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Older Adults' Perceptions of OTC Drug Labels: Print Size, White Space and Design Type

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Abstract. The present research examines older adults' perceptions of the readability of OTC medication labels. Twelve labels depicting an OTC medication with a fictious name were constructed and attached to bottles. The labels varied in (a) print size (4 point, 7 point, 10 point), (b) amount of white space between lines/sections of text (no line spaces; line spaces between main sections; line spaces between separate statements), and (c) label design (standard vs. extended/pull-out). Fifty-three older adults rank-ordered the labels according to overall ease of reading. In general, participants preferred the labels printed with larger type and white space. However, white space appears to be less important than print size in readability perceptions. Readability perceptions were also higher with the alternative extended label designs (pull-out). Implications for labeling on containers with small surface areas is discussed.

1. Introduction

In recent years, there has been increased interest in better enabling consumers to more easily acquire information from over-the-counter (OTC) pharmaceutical labels [1]. Recently, the FDA {2} has proposed a set of regulations that would attempt to standardize OTC drug labels. Addressed are issues such as minimum print size and white spacing; standard ordering and layout of label information; and the use of consistent language on OTC drug labels [2]. The purpose is to enhance reading and understanding of OTC drug labels, ultimately enabling consumers to use products safely and effectively [2]. One potential advantage of a uniform label format is that consumers will be able to quickly locate information [3]. Consistency as provided by standardization has also been shown to be beneficial in other domains [4].

Frequently, large amounts of information needs to be communicated on OTC drugs. This creates a difficulty when the surface area of a label is small. One way to accommodate all this information is through the use of package inserts. However, these inserts are often discarded or misplaced [6]. A second way to accommodate all of the important information on small surface areas is to decrease print size allowing all the information to fit on the drug container. However, this decreased print size usually results in sizes to small to be read by people with poor vision, such as, older adults, who are the largest consumer group of pharmaceuticals [7].

Recent research has shown that increasing the available surface area on OTC containers to allow for increased print size is not only preferred but also enhances people's knowledge compared to conventional OTC labeling [8,9]. Similar results have also been found for other types of consumer products [10].

Other research has found that print type characteristics (e.g., size, width) influence reading performance [11,12]. Research suggests that if print size is too small and compact people will not want to expend the mental energy to read the material [12].

Research has also shown that the use of white spacing in bodies of text can facilitate willingness to read textual information [12]. Instructions written in a list format, with pictographs, has been found to yield better performance than instructions in paragraph form

[13]. The use of a list format allows people to chunk information into meaningful units facilitating the extraction, comprehension, and memory of the information [14].

The purpose of the present research is to determine the effects of increased print size, white space, and label area on OTC drug label readability and aesthetic preference. Older adults were used as participants because they tend to use more pharmaceuticals than other age groups and have age related declines in sensory, perceptual, and cognitive abilities [7]. Three different font sizes and white spacing formats were used to assess the effects of print size and spacing. Also, a pull-out label was compared to a standard label layout to assess the effects of increased surface area.

2. Methodology

2.1 Research design

Twelve label conditions were used. Eleven varied as a function of three print sizes, three white spacing formats, and two label designs. Not all possible orthogonal combinations of print size, white spacing, and label formats were used in the study. This was decided because the number of conditions would have been too large and some of the conditions would have been unrealistic and/or untenable (e.g., the large print/white spacing extended label designs was to big to fit on the bottle). A twelfth condition with no back label was used as a control.

Print size was either 4, 7, or 10 point font for the small, medium, and large print conditions, respectively. White spacing consisted of no spacing between text, separation of the label sections, and separation of sentences (list format) for the small, medium, and large white spacing conditions, respectively. The two label designs were a standard and an extended label. The standard label included all relevant drug instructions on one side of the label, attached to the back of the bottle. The extended label was comprised of three panels with all the relevant instructions. The front (first) panel pulled or folded out revealing the second and third panels. The back of the third panel was physically glued to the back of the bottle.

2.2 Participants

Fifty-three older adults from various retirement communities and continuing education course from the Raleigh, North Carolina area participated. Participants reported a mean age of 82 years old (*SD* = 7.1). The use of eye glasses for reading was reported by 94% of the participants. Participants reported their highest attained educational level as follows: 25% completed high school, 36% had some college or trade school, 15% had a bachelors degree, 11% had some post-graduate study, and 11% had a graduate degree.

2.3 Materials

Twelve OTC bottles and labels were constructed. The dimensions of the bottles used were: 19 X 9.5 X 5.5 cm. The bottles were bluish-green in color with a white metal screw-on cap. The bottles were taken from an existing OTC medication, which was emptied and their original labels were removed. The experimental label designs were then affixed. All the bottles' front and side labels were identical. However, the bottles differed according to the 12 back-label conditions. The label content was taken directly from information in an actual (currently sold) OTC motion sickness medication. A fictious product name was used for the medication.

2.4 Procedure

Participants completed a consent form and a demographics questionnaire (e.g., age, gender, educational background).

Participants were given all 12 OTC motion sickness medication bottles and instructed that the bottles were all identical except for the back labels. The experimenter orally described the format differences between the label conditions. The participants were instructed to rank order the bottles according to a combination of several criterion: which label formats were easiest, fastest, and most comfortable to read. Participants were instructed to choose the best label and place it to their left (rank score of one), then decided which label was next best (rank score of two) and so fourth down to the worst label condition. Participants then rank ordered the bottles from best (one) to worst (twelfth). Participants were allowed to change their rank orders until they were satisfied. Ties were allowed in the ranking.

Prior to participating in the above described task, participants performed an information acquisition task with one of the bottles in randomly assigned conditions. These data will not be described in this report.

3. Results and Discussion

The data were rank scores with lower numbers indicating greater preference (with respect to readability). The mean rankings across all the participants (N = 53) for the 12 label conditions are listed in Table 1. The label conditions' rank order was first analyzed using the nonparametric multi-condition within-subjects Friedman test; this test was significant, $p < .0001$. This was followed by paired comparisons among the label conditions using the Wilcoxon Matched-Pair Signed-Rank test. Because there were 70 possible pairwise comparisons, the alpha error rate was controlled by using the Bonferroni correction technique which indicated the use of a .0007 probability level for determining significance. The mean ranks, standard deviations, and statistically significant differences can be found in Table 1.

As seen in Table 1, participants preferred the larger print label conditions over the smaller print conditions. This is not surprising considering many older adults experience some type of vision impairment [7], and therefore, would find it easier to read labels with larger print type and prefer it over smaller print.

Table 1. Mean rank for each of the 12 label conditions.

Print Size	White Space	Label Design	Mean Rank	SD	Diffs
Large	Medium	Extended	1.61	0.83	a
Large	Small	Extended	1.90	0.76	a
Medium	Large	Extended	3.61	1.67	b
Medium	Medium	Extended	3.94	0.79	b
Medium	Small	Extended	4.14	1.28	b
Small	Large	Extended	7.75	1.80	c
Small	Large	Standard	7.82	2.29	c
Small	Medium	Standard	8.88	1.73	cd
Small	Medium	Extended	9.49	1.61	de
Small	Small	Standard	9.80	1.69	e
Small	Small	Extended	9.86	1.28	de
No Back Label (Control)		—	11.77	1.03	f

NOTE.

(1) Print size: (small (4 point), medium (7 point), or large (10 point)).

(2) White Space: none (no extra line space), medium (line space between main sections), or large (line space between listed statements).

(3) Label design: standard or extended/pull-out.

(4) Lower rank scores indicate greater perceived readability.

(5) SD = Standard Deviation

(6) Diffs: Means with different letters are statistically different from each other at $p < .0007$ (Bonferroni correction).

(7) Not all factors are orthogonally crossed (e.g., there is no large print / large white space condition)

Interestingly, within each of the large and medium print size conditions, white space did not have a substantial effect on preference. However, this was not the case in the small print conditions where white space as well as label type had a large influence on label preference. For the small print conditions, participants preferred the larger white space conditions over the smaller white space conditions. The only exception was that there was no difference between the large white space conditions and the medium white space/standard label condition. Furthermore, the only difference between the small and medium white space conditions was for the standard label where the medium white space condition was preferred over the small white space condition. These results also indicate that with the small print, the extended label is not preferred over the standard label.

Although the results reported here are based on participant preference, they are suggestive of several important implications. First, older adults, who are the largest consumer of OTC medications [7], prefer the use of larger print. Second older adults are not concerned with white spacing if print size is large enough. Furthermore, the use of an extended label design can be beneficial mainly by enabling the enlargement of important label information. More research on drug labeling will benefit consumers by finding ways to facilitate knowledge acquisition, promote proper use, and prevent negative outcomes [15].

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