Chapter 4

Research Methodology

4.1 Introduction

Chapter 4 summarizes research methodology used to investigate hypotheses discussed in Chapter 3. Specifically, Chapter 4 describes: study design and research subjects; sampling plan (population of interest; sampling frame, sample size and method); survey questionnaire (origins, development, translation, pretest); data collection; and data analysis approaches.

4.2 Study Design and Research Subjects

This study is part of a larger research project concerning consumer choice behavior related to breast enlargement in Bangkok, Thailand. The larger project focuses on understanding this behavior and its determinants among female university students in the Bangkok area, using self-administered questionnaires to collect data. Self-administered questionnaires are an appropriate way to collect data considered sensitive because respondents have privacy and are free to provide answers they are willing to share. Self-administered questionnaires are the most familiar and most widely used method for measuring attitudes toward the body (Ben-Tovim and Walker 1991).

The study's design used a field survey to collect data from a representative sample of the population of interest, defined as Thai female undergraduate and graduate students in Bangkok in 2002 and 2003. The survey was administered by two well-trained research assistants, who are English and Thai bilingual and have experience in field market research.

Survey data were analyzed using multiple statistical techniques. Cluster analysis was used to determine group membership of respondents on the basis of the nine self-concept variables discussed in Chapters 2 and 3. Multivariate analysis of variance was used to investigate differences between clusters on the self-concept variables. Multiple discriminant analysis was used to identify important self-concept variables that distinguish between clustered observations.

Details describing the study's sampling plan, survey questionnaire, and data analysis approaches follow in the next several sections.

4.3 Sampling Plan

Key decisions for the sampling plan were made following extensive discussions among the four researchers responsible for the larger research project. Discussions were led by a marketing professor (research project leader) and included three doctoral students majoring in marketing (including the author). Decisions in these discussions focused on identifying a research population of interest, choosing a sampling frame, and specifying sample size, all as described in following subsections.

4.3.1 Population of Interest

The first sampling decision was to identify a particular set of subjects as an appropriate population of interest. A demographically homogenous group (in terms of age, education, and geographical location) was preferred because such homogeneity minimizes measurement error that otherwise would be caused by differing frames of reference and differing interpretations of questionnaire content by members of a heterogeneous group. Although it might be argued that undergraduate and graduate students form two different groups in terms

of age and education, these differences are considered minor. Because the present study is concerned only with female university students, only undergraduate and graduate female students were considered.

Female university students were chosen as the population of interest for four reasons. First, theoretically, it is in these years that the self-concept emerges and crystallizes (Rosenberg 1979, p. x). Second, female university students have been shown to be associated with negative body image in the Western literature (e.g., Cash 2002). Third, female university students form a subgroup that makes up a huge potential market for breast-enlargement-related products and services. Fourth, responses of university students have been found to be more homogeneous than those of non-student subjects (Peterson 2001). The four justifications are supported also by the fact that self-concept scales developed in psychology typically have been based on student samples or other specific groups (Malhotra 1981; Wylie 1975).

The Bangkok area was chosen because its metropolitan and outward-looking character attracts an abundance of popular press, televised broadcasting, movies, and mass media, through which expressions of large-breasted female forms are prevalent. Bangkok always has been a tolerant city open to foreign cultures. As noted by Barme (2002):

> *…In fact, as early as early 1920s, Bangkok was already becoming ever more closely integrated into the nascent global capitalist economy, and was developing an increasingly cosmopolitan, outward-looking character. To a large degree this process was shaped by the spread of new mass media technologies. With the advent of the popular press in its various guises (daily newspapers, magazines, comic books, and translated works of both fiction and non-fiction) and the expansion of the cinema business (which screened a variety of imported Western and, from the late 1920s, locally made films), the urban populace was exposed to a ceaseless flow of information, ideas, and images from both home and abroad…. At one and the same time these mass technologies*

> *allowed for new popular forms of cultural expression and representation while providing members of the public with an enhanced awareness, if not always a thorough understanding, of a wider, largely Western-dominated, world. New conceptual horizons unfolded through both print and film, while audiences could adopt new points of reference and comparison, not only in terms of lifestyles, fashion, and habits of consumption…(p. 2)*

More than any other city in Thailand, Bangkok has female university students with high exposures to mass media and extensive opportunities for consumption of the sort under investigation here.

4.3.2 Sampling Frame

The second sampling decision was to obtain a current and accurate sampling frame. Because no sampling frame listing female university students in Bangkok exists, it was necessary to use a cluster sampling procedure (Schaeffer, Mendenhall, and Ott 1979). The procedure used a sampling frame consisting of lists of timetables for targeted schools' courses for the second semester of 2002 and the first semester of 2003.

In terms of data collection, it is more efficient to sample students enrolled in targeted pools of programs amenable to the study's topic matter and objectives than to sample individual students. Targeted pools of programs in the present study included: Master of Arts in Business and Managerial Economics (MABE) Program, Faculty of Economics, Chulalongkorn University; Bachelor's degree Program in Business and Administration (BBA), Master of Science in Marketing (MIM) Program, and Executive MBA Program, Faculty of Commerce and Accountancy, Thammasat University; Bachelor of Economics Program, Faculty of Economics, Thammasat University; and Bachelor's degree Program in Business and Administration, Department of Business Administration, Faculty of Social Science, Srinakharinwirot University. In addition to the sampling frame of course timetables,

lists of program coordinators, contact numbers, and course instructors also were obtained for the purpose of subsequent appointments.

4.3.3 Sample Size and Method

The issue of sample size is critical for establishing the statistical significance of research results. Three major issues are considered when estimating sample size for one or more key research variables: desired confidence level; desired precision level; and variance. Based on these considerations, sample size in a large population can be calculated by the following formula:

$$n = \frac{Z^2}{H^2}\sigma^2,$$

where n denotes sample size, Z is a value associated with a desired confidence level, H is desired precision level, and σ^2 is population variance. Using a desired confidence level of 95 percent, the targeted confidence level of this study is equivalent to a Z score of 2. Generally, precision level (H) is a relative value with a mean value of ±0.15 scale unit with respect to any of the study's nine self-concept variables.

Of particular importance to this study is the issue of sample homogeneity. Homogeneity of subjects allows for control but limits the ability to generalize across larger, more diverse populations of interest. To compensate for this possible limitation, it is preferable to aim at a more conservative (or higher) precision level. This study, therefore, uses ±0.1 scale unit as the preferred precision level, as opposed to the generally accepted level of ±0.15. As for population variance (σ^2), estimates can be taken using a pretest, an *ad hoc* rule of thumb, or *a priori* knowledge of the topic being studied. As there is no past research of the topic that can be used *a priori*, population variance was estimated by a conservative rule of thumb which

states that population variance should be less than or equal to one-fourth of the range of responses to the scale. As this study applies six-point response categories to all scale items, estimated population variance (σ^2) then is 1.25. Putting all these numbers into the above equation yields a sample size of 625.

By the end of the first phase of data collection for the larger research project, the total number of respondents was 715. Taking into account the issue of representativeness of the sample (a major concern in performing cluster analysis) the sample size obtained is considered acceptable to performing the analysis. Table 4.1 summarizes the number of respondents according to institutions, programs, and faculties.

Table 4.1 Classification of Respondents Based on Institutions, Programs, and Faculties

Institution	Program	Faculty	Number of Respondents
Chulalongkorn University	MABE	Economics	63
	BE	Economics	102
Thammasat University	BBA	Commerce	115
	MIM	Commerce	91
	MIF	Commerce	49
	XMBA	Commerce	68
	BE	Economics	82
Srinakarinwirot University	BA	Social Science	87
	MBA	Social Science	58

Once sample size is determined, the next decision involves sampling method. The list of programs mentioned in Subsection 4.3.2 was judgmentally selected based on a belief by the research team that the nine programs adequately represent the population of interest. Given that the population of interest is highly homogeneous by nature, random sampling is less of an issue in comparison with a more heterogeneous population.

With an introduction letter issued by the Chairman of the Doctoral Program in Marketing, Thammasat University, research assistants approached the director of a selected program,

explained the objectives of the study, and requested cooperation. Once permission from the director was secured, research assistants contacted the program's administrative staff who then decided on which instructor to approach. This procedure was completely under control of the administrative staff. Once a targeted instructor was decided, he/she would be contacted and requested for permission. Five of the 15 instructors approached refused to cooperate. Among reasons given were vacation, absences, and student examinations. If an instructor agreed to cooperate, an agreement on specific classes and their schedules was reached between administrative staff and the instructor; otherwise, another instructor would be contacted. Although program selection was judgmental, selection of universities, instructors, and classes was completely random under this sampling procedure. In addition, as no prior notification was given to the targeted classes about the survey, student attendance also was at random, with an average attendance rate ranging from about 90 to 95 percent. The procedure adds to the random nature of sampling employed in this study.

4.4 Survey Questionnaire

This section summarizes activities undertaken in developing the survey questionnaire. Descriptions are organized into five sections: brainstorming and brainwriting; in-depth interviews and qualitative research; conceptual equivalence of the study's constructs of interest; questionnaire development (measure selection, forward and back translation, pretest); and summary of the final questionnaire form.

4.4.1 Brainstorming and Brainwriting

The present study employed a combination of brainstorming and brainwriting as starting tools for developing the field survey questionnaire. Brainstorming is a systematic and creative group session in which barriers to creative thinking are removed to stimulate the production

of new ideas through association (Nijssen and Lieshout 1995). It is a qualitative tool widely used by marketing researchers to identify issues and problems when discussing concepts that are new to the topic being studied. However, one problem with brainstorming is that it creates the possibility of one or more group members dominating the discussion (Mongeau and Morr 1999; VanGundy 1983). This weakness is overcome by an idea called brainwriting.

Brainwriting is a silent, written generation of ideas by a group of people (VanGundy 1983). It avoids the pitfalls of face-to-face brainstorming because all members simultaneously produce ideas in a relatively anonymous environment (Mongeau and Morr 1999). Brainwriting provides a free flow of ideas and opinions without the possibility of discussion being dominated by one or more members (VanGundy 1983).

The objective of brainstorming and brainwriting for the present study is to propose potential psychological constructs deemed important in segmenting the population of interest into theoretically and managerially meaningful clusters. In the first stage, brainstorming for this study emphasized quantity of ideas rather than quality. It was conducted by a panel consisting of one marketing professor as moderator and three marketing doctoral students, including the author. All panel members were familiar to one another; all were willing to verbalize their ideas without any hindrance attributed to distinctions of status among participating members. To facilitate the generation of more ideas, brainstorming was supplemented with brainwriting. These ideas were qualitatively examined in the second stage.

The first brainstorming session began after the professor explained objectives of brainstorming to the panel members. Proposed constructs including relevant ideas were

listed openly without deliberate classification or assignment of meaning. At the end of the first session (approximately 70 minutes), panel members were given a list of proposed constructs and asked to present more constructs and ideas through brainwriting at the next scheduled brainstorming session to be conducted a few days later. In the brainwriting process, participants were urged to consult relevant bodies of literature as idea stimulation aids (VanGundy 1983, p. 69).

Brainstorming was resumed in the following session with a format similar to that of the one conducted before. Again, at the end of the session, participants were asked to attend the next brainstorming session with more constructs and ideas generated through brainwriting.

At the third and last brainstorming session conducted a few days later, all 50 constructs proposed by panel members through brainstorming or brainwriting were listed. Constructs were described and clarified to the satisfaction of all panel members and the session concluded. The author then reviewed and screened all proposed constructs and organized them into five categories. Categorized constructs then were presented to panel members in a meeting two weeks later. After an extensive discussion, the originally proposed 50 constructs were reduced to 15. Among the screening criteria used was whether or not these constructs have been studied in the field of consumer marketing.

The author further trimmed the number of constructs from 15 to nine, selecting constructs having evidence of being sound descriptors and discriminators related to the research topic. These nine constructs are: self-esteem, extraversion, openness to experience, excitement, fun and enjoyment, physical vanity, achievement vanity, being well-respected, and self-fulfillment. To support this selection, panel members looked into the related bodies of

literature to see whether selected constructs had been examined in similar market segmentation studies. A careful examination of the literature revealed that of the nine constructs of interest only excitement, fun and enjoyment, being well-respected, and self-fulfillment previously were used as segmenting variables. Self-esteem, extraversion, and openness to experience were indirectly involved in classification studies, whereas no previous attention has been paid to physical vanity and achievement vanity in segmentation research. The nine constructs were classified into three distinct dimensions: values, personality traits, and motives (see Chapter 2). These dimensions are closely linked to self-concept and to self-oriented motivations.

As summary, brainstorming and brainwriting were used to propose constructs and ideas relevant to the research topic. In the beginning stage, an emphasis was placed on quantity of proposed constructs. Later, proposed constructs were examined qualitatively according to a few screening criteria. Nine constructs resulted and were grouped into three dimensions indicated by the literature to be important to the existence of self-concept. In addition, each construct was shown to be related to self-oriented motivations in the consumer marketing literature.

4.4.2 In-Depth Interviews

The next step in developing the survey questionnaire used individual in-depth interviews. Eight in-depth interviews were conducted independently by a well-trained female research assistant with past experience in conducting in-depth interviews. Objectives were to gain insight into any crucial themes that might emerge from interviewed subjects as they talked about breast enlargement and to conduct preliminary tests of conceptual equivalence of the nine self-concept constructs. Eight female students were recruited at convenience at their

respective campuses for individual interviews lasting 40 minutes on average. Interviewed subjects spoke freely on the topic in an unstructured environment, with audio recordings made of each interview after obtaining each subject's consent.

Analyses of interview transcripts yielded the following results. Breast enlargement was perceived unanimously as an elective choice. Perceptions toward enlargement were mixed. Those having positive perceptions viewed enlargement as hedonic experiential consumption and perceived breast enlargement as a way to pursue physical attractiveness. Breast enlargement as a consumption practice was perceived to be associated with modernity, novelty, and positive attitudes toward changes. In contrast, those having negative perceptions cited safety and unpredictable outcomes as major concerns; even a lowered cost would not make breast enlargement attractive if these concerns remained.

None of the interviewed subjects had any past enlargement experience. When asked about desired breast sizes, most preferred larger sizes but all indicated no interest to try. It was widely accepted among interviewed subjects that frequent contact with or exposure to people having favorable enlargement outcome would contribute considerably to the formation of positive attitudes toward breast enlargement. Nevertheless, positive attitudes alone would not be sufficient to lead most interviewed subjects to actually embark on breast enlargement.

Tests of conceptual equivalence of the nine constructs obtained from brainstorming and brainwriting on in-depth interview subjects will be discussed in the next subsection.

4.4.3 Conceptual Equivalence of Study Constructs

Researchers must be cautious in applying a theory or a measure from one culture directly to another (Mullen 1995). For example, key concepts such as the meaning of "self" often have a meaning that is not widely shared outside the West (Triandis 1999, p. 133). The Western self is predominantly individualistic and heavily populated by private attributes (e.g., I am kind) while the Eastern self is predominantly collectivist and heavily populated by collectivist attributes (e.g., My family thinks I am kind (Triandis 1989)). Many researchers, for example Behling and Law (2000), stress the need for conceptual equivalence of concepts or constructs in different cultures—the extent to which a concept or construct in one culture exists in the same form in another—in international marketing research. Therefore, the present study follows this line of suggestion by taking the following steps to assure conceptual equivalence.

A thorough review of literature was conducted to determine whether the nine constructs of interest have been studied in the international context. The review indicated that extraversion and openness to experience have been studied extensively in international marketing settings, including in the Eastern cultural environment. While still limited in the amount of evidence, physical vanity and achievement vanity have been shown empirically to have conceptual equivalence across cultures (see Durvasula, Lysonski, and Watson 2001). These constitute empirical evidence that extraversion, openness to experience, physical vanity, and achievement vanity are viewed similarly across nations, thus possessing cross-border face validity. On the other hand, self-esteem developed by Rosenberg (1965) has received little attention from research in Eastern cultures and its cross-cultural validity still is questionable. Similarly, the review of literature found no evidence of value constructs used in this study (i.e., excitement, fun and enjoyment, being well-respected, and self-fulfillment) being studied

in different cultures. Therefore, the face validity of self-esteem, excitement, fun and enjoyment, being well-respected, and self-fulfillment will be examined, as follows.

Tests of conceptual equivalence were conducted as part of in-depth interviews described in Subsection 4.4.2. Each test included all nine constructs of interest. The tests focused on how the eight interviewed subjects defined a pair of scale items for each construct presented to them. Each scale item in the pair is considered as best representing its original construct. An example below illustrates the process:

> Consider the following two statements:
> The way I look is extremely important to me.
> I am very concerned about my appearance.
>
> In your opinion, which choice best describes these two statements?
> (a) self-esteem
> (b) concern about one's physical presence
> (c) love of fun and enjoyment

The eight interviewed subjects were instructed to select the choice that best reflects the pair of statements presented to them. In addition to the choice list, interviewed subjects were allowed to write down freely a term that they thought best describes the construct under question. With limited aids given by the research assistant, most interviewed subjects provided correct definitions for all constructs of interest. These include self-esteem, excitement, fun and enjoyment, being well-respected, and self-fulfillment on which no or limited evidence of conceptual equivalence was found in the literature.

In sum, tests of conceptual equivalence provided assurance that all constructs in this study exist in the population of interest and are conceptually equivalent to descriptions in the Western literature. A subsequent pretest also will re-examine conceptual equivalence of the constructs employed in this study.

4.4.4 Questionnaire Development

The goal in questionnaire development now was to produce an adequate number of measures that represent self-concept, along with other behavioral measures for pretest. Measures items were developed through an iterative process of item generation, content validation, and refinement using established scale items from the literature following recommendations of Converse and Presser (1986). The process used a panel of judges (doctoral students majoring in consumer behavior) for assessment of content and face validity and for survey refinement.

Measurement items of the nine constructs of interest were originally developed in English, based on their conceptual definitions (see Chapter 2) and items already established in the Western literature. The constructs again are self-esteem, extraversion, openness to experience, excitement, fun and enjoyment, physical vanity, achievement vanity, being well-respected, and self-fulfillment. Where necessary, items measuring these constructs were modified and adapted to the particular context of this study. The entire pool of items was thoroughly reviewed and edited by all four researchers involved in the larger research project. Whenever possible, scales of previously used measures in their original wording were kept in their entirety.

Based on these activities, the author identified approximately four to 10 items per construct, a number larger than that intended for use in the final questionnaire. That is, it was anticipated that translation and pretest procedures would identify potentially problematic items, which then would be dropped before measurement scales were finalized. In addition, a smaller number of scale items is required because data collection procedures must comply with a permitted survey time of approximately 25 minutes for each in-class survey (including time

allocated for instruction at the beginning of each survey). After review, the resulting pool of items was assembled into a pretest questionnaire.

The pretest questionnaire was organized into sections containing questions for related constructs. Section sequence tried to take advantage of cognitive ties that respondents were likely to have among the groups of constructs. Questions in any section that might be sensitive were positioned after ones thought to be innocuous. Demographic and personal questions were placed at the end of the questionnaire.

Of particular concern to this study is the issue of measurement of values. Much has been debated in the literature as to which type of scale—ranking or rating—values should be treated. Influenced by the notion that only activated human values count, researchers used to have respondents rank only their first and second most important values. Led by the work of Rokeach (1973), however, a new standard was set where researchers asked respondents to rank all values under study.

Several issues associated with this ranking methodology soon were raised (e.g., Alwin and Krosnick 1985; Schwartz 1992). Some researchers argued that people do not, in practice, choose between alternative values when faced with action situations (e.g., Krosnick and Alwin 1988). Others voiced concerns over the measurement of values for the purposes of consumer research. For example, Gutman and Vinson (1979) argue that rankings of values originally developed by Rokeach Value Survey generate three serious problems. First, the ranking procedure forces respondents to indicate differences where none may actually exist; that is, equally attractive values are forced into separate rankings. In addition, wide gaps in preference are ranked as no different from very small gaps. Second, most people cannot

adequately evaluate more than a small number of values (7 plus or minus 2) at a time (Miller 1956; Peterson and Peterson 1959). And third, the ranking procedure biases results in favor of deprived values and against satiated values. For example, low income respondents rate “A Comfortable Life” and “Clean” relatively high, while wealthy respondents rate the two values quite low (Clawson and Vinson 1978).

These issues gave rise to an alternative way of measuring values—rating. Schwartz (1994) offered justification for the conceptual superiority of rating over ranking: Rating has more useful statistical properties and does not force respondents to discriminate among equally important values. Schwartz also argued that rating may be more accurate than ranking in capturing how values enter into situations of behavioral choice: people do not necessarily rank one value over another in action and quite different values may be equally compelling. Based on considerations of these measurement issues, the present study adopted the Multi-Item List of Values (MILOV) rating scale developed by Herche (1994) as its measures of values. MILOV is an improved List of Values (LOV) rating scale developed to address criticisms over statistical properties of the original LOV (Kahle 1983).

Based on the above considerations, measurements of all nine self-concept constructs were developed as easy to answer Likert-type scale statements. Each statement asked for a simple filling of a number among six-point response categories using anchors as "strongly disagree," "disagree," "somewhat disagree," "somewhat agree," "agree," and "strongly agree.” Six-point response categories were used because Thai people are thought likely to mark scale midpoints even when they hold a non-neutral position (Brown 2003). Indeed, Likert-type scales in general tend to bias respondents toward center points of response categories because respondents implicitly assume that the center point is the normal or average (Harrison and

McLaughlin 1993). In a study of potential cultural bias arising from response categories, it was found that Asian respondents were inclined to choose the midpoint of the scale, leading to response bias (Si and Cullen 1998). Thus, the use of even-numbered response categories with no midpoint removes the impact from central tendencies, thus increasing the variance of responses.

Recent evidence also verifies the generalization of six-point scales across cultures. In a study attempting to develop a valid measure of learning organizations, a six-point Likert-type scale was used in developing the Dimension of Learning Organization Questionnaire (DLOQ; Marsick and Watkins 2003). This scale was operationalized in various national contexts in Europe, Asia, South America, and the USA and was found to be reliable. Further, in this connection, Peterson (1994) reports in his meta-analysis no substantive relationships between the magnitude of coefficient alpha and the different numbers of scale response categories, such as five-point scales, six-point scales, and seven-point scales. Therefore, it was considered important to force respondents to express a definite opinion and six-point response categories were used throughout the questionnaire.

4.4.5 Forward and Back Translation

Development activities now turned to translation. Since all items and all instructions on the pretest questionnaire were developed in English, translation of the questionnaire into Thai language was conducted to facilitate responses from students whose first language is Thai. The translation process took care that translated items were linguistically equivalent to original items and clearly understood by Thai-speaking respondents (Behling and Law 2000; Craig and Douglas 2000). A research assistant and a doctoral student were employed in this

process. Both were fluent in Thai and English, familiar with Thai and Western cultures, and experienced with consumer marketing surveys in Thailand.

The first or forward translator was a research assistant hired by the larger research project to translate the questionnaire from English to Thai. The individual was a native Thai speaker with a background and several years' experience in Thai/English and English/Thai translations. The translator consulted frequently with project members to ensure that cultural and conceptual issues perceived in the questionnaires were conveyed accurately. The resulting translation was reviewed by two native Thai doctoral students majoring in marketing to ascertain the quality of Thai language.

The second or back translator was a third Thai native doctoral student majoring in marketing with more than 10 years experience in English-speaking cultures, including six years' experience studying in the United States. This translator was considered qualified for a translation from Thai to English and had no knowledge of the wording of the original English questionnaire.

A panel consisting of two doctoral students, including the author, individually compared original and back translated questionnaires to evaluate whether the two versions were conceptually equivalent. The panel then met as a group with the forward translator and discussed substantive differences between the original questionnaire and its back translation. Based on numerous comments and recommendations, the bilingual research assistant modified 10 items and several instructions in the Thai questionnaire to the satisfaction of all panel members. Two measures were eliminated because of near-redundancy with other measures and because of Thai translation difficulties. Examples below illustrate the process:

(Original) I feel that I'm a person of worth, at least on an equal basis with others.

(Back translation) I feel that I am a valuable person and the value in me is not inferior to others.

(Original) I work hard at having fun.

(Back translation) I work hard and I also enjoy myself fully when partying.

In both pairs of items, discrepancies in the Thai translation were detected and the measures in Thai were modified. The outcome of this meeting was a 51-item questionnaire ready for pretest.

4.4.6 Pretest

The pretest questionnaire was administered by two research assistants to four doctoral students and to 38 members of the population of interest selected at convenience. The pretest was designed to identify problems with instruction, measurement items, and question sequence. Specifically, attention was paid to questionnaire perceived length and time required for completion to ensure that respondents were not overburdened, which could lead to fatigue, response error, and non-response error (item and total).

Pretest respondents completed the questionnaire with two research assistants present. Respondents were instructed to identify instructions or measurement items that were not clear. Research assistants were instructed to watch for signs that respondents were puzzled, for instances of misread instructions, or for any other thing that might indicate response problems. Research assistants debriefed respondents as soon as they completed the questionnaire by asking them to indicate instructions or measurement items that were unclear, confusing, or redundant. This helped identify problems that were not obvious from gestures and facial expressions (Salant and Dillman 1994).

Pretest data were analyzed using standard descriptive analysis and basic psychometric procedures (item-to-total correlations and coefficient alpha) to explore measurement properties. Based on respondent feedback and statistical analysis, several redundant items were eliminated. Preliminary results also revealed that reverse worded items, used in questionnaires to ensure that respondents read and answer each item carefully, were well understood.

The final questionnaire contained 31 items, with each construct having three to five items as measures. Elimination of a large number of items was an expected and desired outcome of the pretest. The pretest questionnaire contained several similar or near-redundant items and a few wordy or otherwise suspect items. Following a thorough discussion among research project members, these items were eliminated. Further, the research assistants reported several complaints about the length of the pretest questionnaire. Therefore, the author worked diligently to reduce the length of the pretest questionnaire.

4.4.7 Final Questionnaire

The final questionnaire began with a one-page introduction to the survey signed by the Chairman of the Doctoral Program in Marketing, Thammasat University. The introduction described research objectives, importance of the study, and a promise of confidentiality. See Appendices 1 and 2 for the final questionnaires in English and Thai.

The final questionnaire measured nine constructs and three related behavioral questions. The nine constructs, their measurement items, and item codes used in data analysis are summarized in Table 4.2. The source of each construct also is indicated in Table 4.2.

Table 4.2 Summary of Measures for the Nine Latent Constructs

Item Code	Constructs, Measurement Items, and Item Codes
	Self-Esteem (Soure: Rosenberg 1965)
SE1	I feel that I'm a person of worth, at least on an equal basis with others.
SE2*	I feel that I do not have much to be proud of.
SE3*	I wish I could have more respect for myself.
SE4*	I certainly feel useless at times.
	Extraversion (Source: Costa and McCrae 1992a)
ET1	I like to have a lot of people around me.
ET2	I laugh easily.
ET3	I like to be where the action is.
ET4*	I usually prefer to do things alone.
ET5*	I would rather go my own way than be a leader of others.
	Openness to Experience (Source: Costa and McCrae 1992a)
OP1	I am intrigued by the patterns I find in art and nature.
OP2	I often try new and foreign foods.
OP3	I have a lot of intellectual curiosity.
OP4	I often enjoy playing with theories or abstract ideas.
	Excitement (Source: Herche 1994)
EX1	I enjoy doing things out of the ordinary.
EX2	I strive to fill my life with exciting activities.
EX3	I thrive on parties.
	Fun and enjoyment (Source: Herche 1994)
FU1	Having fun is important to me.
FU2	Recreation is an integral part of my life.
FU3	I work hard at having fun.
	Physical Vanity (Source: Netemeyer, Burton, and Lichtenstein 1995)
VP1	The way I look is extremely important to me.
VP2	I am very concerned about my appearance.
VP3	Looking my best is worth the effort.

Table 4.2 Summary of Measures for the Nine Latent Constructs (Continued)

Item Code	Constructs, Measurement Items, and Item Codes
	Achievement Vanity (Source: Netemeyer, Burton, and Lichtenstein 1995)
VA1	I want others to look up to me because of my accomplishments.
VA2	I am more concerned with professional success than most people I know.
VA3	Achieving greater success than my peers is important to me.
	Being well-respected (Source: Herche 1994)
WR1	I am easily hurt by what others say about me.
WR2	The opinions of others are important to me.
WR3	I care what others think of me
	Self-Fulfillment (Source: Herche 1994)
SF1	I treat myself well.
SF2	I deserve the best, and often give myself what I deserve.
SF3	The finer things in life are for me.

Note: All items use six-point scales with such anchors as "strongly disagree," "disagree," "somewhat disagree," "somewhat agree," "agree," and "strongly agree."
*Indicates reverse-coded items.

4.5 Data Collection

Data collection was in the form of a field survey administered by two female research assistants according to the identified population of interest and sampling frame. Research assistants made initial telephone contact with targeted program coordinators judgmentally chosen from lists of course timetables at targeted schools for the second semester of 2002 and the first semester of 2003. They secured a promise of cooperation at targeted programs, confirmed the number of potential respondents at each program, and recorded coordinators' and instructors' names for future reference. Research assistants informed coordinators of the study's purpose and its sponsors. They then made an appointment with coordinators to ascertain a survey schedule. Wherever possible the project leader also made direct contact with targeted program coordinators. These contacts again were used to explain purposes of the study and to secure a promise of field survey cooperation.

Research assistants were trained to understand the survey procedure and to act as facilitators during the survey that took place in class. They were trained to explain general objectives of the study and general guidelines to respondents and to answer any questions that respondents might raise. The purpose of this training was to reduce discrepancies or variations in environmental conditions among all respondents across the different data collection settings (Finn and Kayande 1997). Research assistants requested respondents to return completed questionnaires when they were finished. Research assistants stressed that all responses were anonymous to protect the privacy of respondents.

Respondents were asked at the start of the survey to complete three choice behavior questions, included as part of the larger consumer choice behavior project (see Part III of Appendices 1 and 2 for examples of these questions). Each choice behavior question concerned a breast enlargement treatment type—surgery, herbal cream, or herbal pills—that was explained by the two research assistants and was well-understood by respondents.

After finishing this phase of data collection, 715 completed questionnaires were obtained. Taking into account sample representativeness, a necessary condition for performing cluster analysis, project members agreed that this was an acceptable level of sample size.

4.6 Data Analysis Approaches

Cluster analysis, multivariate analysis of variance, and multiple discriminant analysis were used as data analytical approaches depending on proposed theoretical frameworks and associated hypotheses discussed in Chapter 3. All analytical approaches were conducted using *SPSS 10.0*. A brief description of each analytical approach follows.

4.6.1 Cluster Analysis

Cluster analysis is the recommended procedure for assigning group membership to objects being investigated based on selected characteristics of individual objects (Hair Jr. *et al.* 1998, p. 473). Cluster analysis classifies respondents such that resulting groups or clusters of respondents exhibit high internal (within-cluster) homogeneity and high external (between-cluster) heterogeneity. Cluster analysis is a robust statistical procedure, minimally affected by linearity, normality, and homoscedasticity, which are general constraints of many other statistical techniques. Cluster analysis requires representativeness of the sample, absence of multicollinearity among variables used to cluster individual objects, and absence of outliers as statistical assumptions (Hair Jr. *et al.* 1998).

In this study, cluster analysis was used to develop meaningful groups of respondents with different perceptions regarding two clustering variables: respondents' desirable incremental cup sizes compared with their current cup sizes (ideal-actual discrepancy) and the extent to which the decision to enlarge breasts is based on a desire to please oneself (self-oriented motivation). The ultimate goal was to develop mutually exclusive groups of respondents that explicitly demonstrate internal cohesion and external isolation (Cormack 1971) with respect to the two clustering variables. To achieve this goal, cluster analysis began with a hierarchical clustering procedure. Hierarchical clustering generates many possible alternative cluster solutions, each producing a centroid or column vector of mean values on the two clustering variables for each resulting cluster solution. These centroids then are passed over as inputs to a non-hierarchical *k*-means clustering procedure that generates and internally validates a final cluster solution. The final *k*-means cluster solution then is compared to past actual behaviors or to behavioral intentions of respondents to determine its external validity.

The clustering procedure discussed above combines together the advantages and balances out the disadvantages originating from each approach. Hierarchical cluster analysis is useful in generating starting centroids, exploring possible alternative cluster solutions, and identifying outliers. On the other hand, *k*-means cluster analysis derives and internally validates a chosen cluster solution. The two approaches combined are considered an objective and robust method for assignment of group memberships (Punj and Stewart 1983; Singh 1990).

4.6.2 Multivariate Analysis of Variance

Multivariate analysis of variance (MANOVA) is the multivariate extension of univariate ANOVA techniques for assessing differences between group means. In the univariate case, a single dependent measure is tested for equality across two or more groups. In the multivariate case, several dependent variables are simultaneously tested for equality across groups. MANOVA overcomes two shortcomings posed by separate univariate tests using ANOVA. First, MANOVA takes into account the possibility that some composite (linear combination) of the dependent variables may provide evidence of an overall group difference that may be undetected by examining each dependent variable separately, as is the case for a series of univariate tests of ANOVA. Second, in the presence of multicollinearity among the dependent variables, MANOVA is more powerful than the separate univariate tests (Hair Jr. *et al.* 1998). In MANOVA, a variate, defined as a linear combination of the dependent variables, optimally combines the multiple dependent measures into a single value that maximizes differences across groups.

For MANOVA to be used properly, three assumptions must be met: linear relationships among all dependent variables; variance/covariance equality between all dependent variables

across groups; and multivariate normality of the dependent variables. In this last regard MANOVA is especially sensitive to outliers.

Since the principal concern of this study is whether the nine self-concept variables as a set differ across groups, MANOVA is more appropriate than conducting nine univariate tests of mean differences. Specifically, MANOVA is conducted to examine distinctions among clusters derived from cluster analysis in terms of the self-concept variables of interest. MANOVA takes into account correlations among the self-concept variables and utilizes the total information available for assessing overall group differences that is missing when examining each self-concept variable separately. MANOVA is used in this study in two situations. First, MANOVA is used to examine cluster differences of the derived five-cluster solution. Second, MANOVA is used in two cases of two-cluster analyses. In both situations, MANOVA examines discriminating power that the entire set of self-concept variables has in differentiating among clusters.

4.6.3 Multiple Discriminant Analysis

Multiple discriminant analysis (MDA) is a statistical technique often used for testing differences of two or more group means with regard to a set of independent variables. MDA derives variates or weighted linear combinations of two or more independent variables that best discriminate between *a priori* defined groups. MDA employs a single non-metric variable as the dependent or grouping variable whose categories are assumed as given. Independent variables then are used to form one or more variates that maximally differentiate between groups formed by the dependent variable categories.

Both MDA and MANOVA are capable of examining differences among groups with regard to a set of variables. Indeed, MDA is mathematically equivalent to MANOVA, yielding exactly the same overall test statistics. However, MDA can pinpoint the discriminating power that each independent variable possesses by examining correlation values in a structure loading matrix. A structure loading matrix contains correlations between the variates that maximize cluster differences and the independent variables themselves. Independent variables that correlate strongly with the variates are more important to discrimination among clusters than independent variables that correlate weakly.

For MDA to be applied properly, three assumptions must be met: linear relationships among all independent variables; variance/covariance equality between all independent variables across groups; and multivariate normality of the independent variables. In this last regard MDA is especially sensitive to outliers.

In this study, MDA is used to determine combinations of self-concept variables that are important in distinguishing among clusters. Specifically, MDA is employed to identify any combination of self-concept variables that has substantive discriminating power in differentiating between the *k* clusters derived from cluster analysis; and between two selected clusters in two different cases. Determination of substantive discriminating power is based on four general rules of thumb discussed in the literature and summarized in Chapter 5. More importantly, MDA is used for hypothesis testing in two cases of two-cluster comparisons. These hypotheses, labeled as H1a to H9a and H1b to H9b, are derived from the general proposition which states that the nine self-concept variables are associated with group membership. MDA is considered appropriate both for determining group membership and for identifying discriminating power contributed by each self-concept variable.

In summary, this section has discussed analytical approaches to be used for main data analyses in this study. Discussions include general characteristics of each analytical approach, important assumptions, and underlying reasons for applying each approach. However, before any of these analytical approaches can be executed, collected data first must be edited, missing data assessed to ensure that no non-response bias exists, sampling bias examined, and data properties such as normality, central tendency, dispersion, and item non-response investigated. Particular attention must be paid to investigations of outlier cases. Preliminary analysis also should assess multicollinearity based on associations among scales measuring the nine constructs, examine Cronbach alpha values for each scale, and assess validity and reliability of observed measures. Details of preliminary and main data analyses are presented in Chapter 5.

4.7 Chapter Summary

This chapter describes research design and methodology used to obtain primary data from identified sample members. Specifically, the chapter discusses study design and research subjects, sampling plan, survey questionnaire, data collection, and data analysis approaches. The collected data set containing 715 cases will be used to test the associated hypotheses in Chapter 5.