

## **Older adults' comprehension of warning symbols: Effects of contextual cues**

M.F. Lesch, W.R. Powell, W.J. Horrey, & M.S. Wogalter

Presented at the 4th International Conference on Applied Human Factors and Ergonomics. San Francisco, CA, July, 2012.

### Abstract

Safety communications often incorporate symbols since they have the potential to be seen from further distances than text, to be remembered better than text, and to communicate to target populations of varying language backgrounds. While there are clear advantages to incorporating symbols into warning communications, several studies indicate that older adults have greater difficulty than younger adults in understanding warning symbols (e.g., Hancock *et al.* 1999; Lesch 2003).

Based on a review of age-related declines in cognitive abilities, we (Lesch *et al.* 2011) hypothesized that older adults may have particular difficulty with more complex symbols as well as less comprehensible symbols (where comprehensibility is based on judgments of: "How easy would it be to understand this symbol in isolation? That is, without knowing anything else about it, do you think the meaning would be obvious?"). An effect of complexity is expected on the basis a reduced ability to "shut off" irrelevant information (Hasher *et al.* 1991, see also Zacks *et al.* 1996) or on the basis of a reduced ability to selectively attend (e.g., Alain *et al.* 1996, McCalley *et al.* 1995), whereas an effect of comprehensibility is expected on the basis of an increased difficulty in forming associations between previously unrelated entities (see Luo and Craik 2008). We found that both of these variables affected older adults' comprehension, however, it was difficult to disentangle their effects since they tended to be highly (negatively) correlated.

To tease apart the effects of complexity and comprehensibility, the current study used existing symbols that were systematically altered to incorporate contextual cues that would increase the visual complexity of the symbol, as well as its comprehensibility. Comprehension was assessed using a semantic relatedness judgment task. The results suggest that it's not the amount of information (i.e., complexity) contained in the symbol that is critical, but, rather, whether or not that information is relevant to determining the meaning of the symbol. Older adults' comprehension benefits from the inclusion of additional contextual information.