CHAPTER 3

RESEARCH METHODOLOGY

Two experiments were conducted to examine the effects of warning variations for OTC drug televised advertisements on warning recall, recognition and risk perception. Each experiment was performed in two mock OTC drug advertisements, *Paranol* and *Parachlor* drug advertisements. *Paranol* is a mock brand name, represent pain relief category. *Parachlor* is a mock brand name of cold medication, mixed formula of Paracetamol and Chlorpheniramine. These two products were selected because they are the most frequently advertised in Thailand (Wibulpolprasert, Chokevivat, & Tantivess, 2002). Moreover, these two categories were reported as drug groups that people were likely to purchase for their self medication (Sreprasert, 1999; Win, 1999).

The first experiment examined the effects of format of warning, including warning transmission modes and warning conspicuousness. The second experiment examined the effects of content of warning (warning messages specificity and number of warning statements) and format of warning (warning conspicuousness).

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Experiment 1

Effect of warning conspicuousness and mode of warning transmission on warning recall, warning recognition, and risk perception

According to Thai government regulations, warning disclosures in drug advertisements must be conspicuously presented in both audio and visual forms. Some of these warning disclosures do not follow the regulations. For example, warning disclosures are presented incompletely or inconspicuously (such as lack of clarity and using small prints), and many warning messages are presented in either audio or visual form. Therefore, the primary objective of this experiment was to examine the effect of format of warning variations (transmission modes of warnings and warning conspicuousness) for OTC drug advertisements. The effectiveness of warning disclosures were measured by warning recall, warning recognition, and consumer's perceived risk.

Specific Hypotheses

H-1: Consumers who are exposed to warning messages presented both audially and visually will have greater recall than those exposed to warning messages presented either audio only or visual only.

H-2: Consumers who are exposed to highly conspicuous warnings will have greater recall than those exposed to less conspicuous warnings.

H-3: There will be an interaction effect of warning conspicuousness and mode of transmission on warning recall.

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H-4: Consumers who are exposed to warning messages presented both audially and visually will have greater recognition than those exposed to warning messages presented either audio only or visual only.

H-5: Consumers who are exposed to highly conspicuous warnings will have greater recognition than those exposed to less conspicuous warnings.

H-6: There will be an interaction effect of warning conspicuousness and mode of transmission on warning recognition.

H-7: Consumers who are exposed to warning messages presented both audially and visually will have higher level of perceived risks than those exposed to warning messages presented either audio only or visual only.

H-8: Consumers who are exposed to highly conspicuous warnings will have higher level of perceived risks than those exposed to less conspicuous warnings.

H-9: There will be an interaction effect of warning conspicuousness and mode of transmission on risk perception.

Method

Design

The experimental design was a 3 (mode of warning transmission: audio, visual, and audio-visual) x 2 (warning conspicuousness: high and low) between groups factorial design. There are seven conditions in this experiment (6 treatments and 1 control), which were as follows: audio, high conspicuousness; audio, low conspicuousness; visual, high conspicuousness; visual, low conspicuousness; audio-visual, high conspicuousness; audio-visual, low conspicuousness, and the control with no warning (Figure 3.1).

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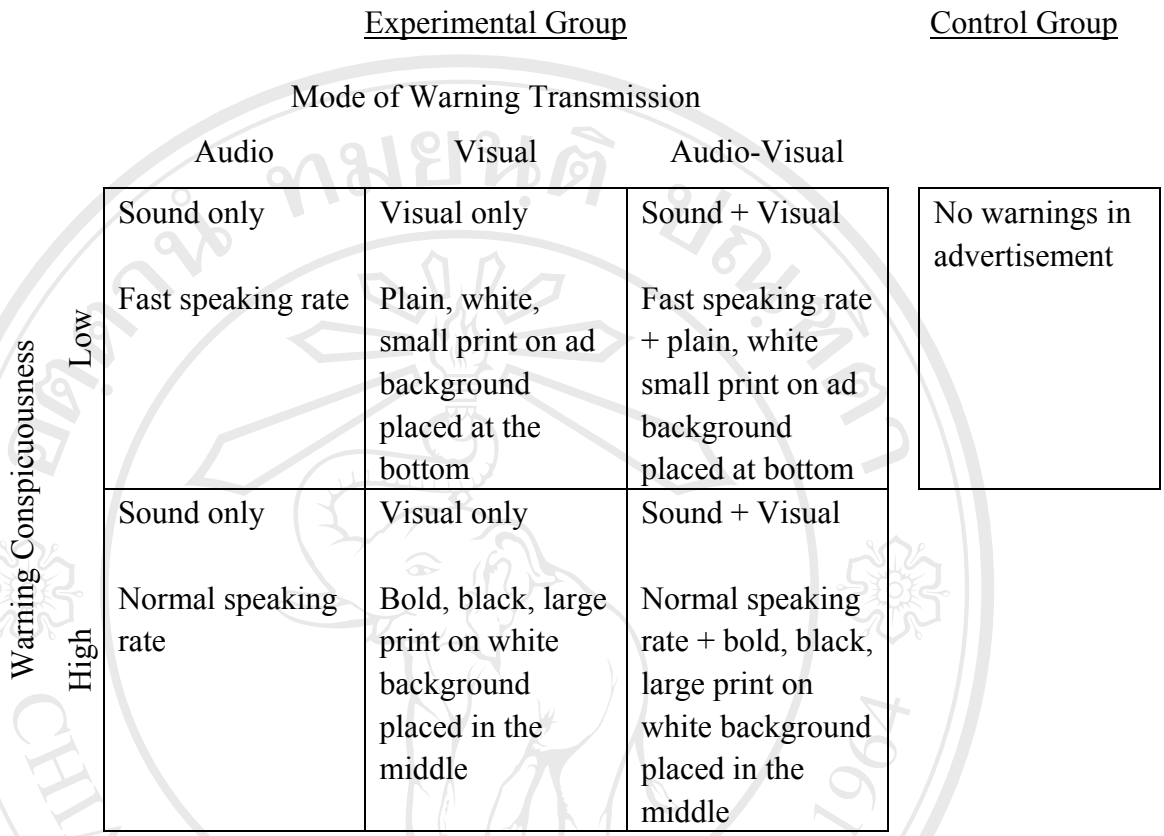
Figure 3.1. Factorial design of experiment 1



Participants

Participants were undergraduate students who enrolled in an academic year of 2004 at Chiang Mai University. They were ineligible if they were studying health sciences, including medicine, dentistry, pharmacy, nursing, veterinary medicine and associated medical sciences. The non-health science students such as those who studied in engineering, agro-industry, business administration, education, humanities, sciences, social sciences, and agriculture were presumed to lack drug knowledge and were recruited into the study. Participants were recruited by using disproportional quota sampling method. The participants who agreed to join the study were made an appointment to go to the test setting. Reminding telephone calls were used to increase participation rate.

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For producing relatively valid results, thirty undergraduate students were planned to assign randomly to each warning conditions. In most circumstances, a sample size of 15 cases per group was sufficiently large to yield fairly accurate p-values (Green, Salkind, & Akey, 2000). Therefore, two hundred and ten undergraduate students were recruited and assigned randomly to seven conditions of individual mock drug advertisements while each participant viewed only one warning condition

Data Collection

The data were collected during the last week of January and the first two weeks of February, 2004. Experiments were run at the classrooms at Faculty of Pharmacy and the study rooms of Chiang Mai University's dormitories, Chiang Mai University.

Materials and Procedure

Mock advertisements were created for two different drugs, a pain relief (*Paranol*) and a cold medication (*Parachlor*) by senior students who were major in advertisement. These two mock advertisements were criticized by an advertisement expert. The scenario of each mock advertisement was shown in Appendix A. Each advertisement was embedded in a 20-minute television program along with commercials for other products and services (see Appendix B). The drama movie program previously aired on Channel 3 was selected because this program frequently showed OTC drug advertisements during commercial breaks. Three commercial breaks were presented at approximately the 2nd, 10th, and 18th minutes of the

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program. Each break contained five commercials, viz. one test advertisement randomly placed and the remaining four commercials concerning non-OTC-related products. The remaining four commercials in each break included either those on alcoholic or stimulant beverages in which two commercials were mandated to present warning disclosures.

The warning messages for test products were shown at the end of the advertisement. Seven warning conditions were shown in Appendix C. Printed warnings were presented at the same time and duration as the audio warnings. Warning messages in this experiment contained two statements. Two warning messages of *Paranol* were constructed imitatively with regulation for Paracetamol drug advertisements. Warning messages for *Paranol* were 1) overuse may lead to liver damage and 2) instructions to read the warning every time before taking the medication. For *Parachlor*, which is the combination of Paracetamol and Chlorpheniramine, warning messages presented in advertisements do not have mandated regulation as exactly as Paracetamol. Therefore, two warning messages of *Parachlor* were constructed from the first two items of warning messages on the label as mentioned in the literature review part. Two warning messages of the *Parachlor* were 1) the medicine may cause drowsiness; consequently, do not drive or operate machinery and 2) overuse may lead to liver damage.

The participants were not informed directly about the purpose concerned warnings. They were told that the purpose of the study concerned factors affecting health communication. They were asked to sign a consent form, view the entire drama program and complete the questionnaire on self-medication. The questionnaire was distributed after the participants watched the program. The questions were asked

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on involvement of self-medication, warning recall, warning recognition, and risk perception in the first part of the questionnaire, followed by demographics. After the participants completed the questionnaire, all of them were debriefed and paid.

Questionnaire Constructions

Self-administered questionnaire was divided into two main parts (see Appendix D). The first part consists of nine questions, measuring a co-variable, dependent variables, and question for manipulation check. The second part consists of four questions, measuring participants' demography.

Nine questions in the first main part were constructed as follows:

Question 1 measured involvement of self-medication. Participants were asked to give their opinions on self medication. The question composed of four-item, five-point Likert-type rating scales anchored by strongly disagree and strongly agree.

Question 2 measured warning recall by using unaided recall technique. The question asked participants to give details of warning messages in any products they could remember.

Question 3 measured warning recall by using aided recall technique. Participants were asked to give details of warning messages in the test drug advertisement.

Question 4 measured warning recognition by a checklist questionnaire. A randomized list of seven warning messages, including the warning messages associated with the mock drug advertisements, was shown to the participants. They were asked to identify the one(s) they heard or saw in the mock drug advertisement from a list of seven warning messages.

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Question 5 measured risk perception toward test drugs by using rating scale. The scale consisted of eight, five-point Likert-type statements anchored by strongly disagree and strongly agree. Participants were asked to give their opinions on safety and efficacy of test product.

Question 6 was a manipulation check of warning conspicuousness, whether the warnings presented in drug advertisement were clear. The question composed of three-item, semantic differential scales which used bipolar objective, clear-unclear.

Question 7 measured frequency of seeing or hearing other drug advertisements in the same drug category as the tested drug.

Question 8 measured frequency of buying drug in the same category as the tested drug.

Question 9 asked participants to give details of their self-care behaviors.

Following completion of the first main part, the participants were requested to answer questions about gender, age, education, and personal disease in the second part of questionnaire.

Two questionnaires were created for two mock advertisements. The format and content of questionnaires for each drug advertisement was the same. Only the name of product in questionnaire was changed from *Paranol* to be *Parachlor*.

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Questionnaire Evaluation

After the questionnaire was constructed, it was checked for content validity by panel of three experts. Content validity is generally concerned with the extent to which an instrument measures what it is supposed to measure (Ary, Jacobs, & Razavieh, 1996). Content validity was not expressed in numerical form. Gathering

such evidence was based on judgments of three experts. In order to obtain content validity, three experts were asked to comments of the proper content and the format of the questionnaire. They discussed and evaluated each question or item together. If all agree that the test items represented the content domain adequately, the test could then be said to have content validity. Then, the revised questionnaire was pretested with 30 undergraduate students studying in the first year at faculty of Pharmacy, Chiang Mai University. This group of students was presumed to lack drug knowledge. The pretest was conducted to assess face validity and reliability of the scales. The students were asked to comments on the format of the questionnaire. Cronbach's alpha was calculated for reliability of the scales, which the results were 0.70 and 0.60 for involvement and risk perception scales, respectively. Finally, the questionnaire was revised again for completion.

Variables and Measurement

Independent Variables

The transmission modes of warnings were categorized as audio only, visual only, or dual modality (audio-visual). In this experiment, audio warnings were read by an announcer. Visual warnings were presented on the screen. Audio-visual warnings were presented on the screen at the same time as an announcer read the warning messages.

Warning conspicuousness was categorized as high and low, which was developed by using the clear and conspicuous standard criteria from the U.S. FTC (Hoy & Stankey, 1993). The FTC considers a televised advertising disclosure to be "clear and conspicuous" if the following conditions are met:

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1. The disclosure should be presented simultaneously in audio and video formats.
2. The video portion should be of “sufficient” size such that viewers can see the disclosure regardless of television screen size.
3. The video portion should be presented such that the type face color contrasts sufficiently with the background color.
4. The background should be a singer color.
5. The video portion should appear on screen for “sufficient” time such that viewers may read the disclosure in its entirety.
6. No other sounds, including music, should be played during the audio disclosure.
7. The audio and video portions of the disclosure should immediately follow the advertising claim to which the disclosure is referring.

In this study, conspicuousness of warning varied by type size, message contrast background, position on the screen, and speaking rate. The presentation of conspicuousness was controlled according to the mode of transmission. There were three sets of warning messages (audio, visual, and audio-visual). In the audio warning presentation, the conspicuousness varied by the speaking rate. In the high conspicuous condition, the announcer spoke at a normal rate (approximately 250 syllables per minute). In the low conspicuous condition, the announcer spoke at a fast rate (approximately ≥ 250 syllables per minute). For visual warnings, warning conspicuousness was manipulated by varying the type size, the message contrast background, and position on the screen. Highly conspicuous warnings were written in bold, black, large print (≥1/25th of the screen height) on a white background placed in

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the middle of the screen. Low conspicuous visual warnings used plain, white, small print (<1/25th of the screen height) on the ad background and were placed at the bottom of the screen. In the audio-visual warning presentations, conspicuousness was manipulated by varying the type size, the message contrast background, position on the screen, and speaking rate. High conspicuous warnings used a bold, black, large print on a white background, placed in the middle of the screen, and with the announcer speaking at a normal rate. Low conspicuous warnings used a plain, white, small print on the ad background, placed at the bottom of the screen, and with the announcer speaking rapidly. A manipulation check was examined for warning conspicuousness. A three-item, seven-point semantic differential scale for measuring warning clarity was used as manipulation check.

Concomitant Variable

Celsi and Olson (1988), and Solomon (1999) indicated that an individual's level of involvement had an effect on consumer information processing. Depending on their level of involvement, consumers might be passive or active when they received advertising communications, and ignored or were aware the content of this communication (Laurent, 1985). Therefore, involvement was used as a co-variable in this study in order to control this effect. Involvement of self medication was measured by a four-item, five-point Likert-type rating scale, which was adapted from studied by Zaichkowsky (1985), Pham (1996), Beatty and Talpade (1994), Trijp, Hoyer, and Inman (1996), and Moorthy, Ratchford, and Talukdar (1997). Coefficient alpha of the scales were 0.76 for *Paranol* and 0.74 for *Parachlor* drug advertisements.

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Dependent Variables

The three dependent variables measured in this study were warning recall, recognition, and risk perception.

Warning Recall

Warning recall was measured through both unaided (free recall) and aided (cued recall) techniques. An unaided recall question (open-ended question) asked participants to identify the name of products which included warning disclosure in advertisement and asked to give details of the warning messages in each. For the aided technique, participants were provided cues for retrieving the warning messages in the advertisement. An aided recall question was an open-ended question asking the participants to write down all of the warning messages in the drug advertisement that they could remember.

Although the participants wrote down all warning messages recalls for open-ended question, the scores corresponding only for warning recall on the test product were used for the analysis. The scoring of warning recall was developed from a scoring reported by Norris and Colman (1992). Each answer was scored one point. The scoring for each statement was considered as follows: zero point for no answer or a completely incorrect answer, 0.25 point for an incorrect answer which contained recognizable parts of the warning, 0.50 point for mostly correct, but insufficiently precise response, 0.75 point for a nearly correct answer with grammatical variation, and 1 point for exact recall. This scoring guideline was approved by the panel of experts. The score was graded by an experimenter.

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eTotal warning recall score is the summation of a free recall score together with a cued recall score.

Warning Recognition

Warning recognition was measured by a checklist questionnaire. The eight warning messages were listed and the participants were asked to check the warning messages they could recognize from the drug advertisement.

The scoring of warning recognition was developed from a scoring reported by Norris and Colman (1992). The scoring of the checklist question was straightforward: one point for a correct choice and zero for an incorrect choice.

Risk Perception

Risk perception of OTC drug was assessed by an eight-item, five-point Likert-type rating scale. The scale was adapted from a scale reported by Shimp and Bearden (1982), Donthu and Gilliland (1996), and Moorthy et al. (1997). Coefficient alpha of the scales were 0.70 for both drug advertisements.

Data Analysis

The data obtained were coded and analyzed by inferential statistic. Statistical analyses were performed according to the objectives and hypotheses of the study. An analysis of covariance (ANCOVA) was used for testing hypotheses H-1 to H-9, followed by post hoc comparisons using Tukey's test for unequal variance groups. A manipulation check of warning conspicuousness was analyzed by independent t-test. Comparisons of participant characteristics among all warning conditions were

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analyzed by chi-square. The Statistical Package for the Social Sciences (SPSS) version 11.0 was used for the data analyses. An alpha level of 0.05 was set as the a priori level of significance.

Experiment 2

Effects of warning conspicuousness, warning specificity, and number of warning statements on warning recall, warning recognition, and risk perception

While experiment 1 examined the effects of format of warnings, experiment 2 examined the effects of both format and content of warnings.

Regarding CIP theory, both the content and format of warning disclosures effect consumers' information processing. Therefore, this study included all the impacts mentioned in CIP theory and examined the effects of warning conspicuousness (format), warning specificity (content), and number of warning statements (content).

Based on Thai regulations, a drug which is required to show specific warning statements on the label, must present a general warning in advertisements. The general warning can be stated as "read the warnings every time before using the medicine." In addition, the number of warning statements presented in some advertisements, such as paracetamol, was allowed to change from 4 specific statements to 2 specific statements and finally to one general statement. Several studies (Houston, 1980; Kisielius, 1986; Morris, 1989) have indicated that specific warning messages produce greater risk information awareness and knowledge than do general warnings. The study by Morris, Mazis, and Brinberg (1989) indicated that the

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disclosure of longer risk messages produced greater risk awareness than that of shorter risk messages. Therefore, this experiment was conducted to compare the effects of the number of warning statements which were nested in warning specificity while varying the level of conspicuousness. All of these factors were manipulated with the consideration of real problem in presentation of warning disclosures appearing on commercial drug advertisements on Thai television. Nine hypotheses, as following, were studied in this experiment.

Specific Hypotheses

H-10: Consumers who are exposed to highly conspicuous warnings will have greater recall than those exposed to less conspicuous warnings.

H-11: Consumers who are exposed to specific warning messages will have greater recall than those exposed to general warning messages.

H-12: Consumers who are exposed to a high number of warning messages will have greater recall of warnings than those exposed to fewer warning messages.

H-13: There will be an interaction effect of warning conspicuousness and warning specificity on warning recall.

H-14: There will be an interaction effect of warning conspicuousness and number of warning messages within warning specificity on warning recall.

H-15: Consumers who are exposed to highly conspicuous warnings will have greater recognition than those exposed to less conspicuous warnings

H-16: Consumers who are exposed to specific warning messages will have greater recognition than those exposed to general warning messages.

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H-17: Consumers who are exposed to more warning messages will have greater recognition than those exposed to fewer warning messages.

H-18: There will be an interaction effect of warning conspicuousness and warning specificity on warning recognition.

H-19: There will be an interaction effect of warning conspicuousness and number of warning messages within warning specificity on warning recognition.

H-20: Consumers who are exposed to highly conspicuous warnings will have a higher level of perceived risk than those exposed to less conspicuous warnings.

H-21: Consumers who are exposed to specific warning messages will have a higher level of perceived risk than those exposed to general warning messages.

H-22: Consumers who are exposed to more warning messages will have a higher level of perceived risk than those exposed to fewer warning messages.

H-23: There will be an interaction effect of warning conspicuousness and warning specificity on risk perception.

H-24: There will be an interaction effect of warning conspicuousness and number of warning messages within warning specificity on risk perception.

Method

Design

The experimental design was an unbalanced nested-factorial design. The number of warning statements was nested within two levels of warning specificity (general and specific), whereas two levels of warning specificity and two levels of warning conspicuousness (high and low) were arranged in a factorial design. Seven conditions, in which no warnings served as a control, were as follows: high

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conspicuousness, 1 general warning statement; high conspicuousness, 2 specific warning statements; high conspicuousness, 4 specific warning statements; low conspicuousness, 1 general warning statement; low conspicuousness, 2 specific warning statements; low conspicuousness, 4 specific warning statements; and the control with no warning (Figure 3.2).

Figure 3.2. Unbalanced nested-factorial design of experiment 2

Warning Conspicuousness	Experimental Group: General Warning 1 statement	Experimental Group: Specific Warning 2 statements	Experimental Group: Specific Warning 4 statements	Control Group
Low	General (1) Fast speaking rate + plain, white, small print on ad background, placed at bottom	Specific (2) Fast speaking rate + plain, white, small print on ad background, placed at bottom	Specific (4) Fast speaking rate + plain, white, small print on ad background, placed at bottom	No warning in advertisements
High	General (1) Normal speaking rate + bold, black, large print on white background, placed in the middle	Specific (2) Normal speaking rate + bold, black, large print on white background, placed in the middle	Specific (4) Normal speaking rate + bold, black, large print on white background, placed in the middle	

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Participants

The participants in this experiment had similar requirements as those in experiment 1. They were undergraduate students who enrolled in academic year of 2004 at Chiang Mai University. Since they were recruited from other faculties besides health sciences; therefore, they were presumed to lack drug knowledge. No students

who participated in experiment 1 were recruited in experiment 2. The recruitment was used the same procedure as in experiment 1. Representatives of non-health science faculties were asked to recruit the students in their faculties by disproportional quota sampling method. The participants who were interested in joining the study were made an appointment to go to the test setting. Reminding telephone calls were used to increase participation rate.

Two hundred and ten undergraduate students were recruited and assigned randomly to seven conditions of individual mock drug advertisements. Each participant viewed only one warning condition.

Data Collection

The data were collected during the last week of January and the first two weeks of February, 2004. *Paranol* experiment was studied at the classrooms at Faculty of Pharmacy, Chiang Mai University. *Parachlor* experiment was studied at the study rooms of Chiang Mai University's dormitories.

Materials and Procedure

Mock advertisements were created for two different category drugs, a pain relief (*Paranol*) and a cold medication (*Parachlor*) in the same way as experiment 1. Seven warning conditions embedded in mock advertisements were shown in Appendix C.

There were three conditions for warning specificity: one condition for general warning, and two conditions for specific warnings. A general warning statement was

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presented by using one statement which was “read the warnings every time before using the medicine.”

The specific warning statements were presented in two and four statements. Two warning messages of *Paranol* were constructed from what stated exactly as mandated in the regulation for Paracetamol drug advertisements. Two warning statements of the *Paranol* were 1) overusing the medicine may lead to liver damage, and 2) read the warnings every time before using the medicine. Four warning messages of *Paranol* were constructed from the first four items of warning messages on the Paracetamol label as mentioned in the literature review part. Four warning statements were 1) take the medicine by the indicated dosage and do not continue using the drug for more than 5 days, 2) patients who have liver or kidney diseases should consult a physician or pharmacist before using this medicine, 3) do not use this medicine for relief of muscle pain which is caused by strenuous working, and 4) while using the medicine, alcoholic beverage should not be drunk.

The warning messages used in this study were constructed from the current warning on cold medication labels. Two warning messages of *Parachlor* were constructed from the first two items of warning messages on the label as mentioned in the literature review part. Two warning statements of the *Parachlor* were 1) this medicine may cause drowsiness; consequently, do not drive or operate machinery and 2) overusing the medicine may lead to liver damage. Four warning messages were also constructed from the first four items of warning messages on the label as mentioned in the literature review part. Four warning statements for the *Parachlor* were stated as 1) the medicine may cause drowsiness; consequently, do not drive or operate machinery, 2) overusing the medicine may lead to liver damage, 3) avoid

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taking the medicine with alcoholic beverages, and 4) do not give to children <1 year old, do not give to asthmatic patients, glaucoma patients, patients with prostatic hypertrophy, or patients with urinary problems.

Warnings of both drug advertisements in this experiment were presented in dual modality. The same procedure and questionnaire was used as in experiment 1.

Variables and Measurement

Independent Variables

Warning message specificity was divided into two categories: general and specific warnings. From the real situation of warning presentation, the Thai regulations require warning disclosures for specific products where a general warning is usually presented in one statement. Therefore, general warnings of test advertisements were presented in one statement whereas, specific warning messages were presented in two or four warning statements.

The numbers of warning statements were divided into 3 levels: one, two, and four statements, in which one statement was included in the general warning and two or four statements were presented with specific warnings.

Conspicuousness of warning was categorized into high and low. Conspicuousness of warning was manipulated by varying the type size, message contrast background, position on the screen, and speaking rate. High conspicuous warnings used a bold, black, large print on a white background, placed in the middle of the screen, and with the announcer speaking at a normal rate. Low conspicuous warnings used a plain, white, small print on the ad background, placed at the bottom of the screen, and with the announcer speaking rapidly.

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Concomitant variable

Involvement was also used as a co-variable in experiment 2. The level of involvement was measured by the same scale used in experiment 1. Coefficient alpha of the scales were 0.78 for *Paranol* and 0.80 for *Parachlor* drug advertisements.

Dependent variables

Warning recall, warning recognition, and risk perception were measured by using the same questionnaire as in experiment 1. Coefficient alpha of the scales were 0.61 for *Paranol* and 0.74 for *Parachlor* drug advertisements. The scoring of these three dependent variables also used the same criteria as in experiment 1.

Since the warning recall and recognition scoring was one point for each statement, therefore, the total scores for the three levels of statements (1, 2, and 4 statements) were one, two, and four points, respectively. To compare these three levels on the same scale as warning recall and recognition, the scoring of one and two statements were transformed into four points.

Data Analysis

Statistical analyses were performed according to the objectives and hypotheses of the study. An analysis of covariance (ANCOVA) was used for testing hypotheses H-10 - H-24, followed by post hoc comparisons using Tukey's test. A manipulation check of warning conspicuousness was analyzed by independent t-test. Comparisons of participant characteristics were analyzed by chi-square. The Statistical Package for the Social Sciences (SPSS) version 11.0 was used for the data analyses. An alpha level of 0.05 was set as the a priori level of significance.

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