EFFECTS OF ECO-LABEL VISUAL MOTIFS ON CONSUMER EVALUATION OF OTC MEDICINE

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ABSTRACT

Eco-label functions as a visual cue that signals environmental attributes. While eco-label has been widely examined in food, its application in over-the-counter (OTC) medicine remains limited. This study examined how eco-label visual motifs are related to consumer evaluation of OTC medicine. An online survey included 733 participants in Japan. Participants evaluated OTC medicine package images with six label conditions: five eco-label conditions and one no-label condition. The five eco-label conditions consisted of the food carbon footprint of products (CFP) label used in Japan and four visual motif labels using animal, earth, human, and plant motifs. Consumer evaluation was measured using six items: environmentally friendly impression, environmental contribution expectation, environmental impact awareness, purchase intention, recommendation intention, and interest toward OTC medicine. Exploratory factor analysis indicated that the six items formed a single factor; therefore, their mean was used as Perceived Environmental Benefit (PEB). A repeated-measures ANOVA with Greenhouse–Geisser correction showed a significant effect of label condition on PEB, $F(2.02, 1481.86) = 151.05$, $p < .001$, $\eta G^2 = .042$. OTC medicine with all eco-label conditions showed significantly higher PEB than that with the no-label condition. Compared with OTC medicine with the food CFP label, OTC medicine with the animal and human motif labels showed lower PEB, whereas those with the earth and plant motif labels showed comparable PEB. These findings suggest that consumer evaluation of environmental information on OTC medicine packages may differ by visual motif, providing an exploratory basis for eco-label design.

Keywords: *OTC medicine, eco-label, visual motif, carbon footprint, information design*

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1 INTRODUCTION

Eco-label can function as an informational cue regarding product environmental characteristics and support decision making for environmentally significant products in sustainability communication (Gorton et al., 2021; Thøgersen et al., 2010). Eco-label has been widely examined in food, where environmental information such as carbon footprint of products (CFP) can be presented on packages. In contrast, eco-label design for over-the-counter (OTC) medicine has received limited attention. In Japan, OTC medicine is also purchased directly by consumers, but the use of eco-label on OTC medicine packages is not yet common. This gap suggests that OTC medicine should be examined as a product context for eco-label design.

In addition, visual expression is also important in eco-label design. Prior studies suggest that visual and verbal communication cues and eco-label format can influence consumer responses to environmental information (Rihn et al., 2019; Tang et al., 2004). In addition, presentation format can affect consumers' recall and interpretation of environmental claims, especially when claims are less familiar (Buvár et al., 2026). These points suggest that eco-label visual motifs used for OTC medicine may be related to consumer evaluation.

Accordingly, this study examined how eco-label visual motifs are related to consumer evaluation of OTC medicine by addressing two research questions: RQ1. Does OTC medicine with eco-label conditions receive higher consumer evaluation than OTC medicine with the no-label condition? RQ2. How do visual motif labels for OTC medicine differ in evaluation compared with the food CFP label?

2 METHODS

An online survey was conducted with 733 participants in Japan. Eligible participants were aged 30–49 years, lived in Japan, and had experience purchasing OTC medicine. The final sample included 481 men and 252 women (mean age = 41.94, SD = 5.13). We asked participants to evaluate OTC medicine package images with six conditions: five eco-label conditions and one no-label condition. The five eco-label conditions consisted of the food CFP label condition and four visual motif label conditions with animal, earth, human, and plant motifs. The food CFP label currently used in Japan was included as a comparison because no commonly used CFP label for OTC medicine was available. Three prototypes were prepared for each visual motif, resulting in 12 prototypes. These conditions differed only in the visual motif, while the label frame, color, font, font size, and text were kept constant. The presentation order of the images was randomized.

We measured consumer evaluation using six items: environmentally friendly impression, environmental contribution expectation, environmental impact awareness, purchase intention, recommendation intention, and interest toward OTC medicine (1 = strongly disagree; 5 = strongly agree). Exploratory factor analysis indicated that the six items formed a single factor, and internal consistency was high (Cronbach's α = .925). Therefore, their mean was used as Perceived Environmental Benefit (PEB). A repeated-measures ANOVA was conducted with label condition as the within-subject factor, with Greenhouse–Geisser correction applied for sphericity violation. Holm-adjusted pairwise comparisons were then conducted.

3 RESULTS

3.1 Comparison of OTC medicine with eco-label conditions and the no-label condition

For RQ1, we examined whether OTC medicine with eco-label conditions received higher consumer evaluation than that with the no-label condition. A repeated-measures ANOVA with Greenhouse–Geisser correction showed a significant effect of label condition on PEB, $F(2.02, 1481.86) = 151.05$, $p < .001$, $\eta G^2 = .042$. Holm-adjusted pairwise comparisons indicated that each eco-label condition had significantly higher PEB than the no-label condition ($p < .001$). The mean difference from the no-label condition (M = 2.73, SD = 0.74) ranged from 0.357 for the human motif label condition to 0.484 for the earth motif label condition.

3.2 Comparison of OTC medicine within eco-label conditions

For RQ2, OTC medicine with the food CFP label was used as a comparison point for examining the evaluation patterns of those with the visual motif label conditions (Figure 1). OTC medicine with the food CFP label received a mean PEB of 3.20 (SD = 0.81). In relation to this condition, OTC medicine with the animal motif label (M = 3.12, SD = 0.82) and that with the human motif label (M = 3.09, SD = 0.82) showed lower PEB, whereas that with the earth motif label (M = 3.21, SD = 0.82) and that with the plant motif label (M = 3.18, SD = 0.80) showed comparable PEB. Holm-adjusted comparisons showed lower PEB for the animal and human motif label conditions ($p < .001$), but no significant differences for the earth and plant motif label conditions.

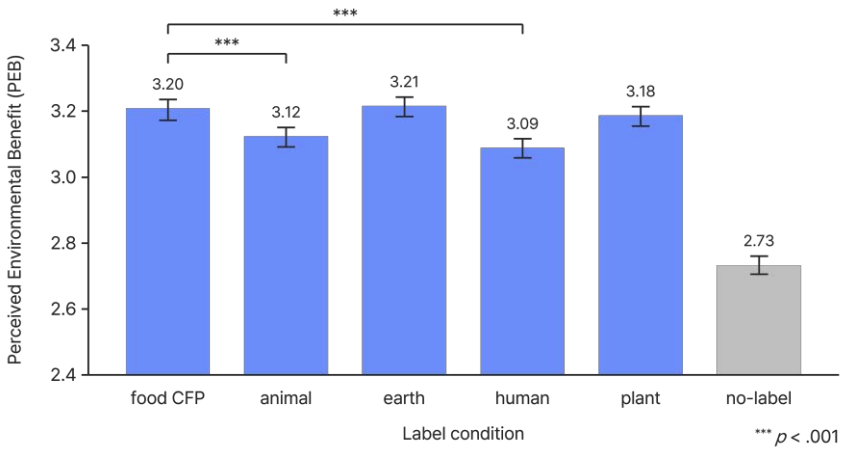

Figure 1. Comparison of OTC medicine within eco-label conditions using a repeated-measures ANOVA

4 DISCUSSION AND CONCLUSION

For RQ1, the result suggests that OTC medicine with eco-label conditions can be associated with more positive consumer evaluation, as represented by PEB. This finding can be discussed alongside prior research describing eco-label as an informational cue regarding product environmental characteristics and as a tool for supporting consumer decision making for environmentally significant products (Gorton et al., 2021; Thøgersen et al., 2010). Thus, this result suggests eco-label design for OTC medicine is worth further examination as a product context.

For RQ2, OTC medicine with the food CFP label provided a useful comparison point for examining visual motif label conditions. OTC medicine with the earth and plant motif labels showed comparable PEB, whereas those with the animal and human motif labels showed lower PEB. This pattern suggests that visual motif labels cannot be assumed to improve consumer evaluation simply because they are visually adapted to OTC medicine. Rather, consumer evaluation may differ depending on the visual motif used. This result can be discussed in relation to prior studies showing that visual and verbal cues and eco-label format can influence consumer responses to environmental information (Rihn et al., 2019; Tang et al., 2004). It also relates indirectly to research showing that presentation formats can affect consumers' recall and interpretation of less familiar environmental claims (Buvár et al., 2026).

Taken together, these findings suggest that eco-label design for OTC medicine is worth further examination in sustainability communication and that consumer evaluation of environmental information on OTC medicine packages may differ depending on the visual motif used. This study provides an exploratory basis for examining visual motifs in OTC medicine eco-label design.

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