

## **The Effects of Education and Incongruent Images on Product Warnings**

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**Abstract:** The research reported in this article investigates how the education level of consumers affects liking and safety feeling toward a product when incongruent images are present with product warnings. The current study used a 2 by 2 experimental methodology to investigate underlying psychological processes of adult consumers who have varying levels of education. The current study finds that relative to high-education consumers, low-education consumers (those who did not complete high school) were more significantly affected by the presence of incongruent images in the product warnings. They displayed higher liking and more safety feeling toward a product when warnings accompanied incongruent images versus warnings with no images. This effect is not found among high-education consumers. That result has alarming implications. Low-education consumers may be unable to critically evaluate product warnings and can be persuaded to misjudge product warnings and product safety when product warnings include incongruent images. The current research extends the previous research on low-education consumers by studying the impact of incongruent images in the product warnings. Specifically, we focus on investigation of subjective attitude formation of warnings (liking and safety feeling) in the presence of incongruent images which was not investigated in the past.

**JEL Classifications:** C91

**Keywords:** Product Warnings, Low-Education Consumers, Incongruent Images, Product Safety

### **1. Introduction**

Product complexity, increasing public safety concerns, liability lawsuits, and stricter government regulations have increased the number and type of products that include labels warning of possible safety hazards when using them. As a result, public policymakers and marketers are devoting more attention to warning message effectiveness (Argo & Main, 2004). A warning label is a message attached to a product, or included in product instructions, that warns the user and the buyer about the risks associated with exposure or use of the item. Labels can be used to caution users about harmful consequences of product use (smoking cigarettes), to warn users of potentially serious situations (peanuts in snack food and allergy), or, in extreme cases, to alert the user to eminent danger if not

avoided (chemical exposure). All of these situations are potentially dangerous and the message can be changed for different degrees of seriousness. But marketers cannot make sure their message is heeded. Because the consequences may be dire, including injury or death of the product user, it is important for marketers to understand how to make warnings more effective. At the same time, the strategic purpose of a marketing communication is rarely to deliver a warning. A promotional message is intended to move a potential buyer through the response hierarchy, from awareness to action.

Research on warning labels has considered factors that may weaken product warnings. The content of the label itself may be confusing and cluttered (Lehto & Miller, 1988). Consumers may not take the time or be interested in processing the information on a label due to lack of time, disinterest, or carelessness. Personal characteristics such as ability to read or understand the content (Mick, 1992), and/or age (Dywan & Jacoby, 1990), interfere with warning label effectiveness. Due to these circumstances, there is growing use of graphics and pictures to communicate product information, often in conjunction with text description. Interpretation of visual content is near universal, eliminating the need to specify messages for different audiences. A picture more easily conveys drama and emotion, replacing the need to use lengthy written passages to describe risk. Marketers have experience using visual messages. Images are often used in marketing communication to attract attention of the target audience (O'Guinn, Allen, & Semenik, 2003). Extending this practice, advertisers use incongruent visual brand information (Halkias & Kokkinaki, 2013), or images not in conjunction with the ad's written messages, to increase attention (Heckler & Childers, 1992; Schmitt, Tavassoli, & Millard, 1993). Visualization attracts attention. Written copy describes features, or makes detailed comparisons with competitive products.

Despite apparent advantages, the use of imagery in product warnings should be carefully investigated within the context of greater visual image use overall. Product warnings are often accompanied by pictorial images used to attract consumers' attention to the overall communication. This can aid consumer understanding of warnings (Kelley, Gaidis, & Reingen, 1989). It can also result in more confusion and misunderstanding of warnings (Lerner & Collins, 1980) when pictorial images are not congruent with product warnings. For example, fabric softener brands such as "Savvital" or "Snuggle" have images of mom holding a baby, or teddy bear, that signal warmth and softness so as to attract consumers' attention to products. Yet, product warnings for these products provide a claim that use of the product is prohibited for children's sleepwear, delivering a message that is incongruent with images. Such incongruent images in product warnings could be not only confusing but also harmful to consumers. Complicating the issue, research has explored potential moderators that may interfere with product warning effectiveness, such as the use of vividness-enhancing images (Young & Wolgater, 1990).

Contrary to claims that incongruent images can deliver positive outcomes, such as increased attention (Heckler & Childers, 1992), adding incongruent pictorial images may not always enhance evaluation of product warnings. Visuals added to attract audience attention may distract consumers so that they are not able to engage in sufficient cognitive elaboration (Sanchez & Wiley, 2006). The problem may be even more serious for low-education consumers (Note 1) since reliance on simple cues (e.g.

modest vocabularies) is one of the coping strategies in navigating the marketplace for low-education consumers (Lepkowska-White & Parsons, 2001).

Marketplace presence in the United States of low-education adults, those who did not complete high school, is significant. National Center for Education Statistics show that high school drop-out rates of 16 through 24 year olds in the U.S. was 7 % in 2011. The rate declined from 1990, when it was 12 % (U.S. Department of Education, 2013), but the problem is still extensive and may pose significant threats to marketers. Lack of general school education has been highly correlated with low income (Gerber *et al.*, 2008), poor health status (Ross & Wu, 1996), and lack of basic knowledge and skill needed for participation in the political process (Emler & Frazer, 1999). Consumers who did not complete high school are less likely to believe alcoholic beverage is harmful, and are less likely to believe that alcoholic beverage contains warning messages (Mazis, Morris, & Swasy, 1991). Lepkowska-White and Parsons (2001), studying students working on their GED certificates, found that when consumers with lower education levels are confronted with product warnings written using either simple or complex vocabulary, they reported higher comprehension levels, more positive attitudes, and feelings of safety toward product warnings that are written more simply.

The study reported here extends previous research on the effectiveness of warning labels when the audience is low-education consumers. The focus of the investigation is subjective attitude formation toward warnings (liking and safety feeling) in the presence of incongruent images. The objective is to understand underlying psychological processes that influence low-education consumers in their efforts to evaluate product warnings in the presence of incongruent images.

## 2. Conceptual Background and Hypotheses

The Elaboration Likelihood Model (ELM) (Petty & Cacioppo, 1981) posits that processing of persuasive messages typically follows one of two routes when leading to attitude change. When individuals are motivated and able to process message arguments, their elaboration of reasoning for behavior follows a central route to persuasion. The claims supporting positive outcomes are systematically examined, logically evaluated, and favored. Alternatively, when individuals lack motivation and/or ability, their elaboration follows a peripheral route to persuasion. ELM argues that when individuals make decisions following peripheral routes because of lack of motivation or ability, their decision is based on outlying cues, such as pictures, source credibility, or number of arguments presented in a message, not the quality of the arguments (Petty & Cacioppo, 1984).

The study reported here focuses on consumer ability to process information, as represented by education, and proposes that level of education is an important factor that influences the manner in which persuasive marketing messages are evaluated. Consumers with low-education level are expected to devote more attention to peripheral cues when they evaluate product relevant messages, because of their limited cognitive capacity (Wagner, Venezky, & Street, 1999).

Previous research has established that low-literate individuals (0 to 6<sup>th</sup> grade reading level) were more likely to rely on peripheral cues such as incongruent but attractive pictorial images to make a product

choice (Jae & DelVecchio, 2004) or to comprehend product information (Jae, DelVecchio, & Cowles, 2008). Low-literate consumers (0 to 12<sup>th</sup> grade level) in the extant qualitative research present similar findings (Viswanathan, Rosa, & Harris, 2005), indicating that they use pictorial cues to engage in decision making. Based on these findings, it is predicted that low-education consumers will put more attention on product warnings in the presence of incongruent images versus no images, because of reliance on peripheral cues. The following hypothesis is proposed.

***H1:** Relative to high-education consumers, low-education consumers will pay more attention to product warnings in the presence of incongruent images versus no images.*

Since low-education consumers rely on peripheral cues in evaluating marketing messages, they may not fully attend to actual quality of product warning messages (Petty & Cacioppo, 1984). In cognitive psychology, the peripheral cues used by low education consumer can be explained by the concept of seductive detail. Seductive details, such as interesting and colorful illustrations irrelevant to text, were originally used to stimulate interest in assigned reading materials for bored students in classroom settings (Garner, Gillingham, & White, 1989). Contrary to expectations, however, seductive details hindered retention of reading material compared with comprehension levels when seductive details were omitted (Harp & Mayer, 1997). Thus the *seductive-detail effect* occurs when pictures or propositions irrelevant to the accompanying text are so distracting that they hinder understanding of the message (Garner *et al.*, 1989; Garner, Brown, Sanders, & Menke, 1992; Sanchez & Wiley 2006).

By interfering with the processing of textual information, seductive details have been shown to interfere with cognition (Sanchez & Wiley, 2006), especially for individuals with limited education who presumably have low working memory capability and are less likely to ignore irrelevant information. Individuals with high working memory capability, in contrast, have demonstrated ability to resist interference and are less vulnerable to seductive-detail effects (Kane & Engle, 2000; Sanchez & Wiley, 2006). A limited number of studies have directly tested seductive detail effect on attitude formation. Park (2005) found seductive graphical images increased readers' attitude scores toward computer learning material but did not increase recall and comprehension. The purpose of warnings in the product is to inform consumers about the danger of potential misuse of product. For low-education consumers, since they appear to rely on incongruent but attention-grabbing images for their product evaluation, they are likely to prefer a product with incongruent images, without careful consideration of warnings. Thus, the following hypothesis is proposed.

***H2:** Relative to high-education consumers, low-education consumers will report more liking toward a product with warnings in the presence of incongruent images versus no images.*

Lepkowska-White and Parsons (2001) found that low-educated adults preferred warnings stated using uncomplicated language more than warnings stated with complex language. Warnings using straightforward vocabulary make them feel safer, while warnings with difficult language failed to evoke safety feelings. Those more positive safety feelings may cause low-education consumers to fail to critically evaluate actual warning statements. When low-education consumers are distracted by incongruent images, they may not be able to properly evaluate product safety. Instead, confronted with incongruent images, they may report that product warnings make them feel safer about a product

than they feel when viewing warnings accompanied by no images. For high-education consumers, the seductive-detail effect should be less evident and incongruent images less intrusive. This leads to the following hypothesis:

*H3: Relative to high-education consumers, low-education consumers will report more safety feeling toward a product with warnings in the presence of incongruent images versus no images.*

### 3. Research Design

#### 3.1 Experimental Design

The study design is a 2 X 2 between subject design with the first factor being education level (low: GED versus high: college) and the second factor being presentation mode of product warning statements (incongruent images versus no images). One group of participants included 65 adults (mean age = 35.7, 56% female) who were enrolled in a GED program from several adult education centers in the eastern United States. Subjects were assigned to one of the two warning conditions, 32 to one and 33 to the other. They were paid \$5.00 for participating. The second group of participants included 64 undergraduate upper-level business students from a large eastern U.S. university (mean age = 22, 50 % female). They participated for extra course credit. These subjects were evenly assigned to the two warning conditions.

#### 3.2. Stimuli Materials

The experimental stimuli focused on a fictitious detergent advertisement, written at the sixth-grade reading level, used in a prior research study with different subject pools (Jae & Viswanathan, 2012). The product, given the brand name *Visatia*, was featured in two ads. Both had a generic picture of a detergent bottle and prominent display of the *Visatia* brand name, but differing pictorial imagery accompanying the product-warning statements.

The first ad says:

Try a new fabric softener *Visatia*! There is nothing like the line-dried freshness of clothes hanging in the breeze. Now you can have that fresh feeling everyday with *Visatia*.

Product warnings are provided in the copy:

Keep away from children. If it gets into your eyes, wash well with water. Do not use on fluffy cotton fabrics such as fleece and terry cloth. Using this product can increase the danger of clothing catching on fire because it reduces flame resistance. Do not use this product on children's sleepwear because it may increase the danger of catching on fire.

In addition, the ad includes attention-grabbing images that are incongruent with the product warning: children, baby clothing, a toy bear, and a woman kissing a baby. Figure 1 depicts the sample stimulus.



**Figure 1.** Sample Stimulus (Incongruent Images)\*

\*Adopted from Jae and Viswanathan (2012)

### 3.3 Procedures and Measures

Prior to conducting the experiment, IRB approval was required from both a university and adult education organizations. Low-education participants were recruited through GED programs of several adult education programs. Several quiet rooms that were some distance from classrooms were provided for surveying participants in small groups. Since subjects were inexperienced in filling out surveys, each survey page featured only one question, prominently printed in 18- to 20-point fonts. Rather than using numerical ratings for answering subjective questions, a visual bar scale was used (Martini & Page, 1996). Participants took about 10 minutes to first view the ad and then, using paper and pencil, reported their liking and feeling of safety toward the product on seven-point Likert-type scales (*not very much/very much, not safe/very safe*). Single items were used to measure dependent variables to avoid cognitive overload for consumers with lower education level.

The question to gauge level of attention reads:

Please tell us how much attention you paid when you read warning messages. Please let us know how much attention you paid by circling the blocks. A bigger block means you paid a lot of attention and a smaller block means you paid very little attention.

The question to gauge attitudes toward product reads:

Please tell us how much you liked this product. If you feel that you liked this product a lot, please circle one of the bigger blocks. If you feel that you did not like the product at all, please circle one of the smaller blocks.

The attitude toward product safety questions reads:

Please tell us how safe you feel about using this product. If you feel that this product is very safe to use, please circle one of the bigger blocks. If you feel that this product is not at all safe to use, please circle one of the smaller blocks.

Figure 2 shows the sample visual scale.

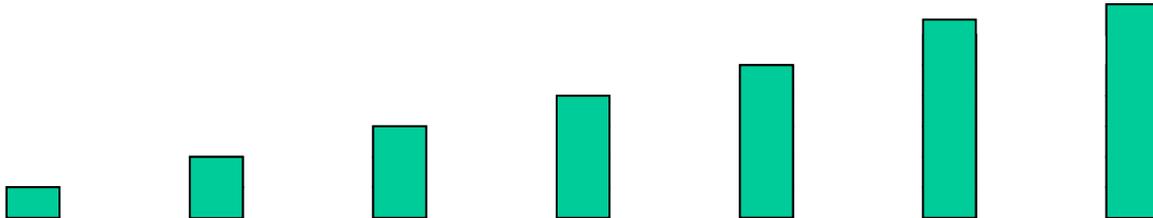


Figure 2. Visual Scale

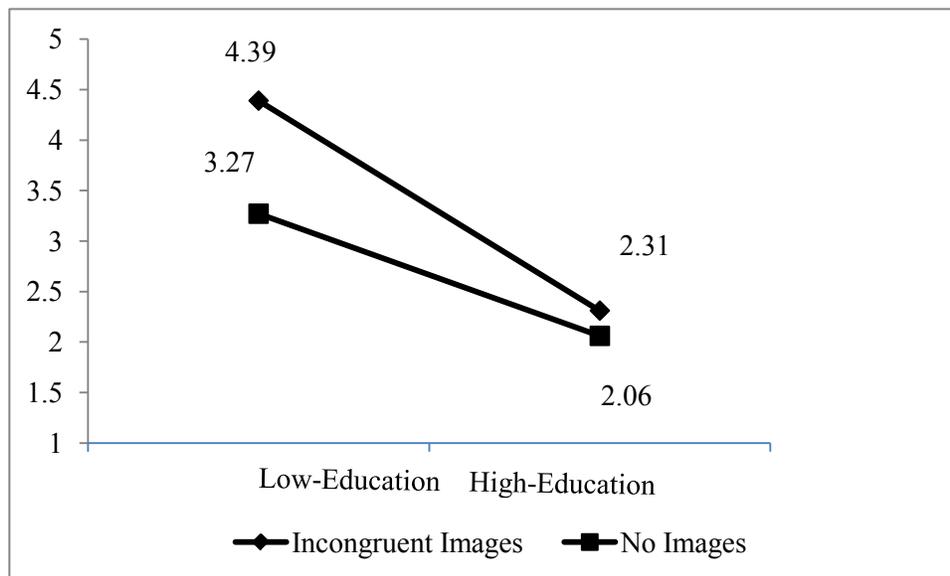
## 4. Results

The study included three dependent measures: level of attention, liking and feeling of safety toward product. Each of these was examined across different levels of education, and in presentation formats where product safety warnings were provided in text form, and visually, using congruent and incongruent imagery. Data analysis was conducted using GLM MANCOVA (age as a covariate) on these three measures and found main effects on education ( $F(3, 123) = 10.69, p < .000$ ) and presentation format ( $F(3, 123) = 2.73, p < .05$ ) and significant interaction effects between education and presentation formats  $F(3, 123) = 3.572, p < .05$ . Age was entered to the model to test whether age revealed any significant influence on dependent variables but it was found to have no effect, nor any interaction effect with other variables. To test specific hypotheses, a separate univariate analysis was conducted for each of the three dependent measures.

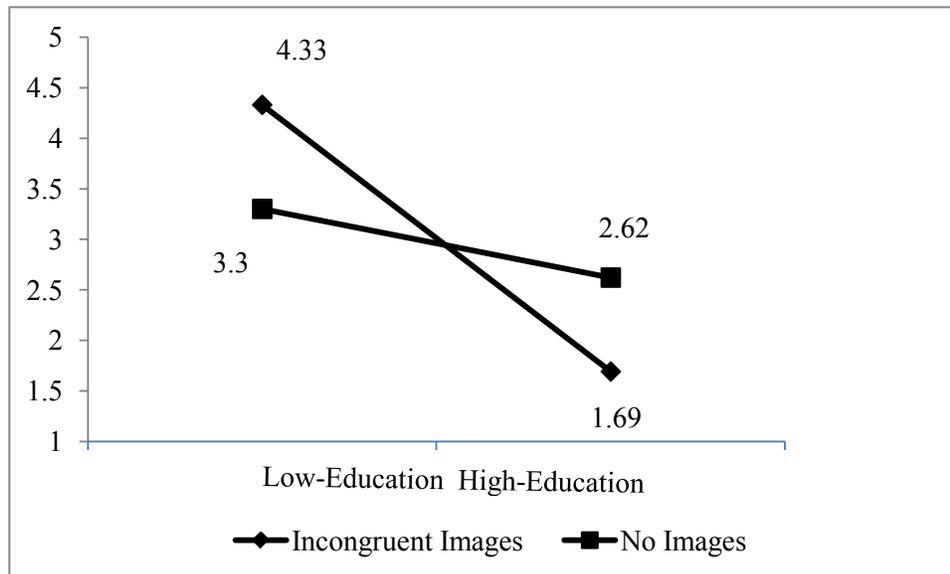
**4.1 Attention** – There was no significant main effect on the level of education for the level of attention ( $p > .3$ ). A follow-up analysis also did not find an interaction effect between education and presentation format on the level of attention paid to the product messages ( $p > .7$ ). Low-education participants reported no significant difference in amount of attention they paid to the warnings in the presence of incongruent images versus no images whereas high-education participants paid only marginally more attention to the incongruent condition (low-education:  $Mincon = 5.72$  versus  $Mno = 5.34, t = -.88, p > .3$ , high-education:  $Mincon = 5.56$  versus  $Mno = 5.00, t = -1.81, p = .075$ ). A meaningful result from this comparison was that low-education participants paid as much attention as high-education participants to both pictorial conditions (incongruent image:  $Mlow = 5.72, Mhigh = 5.56, t = .53, p > .5$ , no image  $Mlow = 5.34, Mhigh = 5.00, t = .78, p > .4$ ). In addition, regardless of different type of pictorial images, low-education participants paid a similar amount of attention to the two product warnings. Thus, the hypothesis 1 is not supported.

**4.2 Attitude toward the Product** – A separate analysis for liking toward the product was conducted, varying the main effect of education,  $F(1, 125) = 29.47, p < .000$ . Education and presentation formats showed a significant two-way interaction  $F(1, 125) = 6.08, p < .05$ . Education level had a different effect on attitude toward the product ads under different picture conditions. As a follow-up, one-way ANOVA was conducted for each education group. Consistent with Hypothesis 2, the analysis revealed that low-education participants displayed significantly higher liking toward the product with incongruent images versus no images ( $Mincon = 4.39$  versus  $Mno = 3.27, t = -2.23, p < .05$ ). No significant contrast results occurred for high-education participants ( $Mincon = 2.06$  versus  $Mno = 2.31, t = .82, p > .4$ ).

**4.3 Product Safety** – Two-way ANOVA was conducted to test Hypothesis 3. Education showed a main effect,  $F(1, 125) = 25.26, p < .000$  and significant interaction effects of education and presentation format on the attitude toward product safety,  $F(1, 125) = 10.65, p < .01$ . As predicted, the *a priori* contrast revealed that low-education participants reported higher ratings toward the product safety for product warning statements with incongruent images versus no images ( $Mincon = 4.33$  versus  $Mno = 3.30, t = -1.93, p = .059$ ). In contrast, high-education participants reported higher ratings toward product safety for product warnings with no images versus incongruent images ( $Mincon = 1.69$  versus  $Mno = 2.62, t = 2.67, p < .05$ ). The result supports the Hypothesis 3. Figures 3 and 4 depict two-way interactions on the liking and product safety feeling toward product.



**Figure 3.** Two-way Interaction on Liking toward Product



**Figure 4.** Two-way Interaction on Safety Feeling Toward Product

## 5. Discussion and Implications

The results of the study are mixed but provide interesting insights for marketing managers and public policy officials. The hypothesized relationship that low-education participants will pay greater attention to product warnings with incongruent images versus no images was not supported. Low and high-education participants did not differ in the amount of attention paid to product warnings with incongruent images ( $M_{low} = 5.72$ ,  $M_{high} = 5.56$ ,  $t = .616$ ,  $p > .5$ ). It is not clear if the incongruent images were ignored by the low-education subjects, or if they were attended to but did not interfere with the safety warning message. Marketers' should be able to use attention-getting images without interfering with the purpose of warning messages. Policy makers should resist making the message on a product all about safety. The question of the nature of the warning message used is not addressed by this result.

Other results did follow expected patterns, confirming hypotheses two and three. Low-education participants used peripheral cues for their evaluation. They reported stronger positive affect and were more favorable toward products that included safety warnings when incongruent images were used than when warnings were stated with no images. The critical result is that while low-education participants felt safer with products that contained warnings with incongruent images, high-education participants felt otherwise. They felt safer with warnings with no images. Apparently, incongruent images increased low-education participants' liking and safety feelings toward a product and distracted subjects from engaging in complete evaluation of product warnings. This did not happen with high-education participants, who were not affected by incongruent images in their evaluation of a product. Marketers should heed this result when including safety warnings with a product. If the target market includes customers at lower education levels, and the product could cause harm or injury, using incongruent images is problematic. Policy makers should follow injury reports for

products that could be unsafe and are targeted to low-education customers. They may want to require a safety warning that is separate from advertising, perhaps packaged with the product, to produce a stronger likelihood that it will be attended to.

## **6. Conclusion and Future Research Directions**

In this study, low-education consumers reported higher positive attitudes and stronger feelings of product safety toward a product that had warnings with incongruent images versus no images. The incongruent image may be more focused on communicating positive features and outcomes from product use. That result has alarming implications when use of the product may be potentially unsafe. Low-education consumers may be unable to critically evaluate product warning statements and can be persuaded to misjudge product warnings and product safety when warnings include incongruent images.

In this study, product warnings written at the sixth grade reading level were used, thus the sample of low-education consumers should not have had any comprehension issues (GED: 9-12<sup>th</sup> grade reading level). However, the subjective evaluation of product warnings between GED and college level in this study displayed significant differences, in spite of product warnings written considerably below their reading level. GED students may obtain a sufficient reading skill to comprehend product relevant messages in a relatively short time, but results from this study suggested they may still be inexperienced in evaluating the product safety message and form overall favorable subjective opinions when distracting incongruent images are present.

Furthermore, this study provides important practical suggestions to managers, who should consider that a low-education market segment may fail to fully evaluate advertising, packaging, assembly, or usage instructions accompanying their products. Specifically, managers should be aware of implications when marketers misuse pictorial information in marketing communication materials that will be viewed by low-education consumers. The study results suggest that public policymakers and governmental agencies such as the Federal Trade Commission (1983) should look into providing more guidelines for product safety warnings. Currently, procedures regarding deceptive information in which incongruent images are coupled with product warnings. Such action would make product manufacturers more aware of how to use such images responsibly. For their part, marketers need to make sure their safety warnings are communicated as clearly as possible. Failure to anticipate harmful behavior can result in potentially damaging lawsuits or fines. Products that gain a reputation for being unsafe, when linked to stories of harm that get reported on newscasts, or posted on blogs and other social media sites, will not fare well in a competitive marketplace. The low-education market is large and potentially lucrative. Even with literacy problems, many of these consumers are savvy to communicating using the Internet.

The study reported here has limitations that need to be addressed. Three single item scales were used to measure dependent variable outcomes. The use of single item scale is known to be as effective as multi- item scales when researchers measure “simple and unambiguous” properties of advertisements

or brands (Bergkvist & Rossiter, 2007). The criterion variables specified here are not usually considered simple or unambiguous. However, considering the sample has low-education, a single item measure could relieve any type of cognitive overload stemming from multi-item scales. Individuals who have difficulty reading might quit the study if faced with several wordy passages. None the less, adopting multi-item scales could have provided results with stronger internal consistency validity.

Sampling issues suggest an additional limitation. The comparison between GED and college treatments, the low and high-education levels, was conducted without a control group because the education gap between GED and college is relatively large. A mixed education level control group would have high variability, diffusing any independent variable effect. The extant studies on low-literate consumers have conducted similar comparisons. When education gap is relatively large between two groups (0 to 6<sup>th</sup> versus college level), a control group was not included considered necessary (Jae & DelVecchio, 2004; Jae, DelVecchio, & Childers, 2011). In this similar situation, the comparison between low and high-education groups without control group is justified.

Several future research directions can be suggested. The main effect of education on attitude evaluation was not predicted because of the possibility that low-education participants might show extreme responses (Greenleaf, 1992). Future research can explore whether low-education consumers are prone to respond with extreme response patterns because they lack experience in answering self-reported survey questions, which may distort survey results. To avoid extreme response style distortion, the interaction effect of education and incongruent image rather than focusing on main effect between low- and high-education participants was focused on. The effect of language difficulty in the product warning is not examined in this study. Future research could investigate the interaction effect of the incongruent images and language difficulty so as to research how varying level of education copes with two factors in evaluating product warnings. American-born low-education consumers were selected for this research. Such selective sampling limits the potential moderating effect of cultural differences. Consumers from varying cultures who have limited English skills may perceive illustrations or incongruent pictures in product warnings differently than English-speaking low-education consumers. Future research could investigate consumers who are studying English as a second language to gain insights into varying perceptions in evaluating product warnings.

The market of consumers who have low-education and low-literacy is large and growing larger. To achieve success with these consumers, marketers will have to understand their unique circumstances and conditions. The purpose of this study is to get that point across, while providing some initial understanding of the challenges marketers will face.

## References

- [1] Argo, J. J., & Main, K. J. (2004). Meta-analysis of the effectiveness of warnings labels. *Journal of Public Policy and Marketing*, 23(2), 193-208. doi:10.1509/jppm.23.2.193.51400
- [2] Bergkvist, L., & Rossiter, J. R. (2007). The Predictive validity of multiple-item versus

- single-item measures of the same constructs. *Journal of Marketing Research*, 44(2), 175-184. doi:10.1509/jmkr.44.2.175
- [3] Dywan, J., & Jacoby, L. (1990). Effects of aging on source monitoring: differences in susceptibility to false fame. *Psychology and Aging*, 5(3), 379-387. doi: 10.1037/0882-7974.5.3.379
- [4] Emler, N., & Frazer, E. (1999). Politics: the education effect. *Oxford Review of Education*, 25(1 & 2), 251-273. doi:10.1080/030549899104242
- [5] Federal Trade Commission (1983). *FTC policy statement on deception*. Federal Trade Commission. Washington, D.C. 20580.
- [6] Garner, R., Brown, R., Sanders, S., & Menke, D. J. (1992). "Seductive detail" and learning from text. In K. A. Renniger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development* (pp. 239-254). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- [7] Garner, R., Gillingham, M. G., & White, C. S. (1989). Effects of "seductive details" on macroprocessing and microprocessing in adults and children. *Cognition and Instruction*, 6(1), 41-57. doi:10.1207/s1532690xci0601\_2
- [8] Gerber, Y., Weston, S. A., Killian, J. M., Therneau, T. M., Jacobsen, S. J., & Roger, V. L. (2008). Neighborhood income and individual education: effect on survival after myocardial infarction. *Mayo Clinic Proceedings*, 83(6), 663-669.
- [9] Greenleaf, E. A. (1992). Measuring extreme response style. *Public Opinion Quarterly*, 56(3), 328-351. doi:10.1086/269326
- [10] Halkias, G., & Kokkinaki, F. (2013). Increasing advertising effectiveness through incongruity-based tactics: The moderating role of consumer involvement. *Journal of Marketing Communications*, 19(3), 182-197. doi:10.1080/13527266.2011.592346
- [11] Harp, S. F., & Mayer, R. E. (1997). The role of interest in learning from scientific text and illustrations: on the distinction between emotional and cognitive interest. *Journal of Educational Psychology*, 89(1), 92-102. doi:10.1037/0022-0663.89.1.92
- [12] Heckler, S. E., & Childers, T. L. (1992). The role of expectancy and relevancy in memory for verbal and visual information: what is incongruency?. *Journal of Consumer Research*, 18(4), 475-492. doi:10.1086/209275
- [13] Jae, H., & DelVecchio, D. S. (2004). Decision-making by low-literacy consumers in the presence of point-of-purchase information. *Journal of Consumer Affairs*, 38(2), 342-354. doi:10.1111/j.1745-6606.2004.tb00873.x
- [14] Jae, H., DelVecchio, D. S., & Childers, T. L. (2011). Are low-literate and high-literate consumers different? applying resource matching theory to ad processing cross literacy levels. *Journal of Consumer Psychology*, 21(3), 312-323. doi:10.1016/j.jcps.2010.11.001

- [15] Jae, H., DelVecchio, D. S., & Cowles, D. (2008). Picture-text incongruity in print advertisements among low-and high- literacy consumers. *Journal of Consumer Affairs*, 42(3), 439-451. doi:10.1111/j.1745-6606.2008.00117.x
- [16] Jae, H., & Viswanathan, M. (2012). Effects of pictorial product-warnings on low-literate consumers. *Journal of Business Research*, 65(12), 1674-1682. doi:10.1016/j.jbusres.2012.02.008
- [17] Kane, M. J., & Engle, R. W. (2000). Working memory capacity, proactive interference, and divided attention: limits on long-term memory retrieval. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 26(2), 336-358. doi:10.1037/0278-7393.26.2.336
- [18] Kelley, C. A., Gaidis, W. C., & Reingen, P. H. (1989). The use of vivid stimuli to enhance comprehension of the content of product warning messages. *Journal of Consumer Affairs*, 23(2), 243–266. doi:10.1111/j.1745-6606.1989.tb00247.x
- [19] Lehto, M., & Miller, J. M. (1988). The effectiveness of warning labels. *Journal of Products Liability*, 11(3), 225-270.
- [20] Lepkowska-White, E., & Parsons, A. L. (2001). Comprehension of warnings and resulting attitudes. *Journal of Consumer Affairs*, 35(2), 278–294. doi:10.1111/j.1745-6606.2001.tb00114.x
- [21] Lerner, N. D. & Collins, B. L. (1980). *The assessment of safety symbol understandability by different testing methods*. PB81-185647. Washington, DC:National Bureau of Standards.
- [22] Martini, T. S., & Page, S. (1996). Attributions and the stigma of illiteracy: understanding help seeking in low literate adults. *Canadian Journal of Behavioral Science*, 28(2), 121-129. doi:10.1037/0008-400X.28.2.121
- [23] Mazis, M. B., Morris, L. A., & Swasy, J. L. (1991). An evaluation of the alcohol warning label: initial survey results. *Journal of Public Policy & Marketing*, 10(1), 229-241.
- [24] Mick, D. G. (1992). Levels of subjective comprehension in advertising processing and their relations to ad perceptions, attitudes, and memory. *Journal of Consumer Research*, 18(4), 411-424. doi:10.1086/209270
- [25] O’Guinn, T., Allen, C. T., & Semenik, R. (2003). *Advertising and Integrated Brand Promotion* (3rd ed.). Mason, Ohio: South-Western.
- [26] Park, S. (2005). *The effect of seductive augmentation and agent role on learning interest, achievement, and attitude*. Published Doctoral Dissertation, College of Education, Florida State University.
- [27] Petty, R. E, & Cacioppo, J. T. (1981). *Attitudes and Persuasion: Classic and Contemporary Approaches*. Dubuque, IA: Wm. C. Brown.

- [28] Petty, R. E., & Cacioppo, J. T. (1984). The effects of involvement on responses to argument quantity and quality: central and peripheral routes to persuasion. *Journal of Personality and Social Psychology*, 46(1), 69-81. doi:10.1037/0022-3514.46.1.69
- [29] Ross, C. E., & Wu, C.-L. (1996) Education, age, and the cumulative advantage in health. *Journal of Health and Social Behavior*, 37(1), 104-120. doi:10.2307/2137234
- [30] Sanchez, C. A., & Wiley, J. (2006). An examination of the seductive detail effects in terms of working memory capacity. *Memory and Cognition*, 34(2), 344–355. doi:10.3758/BF03193412
- [31] Schmitt, B. H., Tavassoli, N .T., & Millard, R. T. (1993). Memory for print ads: understanding relations among brand name, copy and picture. *Journal of Consumer Psychology*, 2(1), 55-81. doi:10.1016/S1057-7408(08)80075-7
- [32] U.S. Department of Education. (2013). *The condition of education 2013 (NCES 2013-037)*. National Center for Education Statistics.
- [33] Viswanathan, M., Rosa, J. A., & Harris, J. E. (2005). Decision making and coping of functionally illiterate consumers and some implications for marketing management. *Journal of Marketing*, 69(1), 15–31. doi:10.1509/jmkg.69.1.15.55507
- [34] Wagner, D. A., Venezky R. L., & Street, B. V. (Eds.) (1999). *Literacy: an international handbook*. Boulder, Colo., and Oxford: Westview Press.
- [35] Young, S. L., & Wogalter, M. S. (1990). Comprehension and memory of instruction manual warnings: conspicuous print and pictorial icons. *Human Factors*, 32(6), 637-649.

## Notes

Note 1. We define low-education consumers as those who did not complete high school and use those who enrolled in GED certificate program (9<sup>th</sup>-12<sup>th</sup> grade reading level) as a proxy for the sample as in Lepkowska-White and Parsons (2001).