot of variety", can you give an example?	1. Do you think other people might think this/these are important? Why? 2. Why would you disagree with them?
	Some foods are so unhealthy, that they are not good to eat even in moderation	1. What are some examples of foods that one might want to moderate? 2. For this food (ask about each they named), what's a good moderate amount to eat? (e.g. how many times a week or month?)	
19	It's important to examine labels when shopping for food	1. What kinds of information do you look for on labels? [...] 2. What information is important to you?	
2	It's important not to rush when you're eating	Why do you think avoiding rushing or distractions might be important?	
5	It's important to not be distracted during meals		

INTERVIEWER INITIALS: _____ Mapping Lay Theories of Healthy Eating- PROTOCOL

33	It's important to avoid certain foods or food ingredients entirely	1. What kinds of things do you think one should avoid? 2. Why should these things be avoided?
23	It's important to not eat heavy meals late in the day	1. Why do you think timing of eating could be important? 2. How might it affect how you feel, how might it affect your health?
29	It's important to eat your biggest meals earlier in the day	
35	It's important to eat three main meals a day	1. Why do you think eating 3 meals (or more smaller meals) is better? 2. Do you think skipping meals is bad for health? How?
12	It's important to eat small meals often throughout the day	
3	It's important to not skip meals	Do you think skipping meals is bad for health? How?
13	It's important to eat the foods we as humans have evolved to eat	1. So what do you think we have evolved to eat? 2. Any examples of what we did NOT evolve to eat?
32	It's good to sometimes miss meals and let your body rest from eating	1. Why do you think this is good? 2. What would some of the benefits be?

3. Statements (n=42) used for interviews and pile sorts (Chapters 4 and 5)

Card #	Statement
1	It's important to avoid overeating, even on special occasions
2	It's important to not worry about what you eat
3	It's important to not eat in front of the TV
4	It's important to not overeat just to be sociable
5	It's important to chew your food well
6	It's important to always eat breakfast
7	It's important to have set times for meals
8	It's important to avoid snacking between meals
9	It is important to avoid eating late in the day
10	It is important to eliminate certain unhealthy foods from a diet
11	It's important to read labels on the foods you buy to see if they are healthy for you
12	It's very important to make sure the food you eat is low in fat
13	It's important to make sure the food you eat is organic (ecologically clean)
14	It's important to avoid foods with unnatural ingredients
15	It's not necessary to watch calories as long as the food you eat is healthy
16	It's important to use healthy cooking methods (like steaming) when preparing foods

17	It's important to limit foods and drinks high in calories, fat, sugar, or salt
18	It’s important to avoid genetically modified foods
19	It’s important to celebrate food with a relaxed attitude & take my time to enjoy meals
20	It's important not to eat when you're in a rush
21	It’s important to eat the right number of calories for how active you are, so that you can balance the energy consumed with the energy you use
22	Some foods are so unhealthy, that they are not good to eat even in moderation
23	It’s important to never deny yourself any particular food, but never eat excessively (too much)
24	It's important to make sure the food you eat is fresh
25	Good food, made at home with care and love, is as important as healthy eating
26	All foods are good for health because they give you energy
27	It’s important to not eat heavy meals late in the day
28	It’s important to eat foods that are whole and not processed
29	It’s important not to drink water with meals
30	It’s important to choose foods that are natural and not made by humans
31	It important to avoid combining heavy foods in one meal (like meat and grains)
32	Both plant-based and animal products are necessary in one’s diet
33	It’s important to not eat more than others around you
34	It's important to eat less animal products (meat, dairy)
35	It’s important to not be distracted during meals
36	I think that how much you eat is more important than what you eat
37	I think it’s important to not skip meals
38	It’s important to be relaxed and/or in a good mood when you eat
39	It’s good to eat foods with added vitamins and minerals
40	It’s good to eat foods with reduced fat or sugar content
41	Some foods are very healthy for you, even if you overeat them
42	All nutrients- fats, carbohydrates, and proteins- are crucial for good health

4. Interview Analysis Codebook (Chapter 5)

THEME: CONTEXT		
Code in MaxQDA	Description of Code	Examples
Context_Weight (1)	Something about eating context (timing, patterns, mood, etc.) results in weight gain or loss; makes it easier/harder to manage weight	Snacking between meals will make you just eat too much in one day
Context_Energy (2)	Context affects you being more/less energetic (not the metabolism of energy e.g. sugar gives you "quick" energy)	Eating often makes sure you have energy through the day
Context_Feel (3)	Something about "how" you consume foods effects how you feel in non-specific terms (e.g. feeling well). FEELING HUNGER/SATIETY.	When I eat before going to bed I don't feel very good the next day
Context_Digest (4)	Context affects your digestion- so you experience digestive issues. INCLUDES: stomach ache, bloatedness, heavy stomach.	If you eat late at night, you could get bloated and uncomfortable
Context_Disease (5)	Context affects risk of future disease (specific diseases or conditions mentioned)	Ff you skip meals, the body will eat at the stomach lining causing ulcers
Context_BodyHarm (6)	Context has negative/positive effect on the body- how it functions, how it operates	If you constantly eat at night, your body doesn't have time to self-repare and it could lead to health problems later;
THEME: CONTENT		
Code in MaxQDA	Description of Code	Examples
Content_Weight (8)	Something about the content of a diet (foods, nutrients, additives) makes you gain or lose weight	When you eat something sugary, you tend to overeat it because it doesn't make you full
Content_Energy (9)	Something about content (food, nutrients, additives) affects how much energy one has/ whether one feels energetic	Eating fatty meats makes me sluggish
Content_Feel (10)	FEEL includes feeling well, FEELING HUNGER/SATIETY, feeling not great, etc. Anything not specific. *If feeling related to*	
Content_Digestion (11)	Something about foods and their characteristics leads to digestive issues (or lack of them). INCLUDES: stomach ache, bloatedness, heavy	Eating processed foos gives you digestive problems - your stomach feels heavy
Content_Disease (12)	Something about food and its characteristics increases/decreases risk of getting a disease/illness/ailment	Eating sugary foods can lead to diabetes
Content_BodyHarm (13)	harms the body, but this harm is not a specific disease	Eating too much sugar makes your body function badly

APPENDIX B

SURVEYS

1. Attribute Rating Survey (Chapter 4). Used for PROFIT analysis

Thank you for taking the time to participate in this short survey!



Remember there are no right or wrong answers as we are looking at how people understand different eating considerations.
Length: <10 minutes

To move to the next page, click the Submit button (>>) on the bottom right.

Main questions

Please carefully read these statements about eating. We will ask you to indicate what you think these statements are about.

For each statement, we will ask you to what degree:

1) They discuss characteristics of the foods one eats
(this might include anything related to the food product itself)

2) They discuss How food is eaten
(this might include one's patterns and habits of eating, the context of meals)

3) They represent sound healthy eating advice
(based on your personal opinion)

For each statement, to what degree do they focus on the characteristics of the foods one might eat? ***(this might include anything related to the food products themselves)***

"These statements focus on characteristics of the FOODs"

	Not at all	A little	A moderate amount	A lot	A great deal

All foods are good for health because they give you energy	○	○	○	○	○
Eat fewer animal products (meat, dairy)	○	○	○	○	○
Don't skip meals	○	○	○	○	○
Make sure the food you eat is low in fat	○	○	○	○	○
Limit foods and drinks high in calories, fat, sugar, or salt	○	○	○	○	○
Some foods are so unhealthy, that they are not good to eat even in moderation	○	○	○	○	○
Have set times for meals	○	○	○	○	○
Never deny yourself any particular food, but never eat excessively (too much)	○	○	○	○	○

	Not at all	A little	A moderate amount	A lot	A great deal
Don't eat heavy meals late in the day	○	○	○	○	○
Don't watch calories as long as the food you eat is healthy	○	○	○	○	○
Don't be distracted during meals	○	○	○	○	○
Avoid combining heavy foods in one meal (like meat and grains)	○	○	○	○	○
Make sure the food you eat is fresh	○	○	○	○	○
Avoid genetically modified foods	○	○	○	○	○
Both plant-based and animal products are necessary in one's diet	○	○	○	○	○
Chew your food well	○	○	○	○	○

	Not at all	A little	A moderate amount	A lot	A great deal
Read labels on the foods you buy to see if they are healthy for you	○	○	○	○	○
Don't eat in front of the TV	○	○	○	○	○
Don't eat more than others around you	○	○	○	○	○
Always eat breakfast	○	○	○	○	○
Eliminate certain unhealthy foods from a diet	○	○	○	○	○
Eat foods with added vitamins and minerals	○	○	○	○	○
Avoid foods with unnatural ingredients	○	○	○	○	○
Keep track of the amount of proteins/fats/carbs in your food	○	○	○	○	○

	Not at all	A little	A moderate amount	A lot	A great deal
Avoid overeating even on special occasions	○	○	○	○	○
Don't worry about what you eat	○	○	○	○	○
Avoid eating late in the day	○	○	○	○	○
Some foods are very healthy for you, even if you overeat them	○	○	○	○	○
Don't eat when you're in a rush	○	○	○	○	○
Avoid snacking between meals	○	○	○	○	○
Eat the right number of calories for how active you are	○	○	○	○	○
Eat foods with reduced fat or sugar content	○	○	○	○	○

	Not at all	A little	A moderate amount	A lot	A great deal
Eat small meals often throughout the day	○	○	○	○	○
Eat foods that are whole and not processed	○	○	○	○	○
Don't drink water with meals	○	○	○	○	○
All nutrients (fats, carbohydrates, proteins) are crucial for good health	○	○	○	○	○
Make sure the food you eat is organic	○	○	○	○	○
Good food is one made at home with care and love	○	○	○	○	○
How much you eat is more important than what you eat	○	○	○	○	○
Keep track of calories	○	○	○	○	○

	Not at all	A little	A moderate amount	A lot	A great deal
Be relaxed and in a good mood when you eat	○	○	○	○	○
Don't overeat just to be sociable	○	○	○	○	○
Have a balanced diet	○	○	○	○	○
Celebrate food with a relaxed attitude and take time to enjoy meals	○	○	○	○	○
Use healthy cooking methods (like steaming) when preparing foods	○	○	○	○	○
Choose foods that are natural and not made by humans	○	○	○	○	○

OPTIONAL: if you have any comments about any of your answers so far, feel free to write them here:

For each statement, to what degree do they focus on <u>how</u> food is eaten?

(One's patterns and habits of eating, the context of meals)

"These statements focus on HOW food is eaten"

	Not at all	A little	A moderate amount	A lot	A great deal
All foods are good for health because they give you energy	○	○	○	○	○
Always eat breakfast	○	○	○	○	○
Keep track of the amount of proteins/fats/carbs in your food	○	○	○	○	○
Be relaxed and in a good mood when you eat	○	○	○	○	○
Chew your food well	○	○	○	○	○
Both plant-based and animal products are necessary in one's diet	○	○	○	○	○
Eat foods with added vitamins and minerals	○	○	○	○	○
Use healthy cooking methods (like steaming) when preparing foods	○	○	○	○	○

	Not at all	A little	A moderate amount	A lot	A great deal
	Not at all	A little	A moderate amount	A lot	A great deal
Good food is one made at home with care and love	○	○	○	○	○
Don't eat in front of the TV	○	○	○	○	○
Avoid genetically modified foods	○	○	○	○	○
Celebrate food with a relaxed attitude and take time to enjoy meals	○	○	○	○	○
Avoid snacking between meals	○	○	○	○	○
Keep track of calories	○	○	○	○	○
Don't be distracted during meals	○	○	○	○	○
Make sure the food you eat is organic	○	○	○	○	○
	Not at all	A little	A moderate amount	A lot	A great deal
Don't worry about what you eat	○	○	○	○	○
All nutrients (fats, carbohydrates, proteins) are crucial for good health	○	○	○	○	○
Limit foods and drinks high in calories, fat, sugar, or salt	○	○	○	○	○
Don't eat when you're in a rush	○	○	○	○	○
Don't skip meals	○	○	○	○	○
Eat foods with reduced fat or sugar content	○	○	○	○	○
Don't eat more than others around you	○	○	○	○	○
Make sure the food you eat is low in fat	○	○	○	○	○
	Not at all	A little	A moderate amount	A lot	A great deal
Have a balanced diet	○	○	○	○	○
Don't overeat just to be sociable	○	○	○	○	○
Avoid foods with unnatural ingredients	○	○	○	○	○
Don't drink water with meals	○	○	○	○	○
Eat small meals often throughout the day	○	○	○	○	○
Don't watch calories as long as the food you eat is healthy	○	○	○	○	○
Eat foods that are whole and not processed	○	○	○	○	○
Some foods are so unhealthy, that they are not good to eat even in moderation	○	○	○	○	○
	Not at all	A little	A moderate amount	A lot	A great deal
Never deny yourself any particular food, but never eat excessively (too much)	○	○	○	○	○
Choose foods that are natural and not made by humans	○	○	○	○	○
Eliminate certain unhealthy foods from a diet	○	○	○	○	○
Eat the right number of calories for how active you are	○	○	○	○	○
Avoid eating late in the day	○	○	○	○	○

	Not at all	A little	A moderate amount	A lot	A great deal
Read labels on the foods you buy to see if they are healthy for you	○	○	○	○	○
Eat fewer animal products (meat, dairy)	○	○	○	○	○
Avoid overeating even on special occasions	○	○	○	○	○
	Not at all	A little	A moderate amount	A lot	A great deal
Have set times for meals	○	○	○	○	○
Some foods are very healthy for you, even if you overeat them	○	○	○	○	○
Avoid combining heavy foods in one meal (like meat and grains)	○	○	○	○	○
Make sure the food you eat is fresh	○	○	○	○	○
Don't eat heavy meals late in the day	○	○	○	○	○
How much you eat is more important than what you eat	○	○	○	○	○

OPTIONAL: if you have any comments about any of your answers so far, feel free to write them here:

Finally, please indicate for each statement to what degree they represent sound healthy eating advice?

Here, we ask about your personal opinion- what *you* think is good advice.

These statements represent sound healthy eating advice

	Not at all	A little	A moderate amount	A lot	A great deal
Avoid overeating even on special occasions	○	○	○	○	○
Don't eat in front of the TV	○	○	○	○	○
Have a balanced diet	○	○	○	○	○
Chew your food well	○	○	○	○	○
Be relaxed and in a good mood when you eat	○	○	○	○	○
Both plant-based and animal products are necessary in one's diet	○	○	○	○	○
Keep track of calories	○	○	○	○	○
Some foods are so unhealthy, that they are not good to eat even in moderation	○	○	○	○	○
	Not at all	A little	A moderate amount	A lot	A great deal
Don't skip meals	○	○	○	○	○
Don't eat more than others around you	○	○	○	○	○

	Not at all	A little	A moderate amount	A lot	A great deal
Eat fewer animal products (meat, dairy)	○	○	○	○	○
Make sure the food you eat is low in fat	○	○	○	○	○
Never deny yourself any particular food, but never eat excessively (too much)	○	○	○	○	○
Make sure the food you eat is fresh	○	○	○	○	○
Eliminate certain unhealthy foods from a diet	○	○	○	○	○
Keep track of the amount of proteins/fats/carbs in your food	○	○	○	○	○

	Not at all	A little	A moderate amount	A lot	A great deal
Eat foods with reduced fat or sugar content	○	○	○	○	○
Eat small meals often throughout the day	○	○	○	○	○
Read labels on the foods you buy to see if they are healthy for you	○	○	○	○	○
Celebrate food with a relaxed attitude and take time to enjoy meals	○	○	○	○	○
Make sure the food you eat is organic	○	○	○	○	○
Have set times for meals	○	○	○	○	○
Good food is one made at home with care and love	○	○	○	○	○
All foods are good for health because they give you energy	○	○	○	○	○

	Not at all	A little	A moderate amount	A lot	A great deal
Limit foods and drinks high in calories, fat, sugar, or salt	○	○	○	○	○
Don't eat when you're in a rush	○	○	○	○	○
Avoid snacking between meals	○	○	○	○	○
Eat foods with added vitamins and minerals	○	○	○	○	○
Always eat breakfast	○	○	○	○	○
Eat foods that are whole and not processed	○	○	○	○	○
Don't drink water with meals	○	○	○	○	○
Some foods are very healthy for you, even if you overeat them	○	○	○	○	○

	Not at all	A little	A moderate amount	A lot	A great deal
Don't watch calories as long as the food you eat is healthy	○	○	○	○	○
Don't be distracted during meals	○	○	○	○	○
All nutrients (fats, carbohydrates, proteins) are crucial for good health	○	○	○	○	○
How much you eat is more important than what you eat	○	○	○	○	○
Eat the right number of calories for how active you are	○	○	○	○	○
Avoid genetically modified foods	○	○	○	○	○
Don't worry about what you eat	○	○	○	○	○
Avoid foods with unnatural ingredients	○	○	○	○	○

	Not at all	A little	A moderate amount	A lot	A great deal
	Not at all	A little	A moderate amount	A lot	A great deal
Choose foods that are natural and not made by humans	○	○	○	○	○
Don't eat heavy meals late in the day	○	○	○	○	○
Use healthy cooking methods (like steaming) when preparing foods	○	○	○	○	○
Avoid eating late in the day	○	○	○	○	○
Don't overeat just to be sociable	○	○	○	○	○
Avoid combining heavy foods in one meal (like meat and grains)	○	○	○	○	○

OPTIONAL: if you have any comments about any of your answers so far, feel free to write them here:

Demographics

Please indicate gender:

- ○ Male
- ○ Female

Type in your age using numbers only (for example: 25)

I care about eating a healthy diet

- ○ Strongly agree
- ○ Somewhat agree
- ○ Neither agree nor disagree
- ○ Somewhat disagree
- ○ Strongly disagree

Type in your height in feet and inches (use only numbers)
Example:

Feet: 5
Inches: 7

Feet

Inches

Type in your weight to the nearest pound (for example: 175)

In the past 3 months, have you tried to lose weight?

- Yes
- No

This is your survey code. Copy and paste this code into Mturk

${e://Field/random}

THANK YOU

for your time and being part of our work!
Below is optional space in case you wanted to comment on something the survey did not address.
Click [>>] BUTTON on the bottom right TO SUBMIT

2. Health Outcomes Survey (Chapter 4)

Welcome

Instructions: Please read the statements **carefully** and reflect on what they mean to you before making your choices.

Keep in mind: **there are no wrong answers**, since we are simply looking for your opinion.

(Survey duration: < 10 minutes)

(click on [>>] button on bottom right to proceed)

The 27 statements below talk about food and eating. People might have different opinions on them- some think they can affect health in some ways, while others don't think they are important.

Please indicate whether <u>you personally</u> think they are important for one's health.

If you think a statement ***is*** important, select **ALL** of the reasons why, in your opinion. *You can select multiple reasons.*

	This behavior is important for:				
	A healthy weight	Preventing chronic health problems	Good digestion	Feeling energetic	It's NOT important
Not eating before bedtime	☐	☐	☐	☐	☐
Avoiding foods with unnatural ingredients	☐	☐	☐	☐	☐
Keeping track of the amount of proteins/fats/carbs in your food	☐	☐	☐	☐	☐
Not snacking in the evenings	☐	☐	☐	☐	☐
Keeping track of your calories	☐	☐	☐	☐	☐
Not being distracted during meals	☐	☐	☐	☐	☐
Examining labels when shopping for food	☐	☐	☐	☐	☐

	This behavior is important for:				
	A healthy weight	Preventing chronic health problems	Good digestion	Feeling energetic	It's NOT important
	A healthy weight	Preventing chronic health problems	Good digestion	Feeling energetic	It's NOT important
Limiting carbs in your diet	☐	☐	☐	☐	☐
Eating foods that are whole and not processed	☐	☐	☐	☐	☐
Avoiding trans fat in your diet	☐	☐	☐	☐	☐
Eating breakfast	☐	☐	☐	☐	☐
Avoiding high fructose corn syrup	☐	☐	☐	☐	☐
Eating three main meals a day	☐	☐	☐	☐	☐
Avoiding saturated fat	☐	☐	☐	☐	☐
	A healthy weight	Preventing chronic health problems	Good digestion	Feeling energetic	It's NOT important
Chewing food slowly	☐	☐	☐	☐	☐
Being relaxed and in a good mood when you eat	☐	☐	☐	☐	☐
Please check only "Good Digestion" option to indicate your attention	☐	☐	☐	☐	☐
Not eating late in the day	☐	☐	☐	☐	☐
Choosing natural foods	☐	☐	☐	☐	☐
Not snacking between meals	☐	☐	☐	☐	☐
Limiting animal products in your diet	☐	☐	☐	☐	☐
	A healthy weight	Preventing chronic health problems	Good digestion	Feeling energetic	It's NOT important
Avoiding genetically modified foods	☐	☐	☐	☐	☐
Not skipping meals	☐	☐	☐	☐	☐
Eating small meals often throughout the day	☐	☐	☐	☐	☐
Not rushing when you're eating	☐	☐	☐	☐	☐
Limiting sugar in your diet	☐	☐	☐	☐	☐

	This behavior is important for:				
	A healthy weight	Preventing chronic health problems	Good digestion	Feeling energetic	It's NOT important
Making sure the food you eat is organic	☐	☐	☐	☐	☐
Having set times for meals	☐	☐	☐	☐	☐

OPTIONAL: any comments about any of your choices so far

You indicated that "Examining labels when shopping for food" is important to you. Please indicate the kind of information you look for on labels (you can choose multiple):

- ☐ Calories
- ☐ Sugars
- ☐ Fats
- ☐ Protein
- ☐ Sodium
- ☐ Vitamins
- ☐ Additives
- ☐ Organic label
- ☐ Genetically modified ingredients
- ☐ Other:

Last long question!

Think about your **own** lifestyle- how easy or difficult is it to perform these behaviors on a daily basis?

	Extremely easy	Somewhat easy	Neither easy nor difficult	Somewhat difficult	Extreme difficult
» Keeping track of your calories	○	○	○	○	○
» Eating three main meals a day	○	○	○	○	○
» Not snacking between meals	○	○	○	○	○

	Extremely easy	Somewhat easy	Neither easy nor difficult	Somewhat difficult	Extreme difficult
» Not eating before bedtime	○	○	○	○	○
» Being relaxed and in a good mood when you eat	○	○	○	○	○
» Limiting sugar in your diet	○	○	○	○	○
» Limiting animal products in your diet	○	○	○	○	○

	Extremely easy	Somewhat easy	Neither easy nor difficult	Somewhat difficult	Extreme difficult
» Avoiding genetically modified foods	○	○	○	○	○
» Not eating late in the day	○	○	○	○	○
» Eating breakfast	○	○	○	○	○
» Eating foods that are whole and not processed	○	○	○	○	○
» Avoiding high fructose corn syrup	○	○	○	○	○
» Examining labels when shopping for food	○	○	○	○	○
» Not being distracted during meals	○	○	○	○	○

	Extremely easy	Somewhat easy	Neither easy nor difficult	Somewhat difficult	Extreme difficult
» Eating small meals often throughout the day	○	○	○	○	○
» Not snacking in the evenings	○	○	○	○	○
» Choosing natural foods	○	○	○	○	○
» Not skipping meals	○	○	○	○	○
» Making sure the food you eat is organic	○	○	○	○	○
» Having set times for meals	○	○	○	○	○
» Limiting carbs in your diet	○	○	○	○	○

	Extremely easy	Somewhat easy	Neither easy nor difficult	Somewhat difficult	Extreme difficult
» Avoiding saturated fat	○	○	○	○	○
» Keeping track of the amount of proteins/fats/carbs in your food	○	○	○	○	○

	Extremely easy	Somewhat easy	Neither easy nor difficult	Somewhat difficult	Extreme difficult
» Avoiding trans fat in your diet	○	○	○	○	○
» Chewing food slowly	○	○	○	○	○
» Not rushing when you're eating	○	○	○	○	○
» Avoiding foods with unnatural ingredients	○	○	○	○	○

OPTIONAL: any comments about any of your choices so far:

Finally, please answer some questions about yourself.
Please remember all answers are completely anonymous!

Are you currently trying to:

- ○ Lose weight
- ○ Stay the same weight
- ○ Gain weight
- ○ I am not trying to do anything about my weight

I care about eating a healthy diet:

- ○ Strongly agree
- ○ Somewhat agree
- ○ Neither agree nor disagree
- ○ Somewhat disagree
- ○ Strongly disagree

Type in your age using numbers only (for example: 25)

Please indicate gender:

- ◯ Male
- ◯ Female

Type in your height in feet and inches (use only numbers)
Example:
Feet: 5
Inches: 7

Feet
Inches

Type in your weight to the nearest pound (for example: 175)

Please indicate the highest level of school you have completed:

- ◯ Some high school
- ◯ High school graduate
- ◯ Some college (or in progress)
- ◯ College degree
- ◯ Graduate school (in progress)
- ◯ Graduate degree /professional
- ◯ OTHER:

3. Endorsement of Healthy Eating Statements in U.S. and Eastern Europe (Chapter 6)



English | Русский

Default Question Block

The following survey is conducted by Arizona State University, School of Human Evolution and Social Change.



Principal Investigators: Daniel Hruschka, PhD; Mariya Voytyuk, PhD student.

We greatly appreciate you taking the time to reply to our survey. Your honest opinions are very important to us- there are no wrong or right answers!
Please read all instructions carefully.



We will be asking you about your opinions on food and health.The survey will take you 12-15 minutes to complete and consists of questions about food and eating, followed by some questions about yourself.

To move to the next page, click the Submit button (>>) on the bottom right.

In 2 or 3 sentences, please write down what healthy eating means to you. Please be as specific as possible.
(There are no right or "good" answers! Just write what eating healthfully means to you personally.)

For each statement, please indicate how well it describes you with 9 being Definitely Yes/Always

	1= Never or Definitely No								9= Always or Definitely Yes
	1 (No)	2	3	4	5	6	7	8	9 (Yes)
When another person does better than I do, I get tense and aroused	○	○	○	○	○	○	○	○	○
I'd rather depend on myself than others	○	○	○	○	○	○	○	○	○
Competition is the law of nature	○	○	○	○	○	○	○	○	○
Parents and children must stay together as much as possible	○	○	○	○	○	○	○	○	○
It is important that I do my job better than others	○	○	○	○	○	○	○	○	○
The well-being of my coworkers is important to me	○	○	○	○	○	○	○	○	○
It is important to me that I respect the decisions made by my groups	○	○	○	○	○	○	○	○	○
I feel good when I cooperate with others	○	○	○	○	○	○	○	○	○
My personal identity, independent of others, is very important to me	○	○	○	○	○	○	○	○	○
If a coworker gets a prize, I would feel proud	○	○	○	○	○	○	○	○	○
Winning is everything	○	○	○	○	○	○	○	○	○
To me, pleasure is spending time with others	○	○	○	○	○	○	○	○	○
I often do "my own thing"	○	○	○	○	○	○	○	○	○
I rely on myself most of the time, I rarely rely on others	○	○	○	○	○	○	○	○	○
It is my duty to take care of my family, even when I have to sacrifice what I want	○	○	○	○	○	○	○	○	○
Family members should stick together, no matter what sacrifices are required	○	○	○	○	○	○	○	○	○
	1 (No)	2	3	4	5	6	7	8	9 (Yes)

How IMPORTANT do you think each of the practices is in contributing to WEIGHT LOSS?
In other words, how important is it to do a certain practice to lose weight.

Please notice we provided an "Other" response at the end for you to write in an important habit we might have missed.

	Very important	Somewhat important	Somewhat **Un**important	Not important at all
Reduce foods high in sugar	○	○	○	○
Reduce foods high in fat	○	○	○	○
Include more vegetables	○	○	○	○
Avoid snacking between meals	○	○	○	○

	Very important	Somewhat important	Somewhat **Un**important	Not important at all
Reduce meat consumption	○	○	○	○
Always eat breakfast	○	○	○	○
Not eat more than others around you	○	○	○	○
Not eat in front of the TV	○	○	○	○
Chew your food slowly	○	○	○	○
Avoid combining meat and grains	○	○	○	○

	Very important	Somewhat important	Somewhat **Un**important	Not important at all
Avoid food high in sodium	○	○	○	○
Avoid eating protein late in the day	○	○	○	○
Avoid foods with a long shelf life	○	○	○	○
Eat more fish	○	○	○	○
Eat small meals often throughout the day	○	○	○	○
Have set times for meals every day	○	○	○	○
Include more dairy products	○	○	○	○
Avoid Genetically Modified foods	○	○	○	○
Avoid foods fried in oil	○	○	○	○
Eat all foods, but in moderation	○	○	○	○

	Very important	Somewhat important	Somewhat **Un**important	Not important at all
Keep away from fast food restaurants	○	○	○	○
Eat sweets only in first half of the day	○	○	○	○
Eat at home rather than at a restaurant	○	○	○	○
Replace sugary beverages with water	○	○	○	○
Other (optional):	○	○	○	○

People get information about healthy eating from various sources. Please rate the reliability of information given by each of the 6 sources on food healthiness.
Reliability of a source means you feel you can trust them to give you full information about something.

FDA= Food and Drug administration; CDC- Center for Disease Control and Prevention; USDA- United States Department of Agriculture)

	Very reliable	Somewhat reliable	Neutral	Somewhat Unreliable	Not reliable at all
Media (Online sources)	○	○	○	○	○

	Very reliable	reliable	Neutral	Unreliable	all
Industry (e.g. food producers)	○	○	○	○	○
University Scientists	○	○	○	○	○
Media (TV, newspapers)	○	○	○	○	○
Government agencies (FDA, CDC, USDA)	○	○	○	○	○
Medical professionals (doctors, nutritionists)	○	○	○	○	○

(OPTIONAL) If you feel that we missed an important source of healthy eating information that you use, please wri it down here and describe why you prefer it.

Please rate how healthy you think each of the following foods are.
By "healthy" we mean how good these products are for your long-term well-being.

	Very healthy	Somewhat Healthy	Neither healthy or unhealthy	Unhealthy	Very unhealthy
Beef	○	○	○	○	○
Pork	○	○	○	○	○
Chocolate	○	○	○	○	○
Beverages made with sugar (e.g. cola, pepsi)	○	○	○	○	○
Potato chips	○	○	○	○	○
Vegetables (cucumbers, tomatoes, etc.)	○	○	○	○	○
Eggs	○	○	○	○	○
Fish	○	○	○	○	○

Please rate how DIFFICULT it was for you to rate each of the foods' healthiness.

	Very easy	Somewhat Easy	Neutral	Somewhat difficult	Very difficult
Beef	○	○	○	○	○
Pork	○	○	○	○	○
Chocolate	○	○	○	○	○
Beverages made with sugar (e.g. cola, pepsi)	○	○	○	○	○
Potato chips	○	○	○	○	○
Vegetables (cucumbers, tomatoes, etc.)	○	○	○	○	○

	Very easy	Somewhat Easy	Neutral	Somewhat difficult	Very difficult
Eggs	○	○	○	○	○
Fish	○	○	○	○	○

For the next 5 questions, please indicate your level of agreement with the statements provided.

Please indicate how much you agree with the following statements about CHOCOLATE

	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
The ingredients in chocolate make it unhealthy to eat	○	○	○	○	○
Chocolate is not bad if the rest of your diet is healthy	○	○	○	○	○
Chocolate should be avoided because it is bad for health	○	○	○	○	○
Chocolate is not bad if you have a healthy lifestyle.	○	○	○	○	○

Please briefly explain which ingredients in chocolate you thought about when asked whether this product is unhealthy?

Please indicate how much you agree with the following statements about POTATO CHIPS

	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
The ingredients in potato chips make them unhealthy to eat	○	○	○	○	○
Potato chips are not bad if the rest of your diet is healthy	○	○	○	○	○
Potato chips should be avoided because they are bad for health	○	○	○	○	○
Potato chips are not bad if you lead a healthy lifestyle.	○	○	○	○	○

Please briefly explain which ingredients in potato chips you thought about when asked whether this product is unhealthy?

Please indicate how much you agree with the following statements about PORK

	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
The ingredients in pork make it unhealthy to eat	○	○	○	○	○
Pork is not bad if the rest of your diet is healthy	○	○	○	○	○
Pork should be avoided because it is bad for health	○	○	○	○	○
Pork is not bad if you lead a healthy lifestyle.	○	○	○	○	○

Please briefly explain which ingredients in pork you thought about when asked whether this product is unhealthy?

Please indicate how much you agree with the following statements about BEEF

	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
The ingredients in beef make it unhealthy to eat	○	○	○	○	○
Beef is not bad if the rest of your diet is healthy	○	○	○	○	○
Beef should be avoided because it is bad for health	○	○	○	○	○
Beef is not bad if you lead a healthy lifestyle.	○	○	○	○	○

Please briefly explain which ingredients in beef you thought about when asked whether this product is unhealthy?

Please indicate how much you agree with the following statements about SODA

	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
The ingredients in soda make it unhealthy to drink	○	○	○	○	○
Soda is not bad if the rest of your diet is healthy	○	○	○	○	○

	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
Soda should be avoided because it is bad for health	○	○	○	○	○
Soda is not bad if you lead a healthy lifestyle.	○	○	○	○	○

Please briefly explain which ingredients in soda you thought about when asked whether this product is unhealthy?

Many people think that the food you eat has an effect on your long-term health. For example, eating some foods can increase the risk of getting such chronic diseases as heart disease, diabetes, cancer,etc.

Please state how likely it is that your health will be harmed by eating or drinking the following things?

	Very likely to harm	Likely	Undecided	Unlikely	Very unlikely to harm me
Foods containing saturated fats	○	○	○	○	○
Foods containing a lot of salt	○	○	○	○	○
Foods containing pesticide residues	○	○	○	○	○
Food that is organically-grown	○	○	○	○	○
Foods with added minerals and vitamins	○	○	○	○	○
Food that has been genetically engineered (GMOs)	○	○	○	○	○
Food containing artificial colors	○	○	○	○	○
Foods containing a lot of sugar	○	○	○	○	○

How much do you agree with the following statements?

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
The more natural the products are, the higher the quality of nutrients and vitamins	○	○	○	○	○
I gladly pay a higher price for natural foods	○	○	○	○	○
I feel good when I eat natural foods	○	○	○	○	○

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
I pay attention during grocery shopping to ensure that the foods are as natural as possible	○	○	○	○	○
Natural foods taste better than other foods	○	○	○	○	○
Natural foods are better for my health	○	○	○	○	○

How Much do you agree with the following statements?

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Good health takes active participation on my part	○	○	○	○	○
I reflect about my health a lot	○	○	○	○	○
I pay attention to nutrition/health information in the media (TV, magazines, etc)	○	○	○	○	○
I take responsibility for the state of my health	○	○	○	○	○
I read more nutrition/health-related articles and books than I did 3 years ago	○	○	○	○	○
I often talk about health with my friends, family, or relatives	○	○	○	○	○
I am interested in information about my health	○	○	○	○	○

Are you currently adhering to any specific diet? If so, please choose the option that best describes it.

- ○ No specific diet
- ○ I watch my calories
- ○ I avoid or limit animal products (vegetarian, vegan)
- ○ I watch carbohydrates in my diet
- ○ I watch fat in my diet
- ○ Other: _____

Are you on this diet for:
(click as many as apply)

- ☐ Weight loss
- ☐ General health
- ☐ To address a health problem (OPTIONAL: which problem?) _____
- ☐ Other: _____

Please choose your gender:

- ○ Male
- ○ Female

Type in your age using numbers only (for example: 25)

_____

Type in your height in feet and inches (use numbers)

Feet _____

Type in your weight to the nearest pound (for example: 175)

_____

Please indicate the highest level of school you have completed:

- ○ 8th grade or less
- ○ 9th to 11th grade
- ○ GED or high school diploma
- ○ Some voc/tech/business/trade school
- ○ Some college/no degree
- ○ Associate's degree
- ○ Bachelor's degree
- ○ Some graduate/professional school
- ○ Graduate/professional degree

4. Healthy Eating Taxonomy Survey

We greatly appreciate you taking the time to fill out our survey.
Your honest opinions are very important to us! Remember there are no wrong or right answers.

Please make sure to read all instructions carefully to ensure you understand the questions.



The survey will take you about 15-17 minutes to complete.
We will be asking you about your opinions on food and health.

To move to the next page, click the Submit button (>>) on the bottom right.

Before we begin the survey: In 1 or 2 sentences, please write down what "healthy eating" means for you personally. Please try to be as specific as possible.
(Remember- there are no "correct" or "good" answers!)

MAIN QUESTIONS

The first part of our survey will ask you about your personal opinions.

Below are statements on how food and eating can affect our overall health. People might have varying opinions on these statements.

Please indicate how much you personally agree or disagree with them.

I believe that...

	AGREE				DISAGREE
	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
It's important to not eat late in the day	○	○	○	○	○
It's important to have set times for meals	○	○	○	○	○
It's important to enjoy the food you are eating, rather than focus on its nutritional content	○	○	○	○	○
It's important to be relaxed and/or in a good mood when you eat	○	○	○	○	○
It is NOT necessary to watch calories as long as the food you eat is healthy	○	○	○	○	○
It's important to avoid genetically modified foods	○	○	○	○	○
	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
It's good to keep track of the amount of proteins/fats/carbs in your food	○	○	○	○	○
It's important to not be distracted during meals	○	○	○	○	○
It's important not to eat before bedtime	○	○	○	○	○
It's important to avoid foods with unnatural ingredients	○	○	○	○	○
It's important to completely avoid certain unhealthy foods in your diet	○	○	○	○	○
It's important to not skip meals	○	○	○	○	○
	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
Some foods are so unhealthy, they are not good to eat even in moderation	○	○	○	○	○
It's important to never deny yourself any particular food, but never eat too much of it	○	○	○	○	○
It's important to eat foods that are whole and not processed	○	○	○	○	○
It's important to eat three main meals a day	○	○	○	○	○

A healthy time to stop eating and drinking anything (other than water) so that my body can rest is:

- ○ Before 6pm
- ○ Between 6pm and 8pm
- ○ Between 8pm and 10pm
- ○ Between 8pm and midnight
- ○ After midnight
- ○ Timing does NOT matter

When do you normally go to bed?

On an average weekday (Mon-Fri) ▾

On an average weekend (Sat-Sun) ▾

Below are more statement about healthy eating. Just like before, please indicate how much you personally agree or disagree with them.

I believe that...

	AGREE				DISAGREE
	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
It's important to chew food slowly	○	○	○	○	○
It's important to limit snacking between meals	○	○	○	○	○
It's important to eat the foods we as humans have evolved to eat	○	○	○	○	○
It's important to examine labels when shopping for food	○	○	○	○	○
It's important to make sure the food you eat is organic	○	○	○	○	○
It's important to avoid certain food ingredients entirely	○	○	○	○	○
	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
It's important not to rush when you're eating	○	○	○	○	○
It's NOT necessary to focus on nutritional contents of your food	○	○	○	○	○
It's good to sometimes miss meals and let your body rest from eating	○	○	○	○	○
Good food, made with care and love, is as important as healthy eating	○	○	○	○	○
It's important to not have any rules about what, when, or how to eat	○	○	○	○	○
It's important to eat your biggest meals earlier in the day	○	○	○	○	○
	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
It's important to always eat breakfast	○	○	○	○	○
It's important to eat small meals often throughout the day	○	○	○	○	○
It's important to limit unhealthy foods to certain times (like weekends or special occasions)	○	○	○	○	○
When deciding whether something is good to eat, it's important to look at the nutritional composition of that food	○	○	○	○	○

OPTIONAL: if any statements stand out for you as particularly important or completely unimportant, please briefly comment why:

We've asked you before to indicate agreement or disagreement on a variety of statements related to "healthy eating". For this question, we want to understand what "health" means to you.

For me, health is mainly about...

	AGREE				DISAGREE
	Strongly agree	Somewhat Agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
respecting public health norms and prescriptions	○	○	○	○	○
keeping up good social contacts	○	○	○	○	○
looking good	○	○	○	○	○
emotional well-being, feeling good mentally	○	○	○	○	○
living in harmony with my family	○	○	○	○	○
having the energy to do the things I want to do	○	○	○	○	○
taking time to relax and enjoy life	○	○	○	○	○
living an active life (e.g. practicing sports)	○	○	○	○	○
having no physical health problems	○	○	○	○	○
keeping the body in a good condition (fitness, jogging, aerobics, etc.)	○	○	○	○	○
staying slim	○	○	○	○	○
taking care of other family members' health	○	○	○	○	○
protecting my body against harmful influences	○	○	○	○	○
	Strongly agree	Somewhat Agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree

OPTIONAL: if you want to add another important example of what health means to you, please use this space

In order to facilitate our research, we are interested in knowing certain factors about you. Specifically, we are interested in whether you actually take the time to read the directions in our survey. In order to demonstrate that you have read the instructions, please ignore the

sport items below completely, do not answer them, and simply move to the next questions. Thank you very much.

Please indicate how often you engage in each of these activities:

	Every day	Several times a week	Less than twice a week	Never
Weight Lifting	○	○	○	○
Yoga	○	○	○	○
Running	○	○	○	○
Biking	○	○	○	○
Walking	○	○	○	○

BEHAVIORS

At the beginning of the survey, we asked you to indicate agreement on a variety of statements related to "healthy eating".

Now we want to ask you to what extent you ACT on some of the activities described in these statements.

I make sure to:

	Always	Most of the time	About half the time	Sometimes	Never
limit snacking between meals	○	○	○	○	○
eat all foods and not deny myself any particular food	○	○	○	○	○
eat three main meals a day	○	○	○	○	○
keep track of the amount of proteins/fats/carbs in my food	○	○	○	○	○
be relaxed and in a good mood when eating	○	○	○	○	○
eat foods that are whole and not processed	○	○	○	○	○
eat my biggest meals earlier in the day	○	○	○	○	○
eat small meals often throughout the day	○	○	○	○	○
watch my calories	○	○	○	○	○
always eat breakfast	○	○	○	○	○
look at the nutritional composition of foods	○	○	○	○	○
sometimes miss meals to let the body rest from eating	○	○	○	○	○
have set times for meals	○	○	○	○	○
eat organic foods	○	○	○	○	○
chew my food slowly	○	○	○	○	○
limit unhealthy foods to specific times (like weekends or special occasions)	○	○	○	○	○
examine labels when shopping	○	○	○	○	○

	Always	Most of the time	About half the time	Sometimes	Never/ I don't avoid
I avoid eating before bedtime	○	○	○	○	○
I avoid genetically modified foods	○	○	○	○	○
I avoid certain food ingredients entirely	○	○	○	○	○
I avoid skipping meals	○	○	○	○	○
I avoid foods with unnatural ingredients	○	○	○	○	○
I avoid having rules about what, when, or how to eat	○	○	○	○	○
I avoid certain unhealthy foods in my diet	○	○	○	○	○
I avoid getting distracted during meals	○	○	○	○	○
I avoid rushing during meals	○	○	○	○	○
I avoid eating heavy meals late in the day	○	○	○	○	○

DIET

You are done with the longest questions in the survey!
Below are some questions about your eating and exercising routines:

Are you currently trying to:

- ○ Lose weight
- ○ Stay the same weight
- ○ Gain weight
- ○ I am not trying to do anything about my weight

Are you currently adhering to any specific diet/way of eating?
You can select MULTIPLE options:

- ☐ No specific diet
- ☐ I watch my calories
- ☐ I am vegan
- ☐ I am vegetarian
- ☐ I watch carbohydrates
- ☐ I watch fat in my diet
- ☐ I'm on a paleo diet
- ☐ I avoid gluten
- ☐ Other (if checked, please specify):

OPTIONAL: Please comment about any particular diet/way of eating you practice. E.g. Are you eating this way for any particular reason or simply overall health? etc.

Please choose how often you do each of the following:

	Very Often	Often	Sometimes	Rarely	Never
Do you deliberately eat less in order not to become heavier?	○	○	○	○	○
If you see or smell something delicious, do you have a desire to eat it?	○	○	○	○	○
Do you have a desire to eat when things are going against you or when things have gone wrong?	○	○	○	○	○
Do you try to eat less at mealtimes than you would like to eat?	○	○	○	○	○
Do you have the desire to eat when you are irritated	○	○	○	○	○
Do you have a desire to eat when you are emotionally upset?	○	○	○	○	○
Do you have a desire to eat when you are feeling lonely?	○	○	○	○	○
Do you watch exactly what you eat?	○	○	○	○	○
Do you have a desire to eat when you are expecting something unpleasant to happen?	○	○	○	○	○
Do you eat more than usual, when you see others eating?	○	○	○	○	○
Do you have a desire to eat when you are depressed or discouraged?	○	○	○	○	○
When you have eaten too much, do you eat less than usual the following day?	○	○	○	○	○
If you see others eating, do you also have the desire to eat?	○	○	○	○	○
Do you deliberately eat foods that are slimming?	○	○	○	○	○
If you walk past a snack-bar or a cafe, do you have the desire to buy something delicious?	○	○	○	○	○
If food tastes good to you, do you eat more than usual?	○	○	○	○	○
	Very Often	Often	Sometimes	Rarely	Never

In a usual week, how many hours do you spend doing the following activities?

	NONE	Less than 1/2 hrs a week	1/2- 2 hrs/week	2.5- 4 hrs/week	4.5- 6 hrs a week	More than 6 hrs a week
STRENUOUS exercise (heart beats rapidly). Examples: biking fast, jogging, aerobic dancing, tennis, zumba, basketball, etc.	○	○	○	○	○	○
MODERATE exercise (not exhausting). Examples: walking quickly, dancing, baseball, gymnastics, easy bicycling, skateboarding.	○	○	○	○	○	○
MILD exercise (little effort). Examples: walking slowly, yoga, bowling, golf.	○	○	○	○	○	○

How would you evaluate your health?

Compared to other people your age, would you say your diet is more healthy, less healthy, or about the same?

- A lot more healthy
- More healthy
- About the same
- Less healthy
- A lot less healthy

DEMOGRAPHICS

Lastly, please answer some questions about yourself.
Please remember all answers are completely anonymous!

Please indicate gender:

- Male
- Female

Nationality (where were you born?):

- USA
- Other:

Are you currently a smoker?

- Yes (regular smoker)
- Yes (I rarely smoke)
- No (I quit)
- No (never smoked)

How do you usually describe yourself?

- White
- Black or African American
- Hispanic or Latino/a
- Asian or Pacific Islander
- American Indian or Alask Native
- Other (please specify):

Type in your age using numbers only (for example: 25)

Type in your height in feet and inches (use only numbers)
Example:
Feet: 5
Inches: 7

Feet

Inches

Type in your weight to the nearest pound (for example: 175)

Please indicate the highest level of school you have completed:

- Some high school
- High school graduate
- Some college (or in progress)
- College degree
- Graduate school (in progress)
- Graduate degree /professional
- OTHER:

If college or postgraduate degree, please specify major:
(e.g. sociology, physics, etc.)

What is your approximate average household income?

- Less than $10,000
- $10,000 - $19,999
- $20,000 - $29,999
- $30,000 - $39,999
- $40,000 - $49,999
- $50,000 - $59,999
- $60,000 - $69,999
- $70,000 - $79,999
- $80,000 - $89,999
- $90,000 - $99,999
- $100,000 - $149,999
- More than $150,000

Please indicate your marital status:

- Married/Domestic Partnership
- Separated
- Widowed
- Single/ Never married
- Divorced

Lastly, please indicate how many children live in your household who are:

	NONE	1 child	2 or more children
Less than 5 years old:			
5 through 12 years old:			
Over 12 years old:			

THANK YOU

for your time and being part of our work!
Below is optional space in case you wanted to comment on something the survey did not address:

These page timer metrics will not be displayed to the recipient.
First Click: *0 seconds*
Last Click: *0 seconds*
Page Submit: *0 seconds*
Click Count: *0 clicks*

This is your survey code. Copy and paste this code into Mturk

${e://Field/random}

Survey Results: Factor Analysis

Chapters 4 and 5 group results on lay beliefs about healthy eating behaviors into themes. These themes were derived from online U.S. survey work (n=300), which helped establish the taxonomy of healthy eating beliefs examined in the current dissertation. The survey used Amazon's Mechanical Turk (Mturk), a crowd sourcing system where tasks are given to anonymous "workers" for a small completion fee ($0.75

for the survey). The survey presented respondents (n=366) with 21 statements on various aspects of eating that can affect overall health. These statements were derived from previous interviews with American and Eastern European participants (Voytyuk & Hruschka, in press) and other work (Fisher & Dube, 2011; Akamatsu et al. 2005) with the goal of reflecting variation in opinions of what constitutes healthy eating. Respondents were asked to read each statement carefully and indicate how much they personally agreed or disagreed with them on a 5-point Likert scale (1= strongly disagree to 2= strongly agree). Out of 366, 68 responses were excluded from analysis due to failing an attention test. Sample characteristics are presented in the table below.

Table 1
Mturk Sample Demographics

N	298
Females	51%
Age (M/SD)	37.9/12.5
BMI (M/SD)	26.5/6.7
Try to lose weight	43%
Eat "healthier"	43%

Analysis and results. To identify groups of statements that hang together and thus represent various themes of healthy eating, the author performed an exploratory factor analysis. A factor loading of 0.6 was used to select statements, as a threshold of at least 0.55 is considered “good” by Comrey and Lee (1992). Additionally, a promax rotation is used. Rotation is a method that aids in identifying simple and interpretable factors (Yaremko et al., 1986). Promax rotation is recommended for oblique factors (those that correlate with each other) and a researcher can determine if factors indeed correlate by examining the factor correlation matrix- if correlations are at 0.32 and above,

an oblique technique can be used (Tabachnick and Fiddell, 2007, p. 646). Correlations for the present data exceed 0.32, warranting an oblique rotation method.

Factor analysis extracted 6 dimensions and only those with computed eigenvalues >1.0 were retained according to the Kaiser-Guttman criterion, resulting in 5 final factors (Zqick & Velicer, 1986) especially as only one item had a loading > 0.6 in the sixth factor. The five factors, their factor loadings (FL), and computed Cronbach's Alphas are summarized in table 1 below.

The factors explain 64% of total variance in the original data matrix. Factors 1 (items related to nutritional aspects of foods) and 2 (items related to how "natural" a food is) include statements that describe various aspects of the foods one should eat. Factors 3-5 present statements on eating styles unrelated to the specific qualities of the food itself. Factor 3 includes statements on the pattern of one's daily meals. Factor 4 contains statements with a specific mention of time- e.g. don't eat late or have set times for meals. Factor 5 focuses on one's focus and process while eating- e.g. avoiding distractions and not rushing.

Table 2
Results of Exploratory Factor Analysis

Food Characteristics				Eating Styles					
Nutrition (35%*)	**FL**	**Naturalness** (9.2%)	**FL**	**Pattern** (8.4%)	**FL**	**Time** (5.8%)	**FL**	**Mindfulness** (5.4%)	**FL**
Look at nutritional composition of food	0.86	Eat organic food	0.9	Always eat breakfast	0.9	Don't eat before bedtime	0.9	Be relaxed/good mood when you eat	0.9
No need to focus on nutritional contents	-0.8	Avoid GM foods	0.8	Important to not skip meals	0.8	Don't eat late in the day	0.8	Don't be distracted during meals	0.8
Examine food labels	0.75	Avoid unnatural ingredients	0.7	Eat small meals often	0.8	Eat biggest meals earlier in the day	0.8	Don't rush when you eat	0.7
Keep track of amount of macros	0.61	Eat whole, not processed foods	0.6	Eat three main meals	0.7				
Cronbach's Alpha	*0.76*	*Cronbach's Alpha*	*0.8*	*Alpha*	*0.8*	*Alpha*	*0.8*	*Cronbach's Alpha*	*0.7*

* Variance explained FL= factor loading