

Full Length Research Paper

Comparison of the effects of cognitive age and advertising credibility of the elderly on reading advertising with different information loads

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This study aims to find the different effects on the elderly caused by reading advertising with different information loads due to differences of cognitive age and advertising credibility. Young adults and middle-aged adults are compared with the elderly. The results reveal that different ages show differences in cognitive age but not in advertising credibility. Most of the respondents in the three age groups have a low cognitive age and low advertising credibility. The elderly have insignificant differences for advertising effect with a high information load. Young adults and middle-aged adults reveal significant differences for the advertising effect of a high information load; however, the advertising effect of a low information load shows no differences due to age. Cognitive age is found to influence the advertising effect of a high information load. The advertising credibility of the three groups is significantly related to the advertising effect of both high and low information loads.

Key words: Elderly, information load, advertising effect, advertising credibility, cognitive age.

INTRODUCTION

The trend of aging is a common social problem of the world. Different regions and cultures have different ages. Many studies on the ageing society are actively looking for countermeasures for the problem of aging. The elderly are not just groups of similar ages; they also have generational and individual differences. The elderly in different cultures and environments will have different lifestyles and needs. No matter how active they are, as they age, their physiological and behavioral abilities change. The tardiness of cognitive processing and interpretation causes the efficiency of their information processing to decline.

The elderly are different from general consumers. They

have different physical and psychological traits, cognitive preferences, and reading comprehension. They process information at a slower rate than younger consumers and remember less product-related information (Reams, 2016). With the increasing market potential of the elderly, it is a pity that their consumption habits and marketing communication are not completely understood. Therefore, there is an urgent need to probe into such aspects in order to provide related information as a reference for silver marketing. The so-called silver marketing to elderly consumers is gaining momentum in Asia. In the affluent Asia Pacific area, the ageing market is projected to reach US\$3.3 trillion by 2020. 52% have indicated that the

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ageing market economy is expected to boom from 2020 to 2025. The silver market is one of that business that we cannot afford to ignore (Ageing Asia Investment Forum, 2015).

Research purpose

Many studies on the elderly have mainly focused on the aspects of medical care and social welfare in Asia, with importance attached to studies on elderly-related sports, welfare, education, and health management. However, there is a lack of research on marketing and communication approaches for the elderly. This study classified three age groups: the elderly above 65 years old, older adults aged 45-64, and young adults aged 25-44, to compare their information loads on advertising effect. The research purposes are as follows:

- 1) To compare the differences of cognitive age and advertising credibility for the three age groups.
- 2) To understand the advertising effects of different information loads for the three age groups.
- 3) To examine the significant relationship between cognitive age and advertising credibility on reading advertisements with different information loads.

LITERATURE REVIEW

The elderly

Along with the decline in physical strength, the elderly experience declines in physical action, working memory, and functional efficiency. Owing to the degradation of their information processing abilities, their cognition of time and space will be narrowed, as will their instant information identification ability and response speed to stimuli. The aforementioned changes affect the elderly's fluency in induction, making inferences, semantics and language, concepts of numbers and space, and emotional responses to advertising information (Schaie and Carstensen, 2006:13-24). Moreover, the elderly are less willing to engage in social activities and self-study in Asian society. Therefore, the elderly become isolated from society, increase the gap of real life, become less willing to receive information, and participate less in social activities. The elderly's psychology will be strongly affected by what they are exposed to.

Information load (IL)

Advertisements usually contain such information as price, value, quality, performance, function, content, components, accessibility, unique supplies, flavor, nutrition, packaging, appearance, guarantees, and safety etc., which can all be treated as advertising information (Resnik and Stern,

1977). Advertising designers encode messages to convey consumption motives or needs as stimulation and specifically provide benefits or identifications to trigger the consumers' action.

When consumers have trust in the advertising contents, it is easier to accept the messages and reveal the effectiveness of the advertisement. Different information sources reveal different transmission functions. Advertising information load is the amount of information content in advertising and the audiences' loading of such information when reading advertising. Sweller (2011:37-76) defined the degree of overload for visual or verbal information, stating that complicated information will result in a negative cognitive effect. If there are too many information loads in an ad, the consumers' decision-making time will increase and the decision-making quality will decrease. Therefore, advertising content with a proper information load is more effective. Anderson et al. (2012) found that stronger vertical differentiation is positively associated with the delivery of more product information in a brand's advertisements, and that brands with higher levels of quality include more information cues. Comparative advertisements contain significantly more product information than self-promotional advertisements. In addition, brands with larger market shares and brands competing against generic substitutes with large market shares use ads that have less information content.

However, the amount of advertising information load is directly related to the advertising layout and will vary due to the media being used. Compared to video advertising, print advertising presents more information loads. Moreover, the layout, forms and presentation media are directly associated with the information load in advertising. Therefore, this study aims to find the best effect of information load and recognize the limits of information load receiving and the threshold values of loading for the elderly.

Advertising effect (AE)

How advertising affects consumer behavior is a complicated process that is difficult to explicitly explain. The assessment of advertising effect should not be restricted to surveys on the effect of the advertising itself. Advertising effect can be seen as the economic, psychological, and social benefits of advertising, as well as the sum of the direct and indirect changes caused by advertising information in the process of communication. Advertising effect is an evaluation that changes consumers' cognition, emotion, and action after receiving advertising messages.

The same advertising content will have different advertising effects for different ages and consumer groups. There are many factors affecting the advertising effect. Individuals' demand intensity, prior knowledge, cognitive ability, and engagement will affect the efficiency

and effectiveness of the advertising persuasion.

Furthermore, when consumers hold a good attitude towards an advertisement, they will develop purchase intention. Increasing consumers' attention and influencing their cognition, emotion, and behavior are based by advertising materials (Pozharliev et al. 2015). In addition to consumers' personal characteristics, advertising context and message also influence attitude, effect, and behavior. The extraction and decline of information and memory of the elderly make the effect of advertising messages uncontrollable. Therefore, this study chose cognitive age and advertising credibility as the research moderators to examine the impact of information load on advertising effect.

Cognitive age (CA)

Although physiological age is comprehensively used as a segmentation variable, the assessment of cognitive age is an affecting factor that can better explain the external behaviors of individual responses. The earliest concept of cognitive age was developed in 1950. To date, cognitive age remains a commonly used concept in studies of consumer behavior. Cognitive age is an individual's self-perception of his/her actual age and role (Hong et al., 2013). It is a behavior variable that has more influence than physiological age (Lachman et al., 2009:142-160; Sudbury and Simcock, 2009:22-38). Agrigoroaei and Lachman (2011:1-11) indicated that physiological age is an oversimplified variable that cannot exhibit individuals' abilities or the health status of the elderly. Taking Europe and the United States for example, in general, cognitive age is younger than actual age by approximately 10-15 years. In Asian society, most of the elderly estimate that their cognitive age is younger than their actual age by approximately five years. However, the elderly prefer healthier and more extroverted images (Nielsen, 2015). In terms of the effect of cognitive age on media behavior, the elderly will evade age problems and reminders in the media; however, they do not fully believe in younger advertising roles. This makes it significantly complicated to communicate with and persuade the elderly. Therefore, cognitive age is more suitable to be used as a segmentation tool for assessing consumer behavior. It is also an assessment factor with high reliability. According to Caboral-Stevens (2016), the cognitive age variable includes the four aspects of the feel age, look age, do age, and interest age. Cognitive age was used as one of research variances on information load and advertising credibility in this study.

Advertising credibility (AC)

Advertising credibility is used to judge the reliability of overall advertising and refers mostly to generalized beliefs about integrity, such as trust, honesty, and

truthfulness (Soh et al., 2007). Advertising credibility can be determined by various factors, including trust in the media, advertising, message, products, presentation, and text (Ling et al., 2010; Verstraten, 2015). According to Ling et al. (2010), advertising credibility is a key factor that affects consumers' attitudes and behaviors. The readers' and audiences' trust in information sources will reflect the advertisers' reliability, and their dependence on media is the key factor of advertising credibility. For readers and audiences who do not read, watch, or trust media information, advertising is ineffective. Therefore, advertising credibility shows the readers' and audiences' acceptance of the media. The most important factors are information credibility and media credibility.

Information credibility refers to the credibility of the sources or contents, and it depends on their reliability, rationality, and completeness. Many studies have focused on the persuasive influence of the source information when the information provides a stronger influence based on the comprehension, adoption, and trustworthiness of advertising information (Dou et al., 2012). Effective media and proper content are also important factors of advertising credibility. The information in advertisements can influence how consumers receive the information and their attitudes towards the products, which determine the quality and quantity of the message.

Consumers' information credibility for different media will differ due to various lifestyles and media uses. Buchanan (2016) demonstrated that the information sources of traditional media are more reliable than those of non-traditional media. Different age consumers will be concerned about different media and information sources. The information that can be remembered and recalled by consumers will be affected by the memories they have encoded, stored, and are capable to retrieve during the purchase process (Verstraten, 2015).

When consumers can properly receive information and are not skeptical of the messages of the brand, advertising, or media, the advertising information will have a positive correlation with advertising attitude. Advertising credibility is important to research, because consumers tend to distrust advertising. This study treated the four dimensions of credibility, trust, precision, and justice and completeness constructed by Soh et al. (2007) as the base to conduct general investigation on advertising credibility (Soh et al., 2007; Blackshaw, 2008). For the elderly, the cognitive understanding of advertising messages is the first step of trust, therefore advertising credibility was used as the other research moderator in this study.

METHODOLOGY

Research design

This study assumed that the information load will affect the

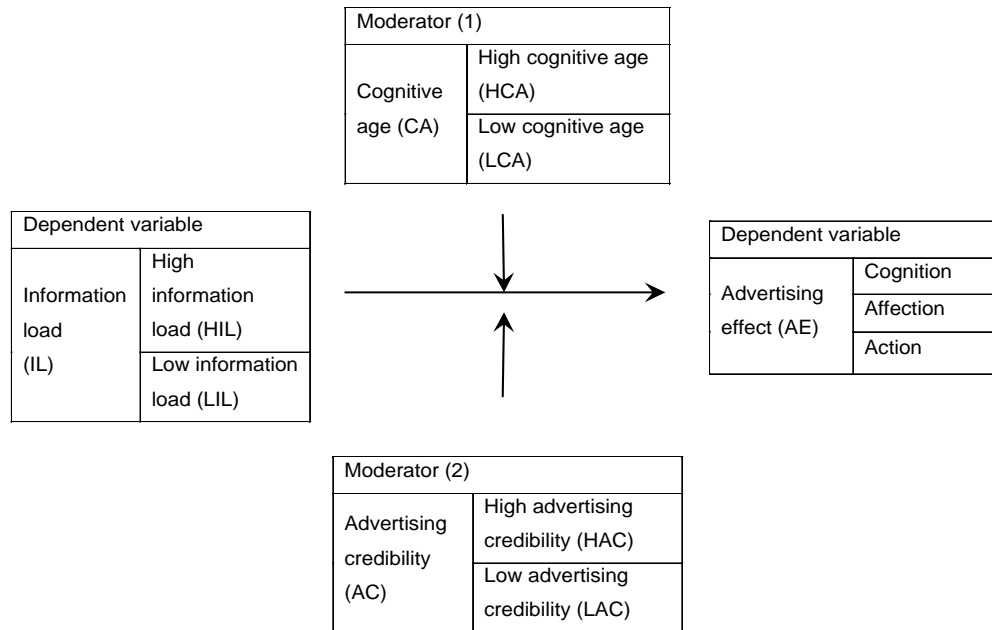


Figure 1. Research framework.

effectiveness of advertisements for the elderly. Therefore, using three age groups as a comparison, this study examined the impact of information load on advertising effectiveness and used cognitive age and advertising credibility as moderators to understand whether the elderly would be affected by personal cognitive age and advertising credibility when reading advertisements.

This study selected 127 respondents aged from 25 to 79 as participants. First, this study measured the cognitive age and advertising credibility of the three age groups. Second, this study used ad samples for a questionnaire survey on advertising effect with different information loads, including cognition, affection, and action. Third, we examined the effect of cognitive age and advertising credibility as moderators on information load and advertising effect.

Newspapers were selected as the sample of advertising media, owing to restrictions on study sites and manpower, as well as the fact that newspapers are the second-most preferred media of the elderly (read by as many as 52.6% of the respondents) (Nielsen, 2011). High and low information load samples were selected randomly. In consideration of the differences in logic and understanding of the questions by the elderly, the number of questions was reduced and the wordings were revised based on experts' validity to facilitate the conduct of the study.

This study hypothesized that the effect of advertising information load would vary because of the changing information-receiving abilities of the different age groups. By adjusting the amount of information load in advertisements, the threshold value and effect of the audiences' advertising information receiving abilities were recognized to find if a high information load would be an obstacle for the elderly. The test sample (See Figure 4 and Figure 5) was designed with high and low information loads that were based on the average messages in ads. The samples with a high information load included prices, images, and a long text about the products and attributes, pictures and signatures of spokespeople, slogans, and background pictures, etc. The samples with a low information load only included prices, images, and a short text about the products or pictures of spokespeople, etc. This study chose the health supplement of Viartril-S as the sample product in this study.

Research framework

Cognitive age and advertising credibility were used as moderators to investigate the advertising effect on different information loads. The research framework is shown in Figure 1.

Research hypotheses

According to the research objective, the following hypotheses were developed:

- H1: Cognitive age and advertising credibility of the three age groups will be different.
- H2: The advertising effect of high and low information loads of the three age groups will be different.
- H3: The cognitive age and advertising credibility of the different ages will be significantly related to the advertising effects when reading advertisements with different information loads.

Reliability and validity

The reliability of the questionnaire is shown in Table 1. The Cronbach's α coefficients were all greater than .6. The Cronbach's α coefficient for cognitive age was .816, that for advertising credibility was .827, that for advertising effect with a high information load was .878, and that for advertising effect with a low information load was .835. The reliability and validity of the questionnaire was therefore acceptable.

Hypothesis verification

H1: The cognitive age and advertising credibility of the three age groups will be different.
 As shown in Table 2, the results of the independent t test on cognitive age for the three age groups were all at a significant level, indicating that the different age groups varied on their cognitive

Table 1. Questionnaire reliability.

Item		Mean	Sd	α after item deletion	α			
CA	Do you think that you are younger than your actual age?	1.58	0.988	0.694	0.816			
	Do you think that your appearance looks younger than your actual age?	1.69	1.144	0.666				
	Do you think that your actions are younger than those of your actual age?	1.66	1.025	0.688				
	Do you think that your interest age is younger than your actual age?	1.61	1.040	0.944				
AC	I think the content of advertising is reliable.	2.48	1.053	0.726	0.827			
	I think the content of advertising is correct.	2.87	1.224	0.756				
	When I read advertising, the content is enough for me	3.11	1.071	0.799				
AE of HIL	Cognition	I find that the content of the advertising is comprehensible	2.13	8.39	0.878	0.878		
		I find that the advertising can attract my attention	2.52	1.007	0.847			
	Affection	I like the product in the advertising.	2.39	9.10	0.850			
		I intend to understand more about the product information in the advertising	2.34	9.19	0.847			
	Action	After reading the advertising, I find the product to be worth buying	2.11	0.789	0.863			
		After reading the advertising, I will be willing to purchase the product	2.65	1.004	0.875			
	AE of LIL	Cognition	I find that the content of the advertising is comprehensible	2.41	0.876		0.835	0.835
			I find that the advertising can attract my attention.	2.72	0.973		0.787	
Affection		I like the product in the advertising	2.34	0.789	0.807			
		I intend to understand more about the product information in the advertising	2.94	0.982	0.759			
Action		After reading the advertising, I find the product to be worth buying	3.41	0.937	0.842			
		After reading the advertisement, I will be willing to purchase the product	3.08	1.036	0.812			

age. It could be said that cognitive age varied with age. The results of the independent t test on advertising credibility for the three age groups did not reach a significant level, indicating that the advertising credibility of the different age groups was mostly the same. Therefore, the degree of advertising credibility did not vary with age differences.

H2: The advertising effect of high and low information loads of the three age groups will be different.

Table 3 shows that the results of the independent t test of the advertising effect of a high information load were only significant for young adults and middle-aged adults. The results of the advertising effect of a low information load for the three age groups were all insignificant, indicating that the advertising effects of a low information load were mostly the same for different age groups. Only the young and middle-aged groups differed in the advertising effect of a high information load.

H3: The cognitive age and advertising credibility of different ages will be significantly related to the advertising effects when reading advertisements with different information loads.

As shown in Table 4, the results of the covariance effect of cognitive age demonstrated that the influence of a high information load on advertising effect was insignificant ($F_{(1,123)}=.033$, $P=.855>.05$). The explained power of cognitive age on the advertising effect of a high information load was low. The result of the within-group effect test was significant ($F_{(2,123)}=3.832$, $P=.037<.05$), indicating that the cognitive age of different age groups would influence the advertising effect of a high information load. As shown in Table 4, the result of the covariance effect of

cognitive age was $F_{(1,123)}=.057$, $P=.812>.05$, demonstrating that the influence of a low information load on advertising effect was insignificant. Thus, the explained power of cognitive age on the advertising effect of a low information load was low. The within-group effect test was insignificant ($F_{(2,123)}=.150$, $P=.861>.05$), indicating that the cognitive age of different age groups would not influence the advertising effect of a low information load.

As shown in Table 5, the pair comparison results demonstrated that the advertising effect of a high information load for the elderly was lower than that for young adults. The elderly and young adults revealed a significant difference, but there was an insignificant difference between the elderly and middle-aged adults. The three age groups all showed an insignificant effect of a low information load.

As shown in Table 6, the results of the covariance effect of advertising credibility demonstrated that the influence on the advertising effect of a high information load was insignificant ($F_{(1,123)}=1.732$, $P=.191>.05$). The explained power of advertising credibility on advertising effect was low. The result of the within-group effect test was significant ($F_{(2,123)}=3.106$, $P=.048<.05$), indicating that the advertising credibility in the different age groups influenced the advertising effect of a high information load. The effect of a low information load was significant ($F_{(1,123)}=12.379$, $P=.001<.05$). The explained power of advertising credibility on the advertising effect of a low information load was high. The results of the within-group effect test were ($F_{(2,123)}=1.564$, $P=.213>.05$), indicating that the advertising credibility in the different age groups did not influence the advertising effect of a low information load.

As shown in Table 7, the pair comparison result revealed that the advertising effect of a high information load for the elderly was

Table 2. Result of cognitive age and advertising credibility.

Variables	Age	n	Mean	Sd	T value	P value
Cognitive age	Young × Middle-aged	61	1.08	0.192	-5.185	0.000**
		39	1.72	0.750		
	The elderly × Middle-aged	39	2.77	0.693	-5.767	0.000**
		27	1.72	0.750		
	The elderly × Young	61	2.77	0.693	-12.434	0.000**
		27	1.08	0.192		
Advertising credibility	Young × Middle-aged	61	2.63	0.918	-1.725	0.088
		39	2.97	0.970		
	The elderly × Middle-aged	39	3.02	1.012	-.238	0.812
		27	2.97	0.970		
	The elderly × Young	61	3.02	1.012	-1.784	0.078
		27	2.63	0.918		

* P<.05, **P<.01.

Table 3. Result of advertising effect with high and low information loads.

Variables	Age	n	Mean	Sd	T value	P value
High information load (HIL)	Young × Middle-aged	61	2.29	0.538	-2.513	0.014*
		39	2.58	0.615		
	The elderly × Middle-aged	27	2.28	0.653	1.908	0.061
		39	2.58	0.615		
	The elderly × Young	61	2.28	0.653	0.060	0.952
		27	2.29	0.538		
Low information load (LIL)	Young × Middle-aged	61	2.99	0.679	0.376	0.707
		39	2.94	0.555		
	The elderly × Middle-aged	27	2.83	0.510	0.840	0.404
		39	2.94	0.555		
	The elderly × Young	61	2.83	0.679	1.107	0.271
		27	2.99	0.510		

* P<.05, **P<.01.

lower than that for the other age groups. It was significantly different from the middle-aged adults but was not significantly different from the young adults. The advertising effect of a low information load was insignificant and lower than that of the other age groups.

DISCUSSION

The hypotheses were partially supported in this study. Different cognitive ages were found to exist in the various age groups; however, advertising credibility did not reveal a significant difference. The different age groups mostly showed a low cognitive age. Of the 127 respondents, only 12 respondents had a high cognitive age, indicating the perceived cognitive age for all age groups was mostly lower than the physical age. In addition, only 38

respondents had high advertising credibility. The middle-aged respondents had higher advertising credibility than the elderly.

In addition, the middle-aged and the elderly showed significant differences on advertising credibility; however the young adults' advertising credibility showed an insignificant difference. Cognitive age was found to influence the advertising effect of a high information load for young adults and middle-aged adults. Cognitive age and advertising credibility affected the advertising effect of a high information load due to age. Only advertising credibility affected the advertising effect of a low information load. The cognitive age of the elderly was only significantly different from that of the young adults regarding the advertising effect of a high information load,

Table 4. Effect of cognitive age on the advertising effect of high and low information loads.

Dependent variable: Advertising effect of a high information load					
Source of variance	Type III	fd	Average sum of square	F	p
Adjusted model	2.378(b)	3	0.793	2.275	0.83
Intercept	52.976	1	52.976	152.039	.000**
Cognitive age	0.12	1	1.948	.033	0.855
Age	2.358	2	1.179	3.832	0.037*
Error	42.858	123	0.348		
Adjusted total	45.236	126			
Dependent variable: Advertising effect of a low information load					
Adjusted model	0.512(b)	3	0.171	0.455	0.714
Intercept	84.298	1	84.298	224.920	0.000**
Cognitive age	0.021	1	0.021	0.057	0.812
Age	0.113	2	0.056	0.150	0.861
Error	46.099	123	0.375		
Adjusted total	46.611	126			

Independent variable: cognitive age; * P<.05, **P<.01.

Table 5. Pair comparison of cognitive age on the advertising effect of high and low information loads.

Dependent variable: advertising effect of a high information load				
Age		Mean difference	Sd	p
The elderly	Young	-0.282	0.136	0.014*
	Middle-aged	0.038	0.215	0.859
Dependent variable: advertising effect of a low information load				
The elderly	Young	-0.121	0.223	0.588
	Middle-aged	-0.087	0.187	0.641

Independent variable: cognitive age; * P<.05, **P<.01.

Table 6. Advertising credibility on the advertising effect of high and low information loads.

Dependent variable: Advertising effect of a high information load					
Source of variance	Type III	fd	Average sum of square	F	p
Adjusted model	2.962(b)	3	.987	2.872	0.039*
Intercept	57.699	1	57.699	167.880	0.000**
Advertising credibility	.595	1	.595	1.732	0.191
Age	2.135	2	1.067	3.106	0.048*
Error	42.274	123	.344		
Adjusted total	45.236	126			
Dependent variable: Advertising effect of a low information load					
Adjusted model	4.708(b)	3	1.569	4.606	0.004**
Intercept	68.173	1	68.173	200.110	0.000**
Advertising credibility	4.217	1	4.217	12.379	0.001**
Age	1.066	2	.533	1.564	0.213
Error	41.903	123	.341		
Adjusted total	46.611	126			

Independent variable: cognitive age; * P<.05, **P<.01.

Table 7. Pair comparison of advertising credibility on the advertising effect of high and low information loads.

Dependent variable: Advertising effect of a high information load				
Ages		Mean difference	Sd	p
The elderly	Young	-0.036	0.137	0.792
	Middle-aged	-0.306	0.147	0.039*
Dependent variable: Advertising effect of low information load				
The elderly	Young	-0.237	0.137	0.085
	Middle-aged	-0.124	0.146	0.396

Independent variable: cognitive age; * P<.05, **P<.01.

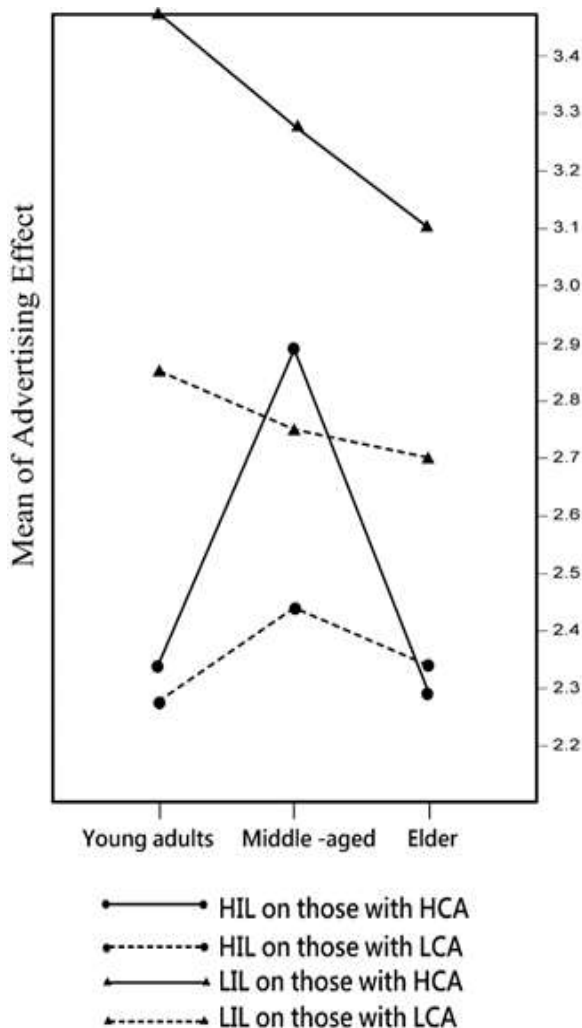


Figure 2. Relationship between cognitive age and ad effect with high and low information loads for age groups.

Generally, the advertising effect of a high information load was influenced by cognitive age and advertising credibility at different ages. The advertising effect of low information was only influenced by advertising credibility.

As shown in Figure 2, the advertising effect of the elderly was lower than that of the other age groups. The respondents revealed a greater advertising effect with low information loads. Middle-aged adults with a high cognitive age found a high information load to be more effective than those with a low cognitive age. Thus, the results for middle-aged adults with a high cognitive age were found to be different from past statements on individuals with a high cognitive age. Young adults with a low cognitive age found a low information load to be more effective.

As shown in Figure 3, a low information load was found to have more advertising effect for all age groups, particularly for those with high advertising credibility. Middle-aged adults with high advertising credibility found a high information load to be more effective than the other groups. Although the advertising effect for the elderly was generally lower than the other groups, regarding advertising credibility, the three age groups' advertising effects were insignificantly different.

Conclusion

There was a significant difference on the advertising effect of a high information load influenced by cognitive age and advertising credibility for the different age groups. This result indicated that there were no differences caused by age but there were differences caused by the advertising content. Advertisements with a high information load had significantly different effects at different ages, particularly for persons aged 45-64, who had yet to retire. In comparison to the elderly, they had consumption, action, and the ability to receive information from marketing communication.

Low information loads for the elderly had better advertising effects. The test sample ads used in this study were health products. The elderly are the main

and the advertising credibility of the elderly was only significantly different from that of the middle-aged adults regarding the advertising effect of a high information load.

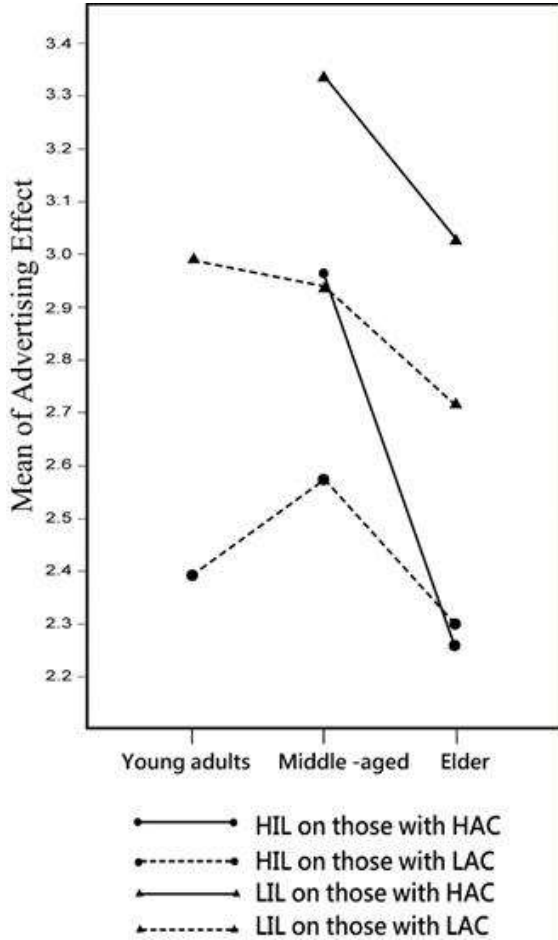


Figure 3. Relationship between ad credibility and ad effect with high and low information loads for age groups.



Figure 4. High information load sample.



Figure 5. Low information load sample.

consumers of supplement products, but the effect toward these ads was insignificant. Young adults revealed a higher advertising effect from low information ads, indicating that the difference was not caused by the attributes of the products. Therefore, it was inferred that the information load was the key factor on advertising effect.

The cognitive age and advertising credibility of the elderly did not show obvious advertising effect, but it was known from the research that low information advertising maintains a certain degree of advertising effect on the elderly. The use of marketing techniques is relatively clear and understandable. Therefore, the main consumers' needs or products' characteristics for the elderly are mostly achieved by situational pictures or soft sells in ads. Middle-aged individuals are potential consumers for the silver market in future. Ad designers should build these consumers' trust in advertising in order to have a better advertising effect. Although young people have not become the main consumers of the silver market, their advertising effect could be enhanced through a low information load.

Suggestions

This study treated the elderly as respondents in order to recognize the variations of the advertising effect of different information loads of the three age groups. However, the samples were nutritional supplement products, and we were unable to compare the differences caused by the attributes of different products. Future researchers should include different product attributes to demonstrate the advertising effects in different age groups.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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