

## Comprehensibility of warning symbols for child care products: An in-depth study

■ Neha Tripathi, Seema Kwatra and Nirmal Kaur

Department of Family Resource Management, College of Home Science, G.B. Pant University of Agriculture and Technology, PANTNAGAR (UTTARAKHAND) INDIA

### ARTICLE INFO :

Received : 13.04.2012  
Revised : 19.08.2012  
Accepted : 21.09.2012

### KEY WORDS :

Child care products, Effective, Warning symbols, Comprehensibility

### HOW TO CITE THIS ARTICLE :

Tripathi, Neha, Kwatra, Seema and Kaur, Nirmal (2012). Comprehensibility of warning symbols for child care products: An in-depth study, *Adv. Res. J. Soc. Sci.*, 3 (2) : 150 - 153.

### ABSTRACT

Child care products are an integral part of children's developmental processes. It may also inflict accidental injuries to children. Effective warning should result in safe behaviour, leading to reduction in number of accidents. Safety and developmental appropriateness are of utmost importance for child care products. Consumer's responses to warning are affected by perceived hazardousness which in turn is affected by effectiveness of explicit warning. The study was purposively carried out at Pantnagar on a sample size of 70 *i.e.* 35 parents and 35 general public using comprehension test. The test was conducted to evaluate the level of comprehensibility of warning symbol for five referents (suffocation, unattended, age, weight, height) with four variants of each referent. The use of symbols along with written text is must to enhance comprehensibility of warning signs. The results of comprehension test reveal that symbols with high level of comprehension for the referents suffocation (91%), unattended (89%), weight (80%), age (89%), and height (89%) meet the acceptance criteria for use as warning symbols as per parents score. Similarly general public had given scores for the referents for suffocation (85%), unattended (85%), weight (91%), age (80%) and height (85%) were found having high comprehensive scores.

## INTRODUCTION

Children play with toys and learn about world. Child care products are an integral part of children's developmental processes. A child of below three year of age may handle the things in a different manner from a child of 3-6 years of age group. Child care products may also inflict accidental injuries to children, like sharp edges of toys; flammable, electrical, mechanical characteristics may cause accidents. Therefore, there is need to look out for toy labels and toy safety marks on the products that we buy for our children, to identify the quality of products.

Effective warnings should result in safe behaviour, leading to reduction in number of accidents. Unfortunately the response rate to the warnings is usually low. Dorris and Pusewell (1998), Otsubo (1999) showed that many either do not notice warning, fail to read them, or do not comply with them. The question is how to raise the impact of warnings.

Edworthy and Adams (1996) argued that a warning sign should be thought of as an artefact that represents the risk associated with the hazardous situation. In order to do so a warning usually serves as an alerting function and as an information function. The alerting aspects of warning serve as an indication of hazards and the severity of hazards. Signal words, colors, symbols and sounds are an example of alerting elements in a warning. When used effectively these elements require little conscious information processing; and are almost spontaneously understood. The information aspects of a warning give indication on how to handle a hazardous product or how to act in a hazardous situation.

Dingus *et al.* (1991); Wogalter *et al.* (1991) reported that perceived hazardousness and perceived cost of compliance are the most influential factors in determining the consumer's motivation to pay attention to a warning and respond to it in an appropriate way. To affect belief concerning the hazardousness of a product, the consumer should be

adequately informed about the existence, nature and magnitude of the hazards. Narain (2010) reported that the toys in the Indian market contain toxic chemicals. Similar study was carried out by Lesley D. (2010) on plastic toys funded by CSE (Centre for Science and Environment). The results showed that cheap sub standard plastic toys with high level of phthalates run over the Indian market. Phthalates pose serious health risk to young children, affecting their respiratory and skeletal systems and

the reproductive system in the male children. Children under five years of age are at greatest risk. This section of our population is highly vulnerable to the impact of toxins and the extent of the accidents/ injuries are relatively uncharted. This is probably important aspect about child care products. In the present study efforts has been made to make warning symbols effective and comprehensive for use on baby products through the use of comprehension test. This study will help trigger in

**Table 1 : Comprehension test (n=70)**

| Referent    | Symbol | Responses (n=35 parents) |           | Responses (n=35-General public) |           |
|-------------|--------|--------------------------|-----------|---------------------------------|-----------|
|             |        | Correct                  | Incorrect | Correct                         | Incorrect |
| Suffocation |        | 25(71)                   | 10(29)    | 25(71)                          | 10(29)    |
|             |        | 32(91)                   | 3(9)      | 30(85)                          | 5(15)     |
|             |        | 23(66)                   | 12(34)    | 23(66)                          | 12(34)    |
| Unattended  |        | 24 (68)                  | 11 (32)   | 26(74)                          | 9(26)     |
|             |        | 27(77)                   | 8(23)     | 30(85)                          | 5(15)     |
|             |        | 29(89)                   | 6(17)     | 27(77)                          | 8(23)     |
| Age         |        | 29(89)                   | 6(17)     | 28(80)                          | 7(20)     |
|             |        | 27(77)                   | 8(32)     | 25(71)                          | 10(29)    |
|             |        | 25(71)                   | 10(29)    | 22(63)                          | 13(37)    |
|             |        | 26(74)                   | 9(26)     | 25(71)                          | 10(29)    |
|             |        | 28(80)                   | 7(20)     | 26(74)                          | 9(26)     |
| Weight      |        | 27(77)                   | 8(23)     | 25(71)                          | 10(29)    |
|             |        | 26 (74)                  | 9(26)     | 25(71)                          | 10(29)    |
|             |        | 25(71)                   | 10(29)    | 32(91)                          | 3(9)      |
|             |        | 29(89)                   | 6(17)     | 30(85)                          | 5(15)     |
|             |        | 28(80)                   | 7(20)     | 25(71)                          | 10(29)    |
|             |        | 25(71)                   | 10(29)    | 28(80)                          | 7(20)     |
|             |        | 25(71)                   | 10(29)    | 30(85)                          | 5(15)     |

the amount of accidents as well as the exposure they cause to children.

## METHODS

Experimental research design was planned to carryout the study. Under experimental research design comprehension test was used for collection of data related to warning symbols, to assess the comprehensibility of warning symbols for child care products. Preference ranking sheet was also developed to select the two most preferred symbols by parents and general public.

From Uttarakhand state, district U.S.Nagar, Pantnagar was purposively selected for the data collection. For this, total sample size of 70, out of which 35 parents, from the age group of 25-35 years and 35 from general public, having the age of 35-45 years were selected.

### Comprehension test:

In the comprehensibility test, the sample population was first explicitly told about the context of use of symbols, and then they were shown one symbol variants per referents and asked to determine what they think each symbol means. The percentage of correct interpretation of a symbol determines its comprehension score. For this study the acceptance criteria was set as 80 per cent correct interpretation with less than 4 per cent opposite interpretations. However there is agreed criterion for the acceptance of the worrying symbols. For public information symbols in general ISO prescribed acceptance criteria of 66 per cent. The results of comprehensibility test *i.e.* the interpretations given by the sample population indicated that why symbols are misunderstood. This information can further be utilized to adapt variants to improve their comprehensibility. preference ranking sheet was also developed from each referents which were chosen by the parents and the general public.

## OBSERVATIONS AND ANALYSIS

Data for the symbols suffocation, unattended, and age were collected from a sample of 70 *viz.*, 35 from parents and 35 from general public, respectively.

Table-1invisaged the results for “suffocation” indicated a comprehension score for the first symbol as 91 per cent and 85 per cent, respectively for parents and general public. Neither triggers more then a negligible percentage of checked responses. The symbol was sufficiently well understood to accept then as properly representing the warning they stand chosen for the study and criterion meet the ISO acceptance criteria for public information symbols.

Results for “unattended” indicate a similar comprehension score of 89 for parents and general public which also means it meets the acceptance criteria. Results for “age” indicate that

symbol variant first and fourth can be accepted as the comprehension score is 89 per cent and 80 per cent, respectively whereas for weight only first variant meets the acceptance criteria with a comprehension score of 80 per cent.

A similar study has been done by Zwaga *et al.* (1991) in which they develop and evaluated a set of warning symbols. Edworthy and Adams (1996) stressed the point that iconic information in the form of warning symbols can at least have an alerting function even if the consumer does not understand the meaning of the symbols.

With the help of comprehensibility score, the selected two symbols for each category having highest score, was chosen to be shown to the respondents as the most promising symbols preferred by them by implementing the preference ranking sheet (Table 2). The respondents were asked to rank them as per their view which one is more suitable amongst five categories (suffocation, unattended, age, weight and height).

### Conclusion:

The ISO standards are prescribed for the public

| Table 2 : Preference ranking (n= 70) |        |      |           |
|--------------------------------------|--------|------|-----------|
| Referent                             | Symbol | Rank | Responses |
| Suffocation                          |        | I    | 57 (95)   |
|                                      |        | II   | 38 (63.3) |
| Unattended                           |        | I    | 58 (96.6) |
|                                      |        | II   | 52 (86.6) |
| Age                                  |        | I    | 55 (91.6) |
|                                      |        | II   | 46 (76.6) |
| Weight                               |        | I    | 58 (96.6) |
|                                      |        | II   | 47 (78.3) |
| Height                               |        | I    | 56 (93.3) |
|                                      |        | II   | 52 (86.6) |

information symbols, not for warning symbols which need more stringent requirements. For this study the acceptance criteria was set as 80 per cent correct interpretation with less than 5 per cent opposite interpretations. The results of comprehensibility test, *i.e.* the interpretation given by the sample population indicated that why symbols are misunderstood. This information can further be utilized to adopt variants to improve their comprehensibility. Feasibility of a warning message is determined by the ability of the intended user to specify two aspect of a warning: the possible danger involved and the measures one should take to avoid possible danger. If one and or the other are insufficiently known, this information should be represented in the proposed symbols.

## REFERENCES

- Dingus, T.A., Hathaway, J.A. and Hunn, B.P. (1991). A most critical warning variable: two demonstration of powerful effects of costs on warning compliance. Proceedings of the human factors society 35<sup>th</sup> annual meeting. Human Factors Society, 1034-6.
- Dorris, A.L. and Purswell, J.L. (1998). Human factors in the design of effective product warnings. Proceedings of human factors society 22th annual meeting. Human factors society, 343-6.
- Edworthy, R.S. and Adams, A. (1996) Warning Design: A Research Perspective. London: Taylor & Francis.
- Narain, Sunita (2010). Majority of toys in Indian market contain toxic chemical: Study. News Flash.
- Otsubo, Shirley M. (1999). A behavioural study of warning labels for consumer products: perceived danger and use of pictographs. Human Factors and Ergonomics Society Annual Meeting Proceedings, forensics professional, 536-540.
- Wogalter, M.S., Brelsford, J.W. and Desaulniers, D.R. (1991). Consumer product warnings: The role of hazard perception. *J. Safety Res.*, **22**(2):71-82.
- Zwaga, Harm J. and Mijksenaar, Paul (2008). The Development and Standardization of Warning Symbols; The Role of Design and Human Factors Human Factors and Ergonomics Society Annual Meeting Proceedings.