# Designing Intuitive Nutrition Labels for Older Adults and Other Vulnerable Populations: Behavioral and Visual Strategies for Equitable Food Choice

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## Abstract:

**Background:** Vulnerable populations—such as individuals with hypertension, older adults, and those with low literacy—face significant challenges in interpreting food labels. Such disparities in understanding may affect long-term health behaviors, nutritional preferences, and subjective well-being (Baumann et al., 2022). The findings suggest a knowledge gap particularly linked to education and age. Additionally, older adults are known to experience difficulty processing complex label information due to cognitive and visual limitations (Campos et al., 2011). Previous research consistently indicates that higher education levels correlate with more accurate interpretation of food labeling (Hess et al., 2012). To support healthy behavior in these groups, more intuitive and visually structured labeling components are essential (Vermeir & Roose, 2020).

**Objective:** This study focuses on the development of a semi-personalized nutrition labeling system tailored to the cognitive and perceptual needs of older adults and other vulnerable consumers. The approach integrates behavioral economics, universal design, and visual communication principles to enhance comprehension and decision-making.

**Methods:** Using national survey data (SSJDA0954), we analyzed older adults' comprehension of nutrition facts and their ability to interpret complex label information. The proposed design for older adults features battery-style nutrient indicators, color-coded allergen icons, and simplified front-of-pack layouts.

**Results:** Survey results indicated that fewer than 8% of respondents with hypertension could accurately interpret sodium equivalence. Eye-tracking studies revealed that, under time constraints, vulnerable populations significantly reduced their attention to key nutrition information. The semi-personalized design improved both detection speed and interpretation accuracy.

**Conclusion:** Visually intuitive and cognitively accessible nutrition labeling can help bridge the gap between health intentions and actual food choices among older adults and other vulnerable populations. This approach provides a practical pathway for promoting health equity through labeling reform.

## Keywords:

Nutrition labeling, older adults, vulnerable populations, visual communication, behavioral design, health equity.