

Relations between Knowledge of Fat, Media Exposure, and Attitudes toward Weight-loss Message – An Exploratory Study

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Abstract

The purpose of this study is to explore the relationship between the science knowledge, media exposure time, and adolescent girls' attitudes toward weight-loss message presented in the mass media. A total of 1312 valid data (Taiwan high school female students) were collected through paper-and-pencil questionnaires. The results indicated that subjects' knowledge of fat was negatively correlated with their media exposure time, in particular, television hours and TV shopping channel hours. The results also indicated that subjects with low fat-knowledge scores spent significantly more hours per week on watching television and TV shopping channels than their counterparts with high fat-knowledge scores. The regression analysis indicated that shopping channel hours was the only negative predictor of knowledge of fat. Brief explanations and discussions were addressed in this proposal.

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Objective and research questions

The purpose of this study is to explore the relationship between the science knowledge, media exposure time, and attitudes toward weight-loss message presented in mass media. In particular, the knowledge of fat is the major concept of science knowledge investigated in this study. The research questions of this study are:

1. What are the relationships among knowledge of fat, attitudes toward weight-loss messages in mass media, and media exposure time?
2. What are the differences in attitudes toward weight-loss messages in mass media and media exposure time by high school female students with better knowledge of fat and without?
3. What are the predictors of high school female students' knowledge of fat?

Background

Misconceptions of science knowledge is one of the important areas studied intensively by many science educators (e.g., Wandersee, Mintzes & Novak, 1994). Traditional studies on misconceptions were mainly conducted in formal education and students' classroom learning. However, message from mass media such as television programming in daily lives may contribute to the formation and alternation of some misconceptions, and in turn may have impacts on related attitudes and behaviors. Some messages from mass media coated with scientific jargons or beautiful slogans are proved to be factually incorrect. However, they sound so true that many people cannot evaluate their correctness. Among many examples from mass media, weight-loss concepts and products are particularly suspicious to be sources for misconceptions.

Indeed the concept of weight-loss has been the subject of much theoretical and empirical research in recent years. A large number of studies have shown that the majority of adolescent girls wish to be thinner and many engage in dieting and other weight loss behaviors (e.g., Wertheim et al., 1998; Tiggemann et al., 2000). A close overview of past studies revealed that weight-loss concept is increasingly recognized as very complex and multi-faceted construct, encompassing at least perceptual, affective and cognitive aspects of body knowledge and experience. However, among cognitive aspects, the science knowledge, for example, that of fat was seldom studied. Therefore, this study explored the relationship of adolescent girls' knowledge of fat, media exposure, and their weight-loss attitudes.

This topic has special significance for Taiwan (Chinese) adolescence. It is interesting to note that the common term of "losing weight" in Chinese language is "reducing fat." Since many adolescence are more and more watching their weight and some may involve in dieting and other weight-loss behaviors, the "fat" in their sense is associated with devil, something bad or evil. However, we all know that fat is indispensable for human survival, and is a necessary nutrition component for body's operation. The attention should be on how much fat we eat and is stored in our bodies. Therefore, the researcher postulated that the misconception of fat, such as that indicated by the interviewed girls, may come from mass media, in particular, television programs and advertisements, and wondered that this misconception may lead to different attitudes toward adolescent girls' weight-loss.

Design and Procedures

Sample

The target subjects were all female students of Taiwan high schools (including vocational high schools). The stratified sampling plan was based on the "Educational Statistics of Republic of China, Taiwan" (Administration of Education of Taiwan, Republic of China, 1999), and was conducted according to geographic areas. One thousand and five hundred paper-and-pencil survey questionnaires were distributed to 20 schools around Taiwan from January to April 2001. A total of 1312 valid data were collected (return rate = 87.47%). The average samples' age was 16.32 years (SD = 1.35).

Instruments

The present study developed a survey with four sections. The first section was the comprehensive test on the knowledge of fat. The test, entitled "Test on FAT" (TOF), consisted of 22 questions (8 yes/no items,

and 14 multi-choice items). These items mainly came from high school home economics textbooks. Sample questions are: Can massages reduce fat tissues stored in the human body? (yes/no); Only meat contains fat, vegetables do not contain fat? (multiple-choice). The difficult level of the TOF is 58.40% (counted by the mean score of percentages of each question being answered correctly). The higher the score, the better knowledge of fat the subject has.

The second section was a questionnaire requesting subjects' attitudes toward weight-loss messages presented in mass media programs and advertisements. The questionnaire, entitled "Weight-loss message in mass media" (WMMM), contained 29 statements, such as: "the models in weight-loss advertisement are so beautiful", "I usually pay considerable attention to the pictures of weight-loss message", "I think that the successful stories of weight-loss presented in advertisements are true." The questionnaire required subjects' to read the statements and indicate the extent of their agreement degree based on the options provided on a 7-point Likert scale from very disagree (1-point) to very agree (7-point). The reliability of the WMMM was 0.9103. The final version of the WMMM questionnaire consisted of 29 items for this study. The higher WMMM score, the more positive attitude a subject has toward the weight-loss message in the mass media.

The third section requested subjects' media exposure, in particular, time (in hours) on each medium—television as total, television shopping channel, radio, magazine, newspaper, and the Internet. The fourth section of the survey requested subjects' demographic information, such as age, grade level, full-time or part-time, and so on.

Findings

Table 1 shows the mean scores of TOF, WMMM, each medium exposure time of subjects. The subjects' mean score of the TOF was 12.91, that is, on an average, they answered 60% of all questions correctly. The mean score of WMMM was 2.857 (S.D.=0.407). On an average, subjects spent about two hours per day watching television, 20 minutes per day on watching tv shopping channels, and less than one hour per day on listening to radio, about 18 minutes per day on reading magazines, and about 40 minutes per day on the Internet.

The results indicated that the subjects in this study could answer 60% of questions correctly. However, a close examination of the percentages of subjects' correct answer to each question revealed that some of the question which was rated as "easy" by medical professionals had been answered incorrectly by many subjects. For example, only 372 (28.5%) subjects answered correctly to the yes/no question "Can massages reduce fat tissues stored in the human body? (the correct answer was no). It may help explain why "reducing fat salt, pad, or lotion" are popular among adolescent girls. In our informal follow-up interviews with one subject, she surely stated that rubbing onto the skin by the above products would help reduce the fat particles under the skin. The implications of this interesting but not surprising result may be that we need to re-examine the fat-related concepts taught by formal education as well as delivered by mass media, in particular, those associated with weight-loss products. The source of the fat-related mis-conceptions in adolescence girls warrant more research studies.

Table 1: Questionnaire mean scores, and medium exposure mean hours

Score	Number of respondents	Means	Standard deviation	Note
TOF	1225	12.91	2.34	Possible score range from 0-22
WMMM	1312	2.857	0.41	7-point Likert scale, from 1=very disagree to 7=very agree
TV total hours per week	1288	14.40	14.71	
TV shopping channel hours per week	1291	2.31	8.55	
Radio hours per week	1297	5.26	9.39	
Magazine hours per week	1291	2.01	3.57	
Newspaper hours per week	1296	3.17	5.02	
Internet hours per week	1294	4.58	7.33	

Table 2 shows the results of the correlation analysis of the TOF, WMMM, media exposure time (TV-hours, TV shopping channel hours, radio hours, magazine hours, newspaper hours, and the Internet hours). It is found that TOF scores was negatively correlated with TV hours and TV shopping channel hours at a significant level ($r=-.094$, $p<.01$; $r=-.124$, $p<.01$, respectively). That means the less hours subjects spent on watching TV as a whole and TV shopping channels, the higher TOF scores subject had, and vice versa.

The WMMM was found to be significantly correlated with TV hours ($r=.066$, $p<.05$), TV shopping channel hours ($r=.071$, $p<.05$), magazine hours ($r=.071$, $p<.05$), newspaper hours ($r=.072$, $p<.05$), but not with TOF score ($r=-.036$, $p>.05$), radio hours ($r=-.006$, $p>.05$) or the Internet hours ($r=.023$, $p>.05$). It means that the more hours subject spent on watching television and TV shopping channels, reading magazine and newspaper, the more positive their attitudes toward weight-loss messages in the mass media, and vice versa. It also means that TOF scores and WMMM scores were not significantly correlated. The results indicated that adolescent girls' knowledge of fat was negatively correlated with their media exposure time, in particular, television hours and TV shopping channels hours. However, the data gathered in this study does not show the direction of the relationship: Does more time on watching television and TV shopping channel lead to their poor knowledge of fat, or subjects who has higher knowledge of fat watch television and shopping channel less? The researcher postulated that the formal is a more possible direction in which television hours and shopping channel hours negatively contribute to the fat-related knowledge. It is confirmed by the stepwise multiple regression analysis in which TV shopping channel hour was the only negative predictor of TOF score. However, the TV time did not enter the formula due to its low predicting power.

The same direction question can also be applied to another finding: does more time on watching television, shopping channel, magazine, and newspaper lead to more positive attitudes toward weight-loss messages imbedded, or do subjects who have more positive attitudes spend more time on these media. Either way, it seems clear that adolescent girls who have ample exposure of mass media (TV, TV shopping channels, magazine, and newspaper) have more positive attitudes toward the weight-loss messages delivered by these media. However, some mediating factors such as ideal thin image promoted by mass media, adolescent girls' body (dis)satisfaction, and their wishful weight (e.g., Botta, 1999), may also play important roles in the relationship between their mass media exposure and their attitudes toward the weight-loss-related message.

Table 2: correlation matrix of TOF, WMMM, and each medium exposure time

	TOF	WMMM	TV-hours	TV shopping channel hours	Radio hours	Magazine hours	Newspaper hours	The Internet hours
TOF	--	-.036	-.094**	-.124**	-.015	-.020	-.016	.052
WMMM	-.036	--	.066*	.071*	-.006	.071*	.072*	.023

* $p<.05$, ** $p<.01$

This study further classified subjects of different TOF scores into two groups. Since the mean score was 12.91 out of a total of 22, and 13 is the mode score encompassing the largest group of 210 (17.1%) subjects of the total 1225 samples, the researcher decided to exclude 210 subjects with score 13, and group 510 (41.6%) subjects with scores 4 to 12 as low-score group (TOF_low), while 436 (41.3%) with scores 14 to 20 as high-score group (TOF_high).

As shown in Table 3, the two-tailed t-test indicated that subjects in TOF_low group spent significantly more hours per week on watching television and TV shopping channels than their counterparts in TOF_high group ($t=2.74$, $p<.01$; $t=3.39$, $p<.01$, respectively). However, TOF_low group spent significantly less time on using the Internet than the TOF_high group. There was no significant difference in WMMM scores, radio hours per week, magazine hours per week, and newspaper hours per week between two groups.

Table 3: Mean scores WMMM and media exposure time by TOF_low and TOF_high groups

	TOF_low (n=510)		TOF_high (n=436)		t-value
	M	s.d	M	s.d	
WMMM	114.15	25.79	112.69	23.99	0.90
TV total hours per week	15.63	18.00	13.07	10.59	2.74**
TV shopping channel hours per week	3.07	10.68	1.26	5.22	3.39**
Radio hours per week	5.53	10.50	5.08	8.47	0.75
Magazine hours per week	1.95	2.92	1.81	2.75	0.78
Newspaper hours per week	3.10	5.17	3.16	4.54	-0.21
The Internet hours per week	3.94	4.82	4.83	8.49	-2.04*

* $p < 0.05$, ** $p < 0.01$

In order to predict the knowledge of fat, a stepwise regression analysis was conducted in which the TOF score was the dependent variable, while the WMMM score and mean scores of each medium exposure time were independent variables. As shown in Table 4, the results showed that TV shopping channel hour was the only included negative predictor of TOF score; other independent variables (e.g., WMMM score and other media time) did not enter the formula. It means that the more time subjects spent on watching TV shopping channels, the poorer knowledge of fat they had. However, it should be noted that the R^2 is extremely low in the regression model ($R^2=0.017$); it could be due to the large sample size (1111) in this analysis. Therefore, this result should be interpreted with caution, and can only be supportive data for previous correlation analysis. It might be postulated that if one adolescent girl spends a lot of time watching TV shopping channel, then she will have poor knowledge of fat. What exact message that television shopping channels deliver to them contributes to their conception or mis-conception of fat warrants more academic research, consistent to the call of Bulck (2000). The fact that science knowledge is a neglected topic in most weight-loss-related studies needs more researchers' attention. Perhaps further study, based on the findings presented here, can advance our understanding of the role of science knowledge in this area.

Table 4: The regression model of knowledge of fat

Dependent variable	Predicting variables	B	S.E.	β	Sig.
TOF score	Shopping channel hour	-0.039	0.008	-0.136	0.000

$R^2 = 0.017$

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