



# Who Values Gluten-Free? Dietary Intake, Behaviors, and Sociodemographic Characteristics of Young Adults Who Value Gluten-Free Food

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## ARTICLE INFORMATION

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## ABSTRACT

**Background** Over the past decade, consumer demand for gluten-free products has increased, but little is known about the public health impact of and factors correlated with valuing gluten-free food.

**Objective** Describe the sociodemographic and behavioral characteristics of young adults valuing gluten-free as an important food attribute, and compare their dietary intake with other young adults.

**Design** Cross-sectional analysis of survey data collected in 2015 to 2016 as part of the fourth wave of the Project EAT (Eating and Activity in Teens and Young Adults) cohort study.

**Participants/setting** Population-based sample of 1,819 young adults (25 to 36 years) (57% women, 69% white), initially recruited in Minneapolis-St Paul, MN, public middle and senior high schools.

**Measures** Valuing gluten-free food, weight goals and weight control behaviors, food production values, eating behaviors, physical activity, and dietary intake.

**Statistical analyses performed** Logistic regression models were used to investigate associations with potential correlates of valuing gluten-free food. For dietary intake, adjusted mean estimates were calculated for those who did and those who did not value gluten-free foods.

**Results** Approximately 13% of young adults valued gluten-free food, a characteristic most strongly related to valuing food production practices (eg, organic, locally grown); factors such as Nutrition Facts use and having a weight goal were also related to gluten-free food values. Valuing gluten-free food was related to engagement in both healthy behaviors (eg, eating breakfast daily, eating more fruits and vegetables) and unhealthy behaviors (eg, using diet pills to control weight).

**Conclusions and relevance** Young adults valuing gluten-free food generally engaged in healthier behaviors and had better dietary intake; of concern, they were also more likely to engage in unhealthy weight control behaviors. Valuing gluten-free food may be part of a cluster of behaviors representing an interest in making healthier food choices but may also be a marker for unhealthy weight preoccupation and behaviors.

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FOOD LABELS AND CLAIMS CAN INFLUENCE CONSUMER BELIEFS CONCERNING FOOD PRODUCTS.<sup>1,2</sup> Prior research has shown that certain food labels (eg, “organic”) carry a “health halo” effect, encouraging consumers to opt for such products out of a belief that these products are healthier.<sup>3,4</sup> Health halos can be conferred by claims concerning just one nutrient, because consumers often make generalizations about the overall health of a product based on one piece of information found on labels. For instance, products labeled as “low sodium,”<sup>5</sup> “natural,”<sup>6</sup> and “free from” certain food components or characteristics<sup>7</sup>

may be interpreted by consumers as being healthier overall. The health halo effect can have unintended consequences on eating habits, such as people overconsuming because they believe they have chosen a healthier product.<sup>8,9</sup>

“Free from” food claims have gained prominence lately in the context of gluten consumption, because gluten-restricted diets have been endorsed by celebrities and cited as facilitating weight loss.<sup>10,11</sup> Popular books have claimed that gluten consumption is associated with weight gain,<sup>12</sup> anxiety, and depression<sup>13</sup> and that restricting gluten is associated with reduced incidence of autoimmune diseases.<sup>14</sup> In 2015, a Gallup

poll reported that approximately one in five consumers reported they “actively try to include” gluten-free foods in their diet<sup>15</sup>; “gluten free” was not defined and could have referred to both gluten-free replacement products (eg, rice pasta) and naturally gluten-free food (eg, fruit). Also in 2015, market research publisher Packaged Facts estimated that gluten-free products in traditionally grain-based food categories (ie, replacement products) accounted for almost \$1.6 billion in sales.<sup>16</sup> Market research has also shown that growth in gluten-free product sales was not driven by people with celiac disease,<sup>17</sup> for whom a completely gluten-free diet is indicated but who make up less than 1% of the US adult population.<sup>18</sup>

Research has shown that one quarter to one third of consumers believe products containing gluten-free claims are healthier than their gluten-containing counterparts<sup>7,19</sup>; however, little is known about who values and purchases gluten-free products. Priven and colleagues<sup>7</sup> found that “free from” products were rated as healthier more often among those of Hispanic or Latino compared with white ethnicity or race and for those with an associates or vocational degree compared with those with a doctoral degree. Gallup, in a survey of 1,009 US adults, reported that purchase of specifically gluten-free products was slightly more common among women, nonwhites, those without college experience, and those with lower income<sup>15</sup>; however, overall demographic characteristics of the survey were not included, and the generalizability is unknown. Furthermore, how valuing gluten-free food relates to weight goals, weight-control behaviors, and health behaviors such as physical activity is an open question. Because popular press reports have suggested eating gluten-free foods or following a gluten-free diet contributes to weight loss,<sup>10-12</sup> it is crucial to understand how consumers consider gluten-free products in relation to weight control behaviors.

Another key literature gap is in regard to the associations between gluten-free preferences and dietary quality. It is unknown what dietary patterns are exhibited by people who value products with gluten in comparison with those who value foods that are naturally gluten-free or specialty gluten-free replacement products. Past research comparing nutrients in gluten-containing and gluten-free replacement products suggests gluten-free products may contain more saturated fat and sodium<sup>20</sup> and an overall less healthy nutrient profile than gluten-containing counterparts.<sup>21</sup> However, nutrient profiles differed between brands within each group and between food categories; for instance, gluten-free breads had higher energy, lower protein, and more total and saturated lipids compared with gluten-containing breads, whereas cereal bars with or without gluten were similar except that gluten-free cereal bars contained less energy.<sup>20</sup> Thus, it is possible that consumers purchasing gluten-free foods could unnecessarily be eating poorer-quality food, even while believing it to be healthier; however, it is also possible that incorporating high-quality gluten-free products or naturally gluten-free foods may be in line with an overall healthier dietary profile. In addition, because health behaviors often co-occur,<sup>22</sup> it is possible that consumers choosing to incorporate gluten-free foods into their diet for health or nutrition reasons may also be motivated to eat an overall healthier dietary pattern.

This study builds upon prior work to address these literature gaps and inform nutrition counseling and messaging for

## RESEARCH SNAPSHOT

**Research Question:** Who values gluten-free as an important food attribute, and how does valuing gluten-free food relate to dietary intake?

**Key Findings:** In a cross-sectional population-based survey of 1,819 young adults, valuing gluten-free food as important was related to markers of a healthier dietary pattern, valuing food production practices such as organic or locally grown, and practicing several healthy behaviors such as eating breakfast daily and meeting physical activity guidelines. Of concern, valuing gluten-free food was also related to engaging in unhealthy weight control behaviors.

young adults. The purpose of this study was to describe the sociodemographic characteristics of young adults who valued gluten-free foods and their behavioral profiles in terms of weight goals and weight control behaviors, physical activity and yoga, valuing food production attributes such as organic and locally grown, and food practices including eating breakfast, vegetarian status, and Nutrition Facts use.

## METHODS

### Study Design and Sample

This cross-sectional study utilized data from the fourth wave of the Eating and Activity in Teens and Young Adults Study (Project EAT-IV), a longitudinal cohort study measuring diet- and weight-related factors in adolescents and young adults. Students in 31 public middle and high schools in Minneapolis-St Paul, MN, were initially recruited in schools for Project EAT-I in 1998 to 1999.<sup>23,24</sup> Fifteen years later (2015 to 2016), participants who had responded to at least one of two intermediate follow-up surveys were mailed an invitation for Project EAT-IV. Of the initial school-based sample, 66.1% (N=1,830) of the N=2,770 young adults with contact information were surveyed online or by mail, and the 1,819 (99.4%) who answered the question concerning gluten-free importance were included in this analysis. All study protocols were approved by the University of Minnesota's Institutional Review Board Human Subjects Committee and all participants provided written informed consent.

### Survey Development

Survey items for Project EAT-IV were adapted from the initial Project EAT survey<sup>24</sup> and modified based on the social ecological model and a life course perspective.<sup>25</sup> Given the growing interest in food attributes such as gluten-free and organic, questions concerning the importance of these attributes were added to the survey, which was pilot-tested with formative focus groups involving a total of 35 young adults. Variables are described next, along with item test-retest reliability for ordinal and continuous variables and percent agreement for categorical variables based on a subgroup of 103 participants who completed the EAT-IV survey twice within a period of 1 to 4 weeks.

### Variable Definitions

Valuing gluten-free food was the primary variable of interest for this study and was assessed with the question: “How

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