

한국마케팅학회  
마케팅과학연구 제1집(1998)

## An Analysis of Optimum Number of Response Categories for Korean Consumers

Kim, Kyung Hoon\*

### < CONTENTS >

- I. Introduction
- II. Number of Response Categories, Reliability, and Validity
- III. Practice of the Number of Response Categories, Reliability and Validity in Korean Marketing Studies
- IV. Method
- V. Analysis
- VI. Conclusion and Implication

### I. Introduction

There has been an increasing trend of using questionnaires in Korean marketing studies. Korean marketing researchers should be aware that the data collected by questionnaires usually have many limitations. One of most serious limitations comes from what kind of response categories was used for scales in questionnaire. Different response categories should influence reliability and validity of data. High level of reliability and validity is very essential point for research using questionnaire method. But there was not any marketing study which investigated the relationship between the response categories and reliability and validity for Korean consumers.

Determining the optimum response categories is especially important in constructing scales such as rating scale, interval scale, Likert scale, etc.. Jacoby and Matell (1971) said that too few response categories result in too coarse a scale and loss of much of the raters' discriminative powers and too fine a scale may go beyond the raters' limited powers of discrimination. Some researchers advocate the use of as many categories as the subject can discriminate, for example, a 12 or 20 point scale. Others recommended the use of a 2 or 3 point scale based on the ease of coding or opinions about the respondents' limited discrimination ability (Benson 1971). Also the relationship between response categories and reliability and validity has been investigated by many studies (Cicchetti, Showalter and Tyler 1985; Aiken 1983; Lissitz and Green 1975). But these studies mentioned above was done in foreign

---

\* Associate Professor, Department of Business Administration, Changwon National University Changwon Korea.

countries. Data used for studies mentioned above were collected from also foreigners. It is hard to generalize their findings into Korean situations.

There were a few researches which tried to enlighten the correct usage of statistical methods in Korean management research area (Sung, Choi and Lee 1993; Kim 1993). But they never tried to explain the effect of response categories in marketing research. Thus it is worth subject for Korean marketing researchers to consider the relationship between the response categories and reliability and validity for Korean consumers.

Purposes of this study are: 1) to review past researches about the relationship between the response categories and reliability and validity, 2) to find how Korean marketing researchers measured reliability and validity of their measuring instruments and what kind of response categories they used in their empirical research by reviewing past articles published in three major Korean academic journals (two marketing journals and one management journals) from 1990 to 1994, 3) to investigate the relationship between the response categories and reliability and validity by using data collected from Korean consumers, 4) to draw practical implications for Korean marketing researchers who wish to use scales with different response categories.

## II. Number of Response Categories, Reliability, and Validity

### Optimum Number of Response Categories

Miller (1956) suggested that a subject's accuracy of perception of unidimensional stimuli is limited to seven bits. Bevan and Avant (1968) found that mean response latency was lowest in the 2 category situation and increased with each increase in number of categories to 64. They also found that response uncertainty increased as number of available categories increased to 32 but did not change substantially beyond this point. Their study argued that information transmitted increased until number of categories approximated the number of stimuli but was little affected by further increases in scale complexity.

Green and Rao (1970) approached the problem of determining the number of rating scales to use and the number of response categories to provide for each scale by the sensitivity of solution recovery method. They reported that little information appeared to be gained by increasing the number of rating scales beyond eight or the number of response categories beyond six. They recommended that 6 or 7 point scale would be good enough to be used in marketing research. Benson (1971) argued that the frequent applicability and practical convenience of 2- or 3-point scales are strong points in their favor.

Lehmann and Hulbert (1972) delineated the conditions under which a 2- or 3-point scale may be good enough by examining simulated data. They found that if the researcher is interested in averages across people or will average or aggregate several individual scales to produce a new scale for the individual, then two or three scale points are in general good enough. Also they found if the focus is on individual behavior, 5- to 7-point scales should be used.

Matell and Jacoby (1972) recommended that if a primary consideration is information recovery and reproduction of the original data matrix especially in situations where several instruments are used to

exhaustively sweep the individual's configuration space, then 6- or 7-point scales would be best choice.

Martin (1973) demonstrated that the correlation coefficient decreases as the number of response categories grows smaller. He concluded that the amount of information lost by collapsing scales is greater when the original variables are highly correlated. His study indicated that when it is justifiable one should use 10 to 20 point scales. Martin (1978) also found that for correlations computed from variables which both have fewer than 10 scaling points, the amount of information loss can be substantial.

Cox (1980) made a couple of recommendations for the applied researchers. First, scales with two or three response alternatives are generally inadequate in that they are incapable of transmitting very much information and they tend to frustrate and stifle respondents. Second, the marginal returns from using more than nine response alternatives are minimal and efforts for improving the measurement instrument should be directed toward more productive areas. Third, an odd rather than an even number of response alternatives is preferable under circumstances in which the respondent can legitimately adopt a neutral position. In his review paper, he suggested that the range of five to nine would be appropriate for the applied research.

Researches mentioned above tried to find optimum number of response categories. But some researches argued that optimum number of response categories depends on characteristics of subjects. Guilford (1954), after a review of the literature on the proper number of response categories, suggested that the optimal number of scale intervals varies with the situation and that the appropriate number for any given situation should be empirically determined. This approach is too rigorous, since it requires extensive pretesting before an instrument can be used. In most of marketing research situations this is unrealistic. Härtel (1993) found that differences in rating accuracy associated with different rating formats are contingent upon rater characteristics.

#### The Response Categories, Reliability and Validity

Many foreign studies examined the relationship between the number of response categories and reliability and validity (Cronbach 1950; Bending 1954; Komorita 1963; Komorita and Graham 1965). Peabody (1962) and Matell and Jacoby (1971) found that reliability is generally independent of the number of scale points used for Likert-type items. Symonds (1924) and Champney and Marshall (1939) offered the opinion that they are not independent. Jahoda, Deutsch and Cook (1951) and Ferguson (1941) indicated that the reliability of a scale increases as the number of scale points increases. Komorita and Graham's (1965) study indicated that with relatively homogeneous items, reliability increases with an increase in the number of scale points.

Jacoby and Matell (1971) found that no systematic relationship between predictive validity, concurrent validity, internal consistency reliability, and test-retest reliability and the number of response categories. They suggested that it would be desirable to allow a subject to select the rating format which best suits his needs. Then collected data in this fashion could be collapsed into dichotomize or trichotomous measures, which would not lead to any deleterious effects vis à vis reliability or validity.

Lissitz and Green (1975) argued that the reason why most of the past studies indicated no particular

number of scale points yielded maximum reliability. They reasoned that those findings were due to the sizes of the standard deviations in comparison to the differences between the magnitudes of the reliability coefficients from one particular number of scale points to another. They gave a strong support for rejection of 7-point scale as an optimal number.

Cicchetti, Showalter and Tyrer (1985) investigated the extent which the interrater reliability of a clinical scale is affected by the number of categories or scale points. Their results indicated that reliability increased steadily up to 7-point scale, beyond which no substantial increases occur, even when the number of scale points was increased to as many as 100.

Aiken (1983) found that means of item responses increased linearly and item variances increased curvilinearly with number of response categories. But their study indicated that internal consistency reliability coefficients ( $\alpha$ ) of total scores did not change systematically with increases in the number of response categories.

### III. Practice of the Number of Response Categories, Reliability and Validity in Korean Marketing Studies

To find out what kinds of response categories were being used in Korean marketing studies and how Korean marketing researchers measured reliability and validity of their data, this study reviewed marketing research papers published in two main Korean marketing journals and one Korean management journal from 1990 to 1994. These two Korean marketing journals were Korean Marketing Review published by Korean Marketing Association and Journal of Marketing Studies published by Taegu-Kyungpook Marketing Association. Other Korean Management journal was Korean Management Review published by Korean Academic Society of Business Administration. Main reason why this study reviewed Korean Journals from 1990 to 1994 was to find out recent trends in Korean marketing research methodology. Research papers which used questionnaire method and scales, including rating scale, interval scale, and Likert scale, to collect data and employed more than 3 scale points were chosen to be reviewed for this study. Finally, 54 marketing articles were examined for the number of response categories, methods of measuring reliability and validity of their data (Table-1).

#### Consumer Behavior

In consumer behavior research area, the most preferred response category used was 5-point scale (Kim 1991; Lee, Chae and Lee 1992; Kim, Y. K. 1992; Kim, Bae and Park 1993; Ahn 1993; Hwang 1993; Park 1993; Lee 1994). 7-point scale was the second preferred choice (Lee 1990; Hwang 1993; Whang 1993; Lee, S. T. 1993). There was only one research which employed 9-point scale for consumer behavior research (Kim, Y. K. 1992).

Cronbach's  $\alpha$  measuring the internal consistency of data was found to be most frequently used method to measure reliability in consumer behavior research area (Kim 1991; Kim, S. H. 1992; Lee, Chae and Lee 1992; Kim, Y. K. 1992; Kim, Bae and Park 1993; Ahn 1993; Hwang 1993; Park 1993; Whang 1993; Lee 1993; Lee 1994). Factor analysis was the most preferred tool to measure the validity of data

&lt;Table-1&gt; Response Category, Measuring Construct, Reliability and Validity Used in Recent Korean Marketing Researches

Research	Response Category	Measuring Construct	Reliability	Validity
Lee (1990)	7	Variables in Fishbein Purchase Decision Model	n.a.	n.a.
Kim (1991)	5	Perceived Risk of Changing Brands	Cronbach's $\alpha$	n.a.
Kim, S. H.(1992)	n.a.	Shopping Orientation	Cronbach's $\alpha$	n.a.
Lee, Chae and Lee (1992)	5	Expression and Interpretation of Consumption	Cronbach's $\alpha$	n.a.
Kim, Y. K.(1992)	5 9	Feeling toward Peripheral Cues Attitude	Cronbach's $\alpha$	Factor Analysis
Kim, Bae and Park (1993)	5	Affective Attitude and Cognitive Attitude toward Product, Purchase Intention, and Involvement	Cronbach's $\alpha$	n.a.
Ahn (1993)	5	Importance of Market Maven	Cronbach's $\alpha$	Factor Analysis
Hwang (1993)	7 5	Attitude toward Smoking Cessation, Evaluation of Results of Smoking Cessation, Belief Subjective Norm	Cronbach's $\alpha$	n.a.
Park (1993)	5	Usage Pattern of Retail Shops, Usage Rate of Credit Card, and Profile of Credit Card Holders	Cronbach's $\alpha$	Factor Analysis
Whang (1993)	7	Amount of Information Seeking Importance of Information Source	Cronbach's $\alpha$	n.a.
Lee, S. T. (1993)	7	Attitude toward Product	Cronbach's $\alpha$	Correlation
Lee (1994)	5	Socially Responsible Consumption Scale and AIO	Cronbach's $\alpha$	n.a.

<Table-1> Response Category, Measuring Construct, Reliability and Validity  
Used in Recent Korean Marketing Researches

Research	Response Category	Measuring Construct	Reliability	Validity
Kim and Chu (1991)	9	Consumer Satisfaction	n.a.	n.a.
Kim (1993)	5	Purchase Decision Process and Influencing Factors	Cronbach's $\alpha$ Split-half	n.a.
Yoon (1993)	9	LOV scale	Alternative From Reliability	n.a.
Kim (1994a)	9	Consumer Satisfaction	n.a.	n.a.
Han (1990)	7	Country Image	n.a.	n.a.
Han and Lee (1992)	7	Functional Country Image Symbolic Country Image Attitude toward Product Purchase Intention	Cronbach's $\alpha$	n.a.
Chaiy and Kim (1993)	5	Gift Purchase Involvement Interactive Concept of Gift	Cronbach's $\alpha$	n.a.
Park (1993)	5	Expansion Strategy, Company and Product Factors	Cronbach's $\alpha$	n.a.
Jun, Lee and Gentry(1994)	n.a.	Attitudinal and Behavioral Acculturation	n.a.	n.a.
Lee (1991)	5 7	Attitude toward Product Attitude toward Ad and Brand, Purchase Intention, Involvement	Cronbach's $\alpha$	Factor Analysis
Lee and Lim (1993)	n.a.	Content Analysis of Korean Advertising Researches	Interjudge Reliability	n.a.
Lee, D. H.(1993)	5 6 7	Evaluation of Advertisements Brand Recognition Characteristics of Attention	n.a.	n.a.

<Table-1> Response Category, Measuring Construct, Reliability and Validity  
Used in Recent Korean Marketing Researches

Research	Response Category	Measuring Construct	Reliability	Validity
Pahng (1993)	n.a.	Content Analysis of Advertising	Interjudge Reliability	n.a.
Park and Hyun (1994)	3	Attention and Interest Level toward Ad	n.a.	n.a.
Cho (1991)	7	Store Image	Cronbach's	n.a.
Ahn and Choi (1993)	7	Attributes of Store	n.a.	n.a.
Park (1993)	n.a.	Environmental Dynamism, Interchannel Competition, Control, and Relational Commitment in Franchise Channels	Cronbach's $\alpha$	Factor Analysis
Lee, W. I.(1993)	7	Brand Difference, Risk Taking, and Information Seeking	n.a.	n.a.
Kim and Park (1994)	5	Support from Headquarter, Franchisee's Strategy and Satisfaction, Conflict	Cronbach's $\alpha$	Factor Analysis
Lee and Kim (1993)	5	Service Quality	n.a.	n.a.
Lee (1992)	4 5	Between-Banks Difference Bank Selection Attributes	n.a.	n.a.
Kim and Cho (1993)	n.a.	Service Marketing Mix	Cronbach's $\alpha$	Factor Analysis
Lee (1994)	7	Service Quality Service Value	Cronbach's $\alpha$	Factor Analysis
Lee and Oh (1991)	5	Environmental Dynamism Bureaucratic Structure Manifest Conflict	Cronbach's $\alpha$	Factor Analysis

<Table-1> Response Category, Measuring Construct, Reliability and Validity  
Used in Recent Korean Marketing Researches

Research	Response Category	Measuring Construct	Reliability	Validity
Oh, Park and Kim (1992)	n.a.	Environmental Characteristics Bureaucratic Structure Relationship	Cronbach's $\alpha$	Correlation
Hah (1992)	5	Power Source and Power	Cronbach's $\alpha$	Factor Analysis
Shin (1992)	n.a.	Consumer Satisfaction	Cronbach's $\alpha$	Correlation
Oh, Rhim and Kim (1993)	5	Relational Norms, Bureaucratic Structuring, and Manifest Conflict	Cronbach's $\alpha$	Factor Analysis
Oh, Kim and Choi (1994)	5	Bureaucratic Structuring Relational Norm, Opportunism Reliability	Cronbach's $\alpha$	Factor Analysis
Oh, Park and Kang (1994)	5	Norms	Cronbach's $\alpha$	Factor Analysis
Park (1994)	5	Logistics Strategy Logistics Performance	n.a.	n.a.
Kim, J. I. (1993)	5	Environmental Uncertainty Organizational Structure	Cronbach's $\alpha$	Factor Analysis
Noh (1991)	5	Supplier Choice Criteria	Cronbach's $\alpha$	n.a.
Kim (1994b)	5	Determinants of Purchasing Decision	n.a.	n.a.
Shin (1994)	n.a.	Influence Determinants of Buying Center Members	Cronbach's $\alpha$	Factor Analysis
Kim and Chaib (1991)	7	Environmental Dynamism	Cronbach's $\alpha$ Test-retest	n.a.
Yae and Kim (1992)	3 5	Marketing Efficiency Marketing Orientation Department Activity	Cronbach's $\alpha$	Factor Analysis



<Table-1> Response Category, Measuring Construct, Reliability and Validity  
Used in Recent Korean Marketing Researches

Research	Response Category	Measuring Construct	Reliability	Validity
Kim, J. B.(1992)	n.a.	Factors Influencing New Product Performance	Cronbach's $\alpha$	Factor Analysis
Jeon and Han (1994)	7	Environment, Strategy, Customer Orientation, Cooperation between Departments, and Performance	Cronbach's $\alpha$	Factor Analysis
Kim, M. J.(1993)	n.a.	Subjective Wellbeing	Cronbach's $\alpha$	n.a.
Park (1994)	5	Relationship between Marketing and R&D	n.a.	n.a.
Song (1994)	5	Evaluation of Korean Marketing Curricula	n.a.	n.a.

in this area (Kim, Y. K. 1992; Ahn 1993; Park 1993). But there was only one research which employed correlation analysis to measure the validity of data (Lee, S. T. 1993).

#### Marketing Research

9 point scale was most frequently used one in marketing research area (Kim and Chu 1991; Yoon 1993; Kim 1994a). There was only one research which used 5-point scale in this area (Kim 1993).

Kim (1993) used Cronbach's  $\alpha$  and split-half coefficient to measure the reliability of data. Yoon (1993) used the alternative form reliability in his reliability research. Evidence of measuring validity in any of studies in this area was not available.

#### International Marketing

5- and 7- point scales were commonly used in this area. Han (1990) and Han and Lee (1992) used 7- point scale for their international marketing researches. Chaib and Kim (1993) and Park (1993) used 5 point scale for their researches.

Cronbach's  $\alpha$  was the most popular method for measuring the reliability of data in international marketing related researches. Not any of researches in this area showed evidence to measure validity. Jun, Lee and Gentry (1994) used survey method but did not mention about the number of response categories, reliability and validity of their data.

#### Advertising

Researchers in advertising used various types of scales. Lee (1991) and Lee D. H. (1993) used 5 and 7 point scales for their researches. Lee, D. H. (1993) also used 6 point scale. Park and Hyun (1993) used 3 point scale for their researches related to advertising.

Interjudge reliability was the most frequently measured one in this area. Lee and Lim (1993) and Pahng (1993) measured the interjudge reliability for their content analysis of advertising. Lee (1991) measured the reliability for data by Cronbach's  $\alpha$ . Only Lee's research (1991) in this area measured the validity of data by factor analysis.

#### Retail

7 point scale was found to be the most frequently used scale in researches related to retail (Cho 1991; Ahn and Choi 1993; Lee, W. I. 1993). Kim and Park (1994) employed 5 point scale for their research.

Cronbach's  $\alpha$  was the most commonly used measure for the reliability of data in this area (Cho 1991; Park 1993; Kim and Park 1994). Only two out of five advertising researches employed factor analysis to measure the validity of data (Park 1993; Kim and Park 1994).

#### Service

5-point scale was used in two out of four service marketing researches reviewed (Lee and Kim 1993; Lee 1992). Lee (1992) also used 4-point scale in his bank selection attributes research. Lee (1994) employed 7-point scale for his service quality and service value research.

Only two researches in this area used Cronbach's  $\alpha$  to measure the internal consistency and factor analysis to measure the validity of data (Kim and Cho 1993; Lee 1994).

### Distribution Channel and Logistics

Most of researches in this area used 5 point scale (Lee and Oh 1991; Oh, Park and Kim 1992; Hah 1992; Shin 1992; Oh, Rhim and Kim 1993; Oh, Kim and Choi 1994; Oh, Park and Kang 1994; Park 1994).

Cronbach's  $\alpha$  was the most popular method to measure the reliability of data in this area (Lee and Oh 1991; Oh, Park and Kim 1992; Hah 1992; Shin 1992; Oh, Rhim and Kim 1993; Oh, Kim and Choi 1994; Oh, Park and Kang 1994). Factor analysis was the most frequently used method to measure the validity of data in this area (Lee and Oh 1991; Hah 1992; Oh, Rhim and Kim 1993; Oh, Kim and Choi 1994; Oh, Park and Kang 1994). Also correlation analysis was used to check the validity of data in two researches (Oh, Park and Kim 1992; Shin 1992).

### Industrial Marketing

5-point scale was used in two out of three researches related to industrial marketing (Noh 1991; Kim 1994a). Noh (1991) and Shin (1994) used Cronbach's  $\alpha$  to measure the reliability of data. Shin (1994) employed factor analysis to check the validity of data.

### Strategic Marketing and Other Topics

Kim and Chaik (1991) and Jeon and Han (1994) used 7-point scale for their researches. Kim, J. B. (1992), Song (1994), and Park (1994) used 5-point scale for their researches in this area. Yae and Kim (1992) also used 3-point scale for their research.

Cronbach's  $\alpha$  was the most frequently used method to measure the reliability in this area (Kim and Chaik 1991; Yae and Kim 1992; Kim, J. B. 1992; Jeon and Han 1994; Kim, M. J. 1993). Three researches in this area used factor analysis to measure the validity of data (Yae and Kim 1992; Kim, J. B. 1992; Jeon and Han 1994).

### Summary

This study found that 5-point scale was the most preferred one in recent Korean marketing researches. The Second most frequently used scale was 7-point scale. Also 3-, 4-, and 9-point scales were used but their importance were minimal. 11 out of 54 researches being reviewed did not indicate what kind of response category they used (Table-2).

Cronbach's  $\alpha$  was the most popular method to check reliability in recent Korean marketing researches. Split-half coefficient and test-retest reliability were used but only two researches used those methods. Two advertising researches used interjudge reliability. One reliability research used alternative form reliability. 15 out of 54 researches did not show whether they checked reliability of their data (Table-3).

Factor analysis was the most frequently used method to check validity of recent Korean marketing researches. There were three researches which used correlation to check validity of their data. But 33 out of 54 researches did not indicate how they check validity of their data (Table-4).

<Table-2> Number of Marketing Researches by Response Categories\*

	Response Category					n.a.*	Total
	3	4	5	7	9		
Number of Researches.	2	1	28	14	4	11	54

\* n.a.: Not available

<Table-3> Number of Marketing Researches by Reliability Measures

	Reliability Measure					n.a.	Total
	Cronbach's $\alpha$ Coefficient	Split-half	Test-retest Reliability	Interjudge Reliability	Alternative Form Reliability		
Number of Researches	36	1	1	2	1	15	54

<Table-4> Number of Marketing Researches by Validity Measures

	Validity Measure			Total
	Factor Analysis	Correlation	n.a.	
Number of Researches	16	3	33	54

## IV. Method

### Sample

Sampling units used in this study consisted of four independent samples for 3-, 5-, 7-, and 9-point scales. Three independent samples for 3-, 5-, and 7-point scale consisted of three groups of graduate and undergraduate students of business administration department from one Korean university located in southern part of Korea. Data for three types of response categories (3-, 5-, and 7-point scale) were collected during the fall of 1994. 111 questionnaires for 3-point scale, 134 questionnaires for 5-point scale, and 134 questionnaires for 7-point scale were usable for analysis. Sample for 9-point scale was collected in fall of 1990. 189 questionnaires from this sample were usable for analysis. Sampling units for this study consisted of individuals who owned personal computers including AT, 386, 486, etc..

### Measurement

Consumer satisfaction was measured by 9 constructs such as 1) sales method and ability of sales force, 2) delivery and installation of product, 3) manual, 4) education, 5) customer support and service, 6) hardware, 7) software, 8) price vs. performance, 9) advertising. Scales used in this study was originally developed for Korean personal computer consumers by Kim and Chu (1991). Four different forms of questionnaires were prepared for four different response categories.

Variables for each construct were 1) sales method and ability of sales force: easiness of meeting salesman, understanding customer's needs, proper recommendation, technical knowledge, observing promises, providing a new product information, kindness and sincerity, 2) delivery and installation of product: on-time delivery, observing delivery condition, help for installation, spare parts and documents, 3) manual: packaging and appearance, easiness of contents, useful information, comprehensiveness, technical accuracy, proper graphs and examples, 4) education: opportunity of education, various educational programs, self-learning materials, quality of education, convenient location, 5) customer support and service: support and service, real-time response, on-time solution, correct service, assistance in using, 6) hardware: right application, right solution, speed, response and resource, compatibility, easy to use, reliability, upgradability, conformity to local standard, 7) software: right solution, speed, response and resource, compatibility, easy to use, reliability, 8) price vs. performance: competitive price, economy in upgrading, economy in service, maintenance cost, 9) advertising: frequency, interest, get the message crossed. These variables were measured by 3-, 5-, 7-, and 9-point Likert type scales.

### Statistical Procedure

Cronbach's  $\alpha$  was found to be the most frequently used method to measure reliability of data in Korean marketing researches in previous section. Thus Cronbach's  $\alpha$  was used to measure reliability of data in this study. Cronbach's  $\alpha$  was calculated for each construct. Split-half reliability coefficient was also used to measure reliability of data in this study. Split-half reliability coefficient was calculated for each construct too. To understand the relationship between reliability and response categories, nine Cronbach's  $\alpha$ 's and nine split-half reliability coefficients were compared across four types of response categories.

Factor analysis was found to be the most frequently used method to measure validity of data in Korean marketing researches in previous section. Thus factor analysis was used to measure validity of data in this study. Factor extraction method employed in this study was maximum likelihood for 5-, 7-, and

9-point scale data. But factor analysis using maximum likelihood was not able to extract any factor from 3-point scale data. Thus principle component method was used to extract factors from 3-point scale data. Varimax rotation was engaged to rotate factors for 5-, 7-, and 9-point scale data. But any method of rotation was possible for 3-point scale data. To understand the relationship between validity and response categories, results of rotated factor analysis except 3-point scale data were compared across three types of response categories i. e. 5-, 7-, and 9-point scale.

Any type of statistical test or standardization of data were not tried for data in this study because there were only four different kinds of response categories. Characteristics of this study was exploratory. Thus no hypothesis was constructed to be tested.

## V. Analysis

To understand the relationship between reliability and response categories, Cronbach's  $\alpha$  and split-half reliability coefficient were calculated for each satisfaction construct across different response categories.

〈Table-5〉 showed standardized Cronbach's  $\alpha$ 's calculated for data used in this study. All of four different scales had acceptable level of reliability by Nunnally's reliability standard. Highest Cronbach's  $\alpha$  was .9214 and lowest one was .6752. Nunnally (1967) suggested that, in early stages of research, modest reliability in the range of .5 to .6 will suffice. But for basic research, he argued that increasing reliability beyond .8 was necessary because at that level correlations were attenuated very little by measurement error. Nunnally said that in applied settings, a reliability of .9 was the minimum that should be tolerated and a reliability of .95 should be considered the desirable standard. But Peter (1979) argued that Nunnally's reliability standard was too much rigid for marketing settings.

Four Cronbach's  $\alpha$ 's calculated from the same construct for four different response categories were compared to determine relative level of reliability for each response category. 9-point scale data had four of highest Cronbach's  $\alpha$ 's (among four types of response categories) and three of second highest Cronbach's  $\alpha$ 's. 7-point scale data had four of highest Cronbach's  $\alpha$ 's and three of second highest Cronbach's  $\alpha$ 's. 5-point scale data had only one of highest Cronbach's  $\alpha$ 's and three of second highest Cronbach's  $\alpha$ 's. 3-point scale data did not have any highest Cronbach's  $\alpha$  at all. Thus in terms of Cronbach's  $\alpha$ , 7- and 9-point scales data had highest reliability and 5-point scale data had lower level of reliability. But 3-point scale data had lowest reliability level among four types of response categories.

Spearman-Brown's reliability coefficient for split-half reliability were calculated for each satisfaction construct across four types of scales 〈Table-5〉. Equal length and unequal length Spearman-Brown's reliability coefficients were selected to be used upon the number of items on each of the two parts in splitting. Spearman-Brown's split-half reliability coefficients for four different types of response categories were compared. 9-point scale data had three of highest coefficients and four of second highest coefficients. 7-point scale data had two of highest coefficients and two of second highest coefficients. 5-point scale data had four of highest coefficients and two of second highest coefficients. 3-point scale data had only one of second highest coefficients. Thus, in terms of split-half reliability coefficient, 5-point scale data had highest level of reliability. 9-point scale data had second highest level of reliability. 7-point scale data had third highest level of reliability and 3-point scale data had lowest level of reliability.

<Table-5> Cronbach's  $\alpha$  and Split-half Coefficient

Satisfaction Construct	Cronbach's $\alpha$ **				Split-half Coefficient			
	Response Category				Response Category			
	3	5	7	9	3	5	7	9
Sales Method and Ability of Sales Force	.8052	.8619	.8654*	.8551	.8010	.8428*	.7865	.7884
Delivery and Installation of Product	.6752	.8245*	.7840	.7658	.5579	.7356*	.6521	.7266
Manual	.7171	.7833	.8225	.8803*	.7065	.7085	.7896	.8450*
Educational Service	.7210	.8725	.8850	.8908*	.8017	.8486	.8820*	.8628
Customer Support and Service	.7904	.9116	.9108	.9214*	.7374	.8936	.8504	.9012*
Hardware	.7826	.8906	.8754	.8952*	.7114	.8873*	.8070	.8645
Software	.7152	.7871	.8629*	.8478	.6698	.7216	.8142	.8409*
Price vs. Performance	.6666	.6944	.8226*	.7955	.6157	.7340*	.7297	.7299
Advertising	.7718	.8820	.9103*	.8544	.7546	.8912	.9195*	.8506

\* Highest among four different response categories

\*\* Standardized Item Alpha

〈Table-6〉 showed results of rotated factor analysis from data used in this study. For 5-, 7-, and 9-point scales, maximum likelihood extraction and varimax rotation methods were used. 9 factors explained 62.8 % of total variance for 9-point scale data. Factor analysis for 9-point scale data revealed that satisfaction for hardware and software might be one construct. Factor analysis could discriminate most of constructs correctly with reasonable accuracy. But factor analysis for 9-point scale data experienced difficulties in discriminate variables for two constructs such as sales method and ability of sales force and hardware. Thus, in terms of factor analysis, 9-point scale data had high level of validity.

10 factors explained 66.8 % of total variance for 7-point scale data. Satisfaction of hardware and software were found to be one construct too for 7-point scale. Factor analysis for 7-point scale data could discriminate variables for 6 constructs such as sales and method and ability of sales force, manual, education, software, price vs. performance, and advertising. Factor analysis had difficulties in discriminating variables for three constructs such as delivery and installation of product, customer support and service, and hardware. Thus, in terms of factor analysis, 7-point scale data had reasonable level of validity.

For 5-point scale data, 10 factors explained 62 % of total variance. Factor analysis for 5-point scale data was able to correctly discriminate variables for hardware construct and software construct. At reasonable accuracy, factor analysis could correctly discriminate variables for 7 constructs such as sales method and ability of sales force, delivery and installation of product, education, customer support and service, hardware, price vs. performance, and advertising. Factor analysis had difficulties in discriminate variables for two constructs such as manual and software. Thus, in terms of factor analysis, 5-point scale data had high level of validity.

For 3-point scale, maximum likelihood extraction method failed to extract any factor at all. Only principle component method was able to extract factors. Any method for rotation was not possible for 3-point scale data. Principle component method extracted 15 factors which had eigenvalues more than 1.0. 7 factors could explain 52.1 % of total variance. Highest eigenvalue was 10.1 for factor 1. Second highest eigenvalue was 3.7 for factor 2. There was big difference in eigenvalue between factor 1 and factor 2. Factor loading pattern for 3-point scale data were shown in 〈Table-6〉. These factor loadings revealed that too many variables were related to only factor 1. Difference in factor loadings between constructs for 3-point scale data was negligible. Only variables of education and advertising were related to their own constructs correctly. Factor analysis could not discriminate constructs correctly. Thus, in terms of factor analysis, there was almost no validity in 3-point scale data used in this study.

Factor analysis results for four types of response categories were compared to find relative level of validity. If factor analysis was used to measure validity of data, 5-point scale and 9-point scale data had highest levels of validity. 7-point scale had medium level of validity. 3-point scale had lowest level of validity. 5-point scale had better ability in discriminating variables for constructs than any other scale.



<Table-6> Factor Analysis Results for Different Response Categories

Satisfaction Construct	Variable	Response Category																			
		3					5														
		Factor					Factor														
		1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10			
Sales Method and Ability of Sales Force	Easiness of Meeting Salesman	■																			
	Understanding Customer's Needs	■																			
	Proper Recommendation	■	■																		
	Technical Knowledge	■																			
	Observing Promises	■																			
	New Product Information																				
	Kindness and Sincerity	■																			
Delivery and Installation of Product	On-time Delivery																				
	Observing Delivery Condition	■																			
	Help for Installation	■																			
	Spare Parts and Documents																				
Manual	Packaging and Appearance	■																			
	Easiness of Contents	■																			
	Useful Information																				
	Comprehensiveness																				
	Technical Accuracy	■																			
	Proper Graphs and Examples	■																			
Education	Opportunity of Education	■																			
	Various Educational Programs	■																			
	Self Learning Materials	■																			
	Quality of Education	■																			
	Convenient Location	■																			
Customer Support and Service	Support and Service	■																			
	Real-time Response	■																			
	On-time Solution	■																			
	Correct Service	■																			
	Assistance in Using	■																			

\* ■ : Factor Loading > 0.4

\*\* Principle component method for 3-point scale data and maximum likelihood method for 5-point scale data were used to extract factors. Any rotation for 3-point scale data was not possible. Varimax rotation was tried for 5-point scale data.

<Table-6> Factor Analysis Results for Different Response Categories

Satisfaction Construct	Variable	Response Category																			
		7										9									
		Factor										Factor									
		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Hardware	Right Application					■														■	
	Right Solution					■														■	
	Speed, Response and Resource	■				■															
	Compatibility	■																			
	Easy to Use	■																			
	Reliability	■																			
	Upgradability	■																		■	
	Conformity to Local Standard	■																		■	
Software	Right Solution					■														■	
	Speed, Response and Resource	■																		■	
	Compatibility	■																		■	
	Easy to Use	■																		■	
	Reliability	■																		■	
Price vs. Performance	Competitive Price							■												■	
	Economy in Upgrading							■												■	
	Economy in Service							■												■	
	Maintenance Cost							■												■	
Advertising	Frequency					■														■	
	Interest					■														■	
	Get the Message Crossed					■														■	

\* ■ : Factor Loading > 0.4

<Table-6> Factor Analysis Results for Different Response Categories

Satisfaction Construct	Variable	Response Category																			
		7									9										
		Factor									Factor										
		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Sales Method and Ability of Sales Force	Easiness of Meeting Salesman																				
	Understanding Customer's Needs																				
	Proper Recommendation																				
	Technical Knowledge																				
	Observing Promises																				
	New Product Information																				
	Kindness and Sincerity																				
Delivery and Installation of Product	On-time Delivery																				
	Observing Delivery Condition																				
	Help for Installation																				
	Spare Parts and Documents																				
Manual	Packaging and Appearance																				
	Easiness of Contents																				
	Useful Information																				
	Comprehensiveness																				
	Technical Accuracy																				
	Proper Graphs and Examples																				
Education	Opportunity of Education																				
	Various Educational Programs																				
	Self Learning Materials																				
	Quality of Education																				
	Convenient Location																				
Customer Support and Service	Support and Service																				
	Real-time Response																				
	On-time Solution																				
	Correct Service																				
	Assistance in Using																				

\* ■ : Factor Loading > 0.4

\*\* Maximum likelihood method and varimax rotation were used for 7- and 9-point scales data.

<Table-6> Factor Analysis Results for Different Response Categories

Satisfaction Construct	Variable	Response Category																	
		3					5												
		Factor					Factor												
		1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10	
Hardware	Right Application	■												■					
	Right Solution	■												■					
	Speed, Response and Resource	■												■					
	Compatibility	■		■										■				■	
	Easy to Use	■												■					
	Reliability	■												■					
	Upgradability	■												■					
	Conformity to Local Standard	■												■					
Software	Right Solution	■																	
	Speed, Response and Resource	■																	■
	Compatibility	■																	■
	Easy to Use	■								■									■
	Reliability	■																	■
Price vs. Performance	Competitive Price																		■
	Economy in Upgrading									■									■
	Economy in Service									■									
	Maintenance Cost																		■
Advertising	Frequency									■									■
	Interest									■									■
	Get the Message Crossed									■									■

\* ■ : Factor Loading > 0.4

## VI. Conclusion and Implication

Conclusions from this study are:

First, in terms of reliability level, 3 point scale had lowest level and 5-, 7-, and 9-point scales had reasonable level of reliability. This study found that 9- and 7-point scales had highest levels of Cronbach's  $\alpha$  and 5-point scale had highest level of split-half reliability coefficient. 3-point scale had lowest level of Cronbach's  $\alpha$  and split-half coefficient. This finding partly agreed with the result of Komorita and Graham (1965) which concluded reliability increases with increase of the number of scale points. Also this finding disagreed with Aiken's (1983) research finding indicated that Cronbach's  $\alpha$  is independent of the number of response categories. But this study failed to find enough evidence there was significant difference in reliability level between 5-, 7- and 9-point scale data.

Second, in terms of validity level, 3-point scale had lowest level and 7-point scale had medium level. 5- and 9-point scale had highest level of validity. This finding disagreed with Jacoby and Matell's (1971) research finding concluded that level of validity is independent of the number of response categories.

Third, 3-point scale was found to have lowest level of reliability and validity. 3-point scale may be less capable of transmitting much information and frustrate and stifle respondents compared to other scale points used in this study (Cox 1980).

Fourth, 5-, 7-, and 9-point scale were found to be reasonable in terms of reliability and validity. But this study could not determine which one was best among these three types of response categories. This finding agreed with results of other research findings (Miller 1956; Green and Rao 1970; Lehman and Hulbert 1972; Matell and Jacoby 1972; Cox 1980), but disagreed with some of past research findings (Benson 1971; Jacoby and Matell 1971).

Fifth, 5-point scale had best ability in discriminating variables into constructs correctly. Result of factor analysis confirmed this conclusion. Only 5-point scale could discriminate variables of satisfaction of hardware and software into two independent constructs correctly.

Implications from conclusions mentioned above are:

First, When Korean consumer's behavior is examined, Korean marketing researchers should note that using 5-, 7-, and 9-point response categories can enhance validity and reliability of their measuring instruments. And using 3-point scale without careful pretests should be avoided for Korean consumers. This study found that level of Cronbach's  $\alpha$  of 3-point scale was high enough to be used in marketing study but lower than other three scales studied in this research. And validity of 3-point scale was found to be very low.

Second, if Korean marketing researchers want high level of validity from their data, 5- and 9-point scale is recommended. If Korean marketing researchers want high level of reliability, then 5-, 7-, 9-point scales are recommended.

Third, marketing researchers in Korea should use careful pretest for their scales whenever needed. Guilford (1954) suggested that the appropriate number of response categories should be empirically determined. Survey method using various number of response categories in Korean marketing practice is in the developing stage. Most of scales used in Korean marketing researches were mainly translated from foreign versions. Thus there is no guarantee for reliability and validity of Korean version of scales developed originally in foreign countries.

Limitations of this study are: First, data used in this study were consumer satisfaction of personal

computer in Korea. It is hard to be generalize findings from this study into other situations in Korea. Second, four different samples were analyzed in this study. But it is much better to use one sample for comparing response patterns among different scale points. Third, only four types of response categories were used. There should be marketing research situations in Korea where the number of response categories beyond these scale points used here must be used. Fourth, the relationship between response categories and reliability and validity was examined. Analysis of effect of the number of response categories on means and variances was excluded here.

## References

- Ahn, Gill Sang (1993), "An Empirical Investigation of Influence of Market Maven in Energy Conservation," *Korean Marketing Review*, Vol. VIII No.2 (September), 19-46.
- Ahn, Kwang Ho and Choi Seo Il (1993), "An Investigation of Store Choice Behavior Using Multinomial Logit Model," *Korean Management Review*, Vol. XXII No. 2 (June), 101-120.
- Aiken, Lewis R. (1983), "Number of Response Categories and Statistics on a Teacher Rating Scale," *Educational and Psychological Measurement*, Vol. 43, 397-401.
- Bending, A. W. (1954), "Reliability and the Number of Rating Categories," *Journal of Applied Psychology*, Vol. 38 (February), 38-40.
- Benson, Purnell H. (1971), "How Many Scales and How Many Categories Shall We Use in Consumer Research? - A Comment," *Journal of Marketing*, Vol. 35 (October), 59-61.
- Bevan, William and Lloyd L. Avant (1968), "Response Latency, Response Uncertainty, Information Transmitted and the Number of Available Judgemental Categories," *Journal of Experimental Psychology*, Vol. 76 No. 3, 394-397.
- Chaib, Seo Il and Jae Hwan Kim (1993), "Brand Strategies of the Korean export Companies," *Korean Marketing Review*, Vol. VIII No. 2 (September), 65-79.
- Champney, H. and H. Marshall (1939), "Optimal Refinement of the Rating Scale," *Journal of Applied Psychology*, Vol. 23, 323-331.
- Cho, Nam Ki (1991), "A Study on the Consumer's Store Image Perception," *Korean Management Review*, Vol. XX No.2 (May), 325-352.
- Cicchetti, Domenic V., Donald Showalter and Peter J. Tyrer (1985), "The Effect of Number of Rating Scale Categories on Levels of Interrater Reliability: A Monte Carlo Investigation," *Applied Psychological Measurement*, Vol. 9 No. 1 (March), 31-36.
- Cox, Eli P., III (1980), "The Optimal Number of Response Alternatives for A Scale: A Review," *Journal of Marketing Research*, Vol. XVII (November), 407-422.
- Cronbach, Lee J. (1950), "Further Evidence on Response Sets and Test Design," *Educational and Psychological Measurement*, Vol. 10 (Spring), 3-31.
- Ferguson, L. W. (1941), "A Study of the Likert Technique of Attitude Scale Construction," *Journal of Social Psychology*, Vol. 13, 51-57.
- Green and Rao (1970), "Rating Scales and Information Recovery - How Many Scales and Response Categories to Use," *Journal of Marketing*, Vol. 34 (July), 33-39.
- Guilford, J. P. (1954), *Psychometric Methods*, New York: McGraw-Hill.
- Hah, Nam Il (1992), "A Study of the Relationship between Conflict and Power in Marketing Channel," *Korean Marketing Review*, Vol. VII No.1 (March), 146-167.
- Han, Choong-Min (1990), "The Role of Country of Origin and Brand Name in U.S Consumers' Product Evaluation," *Korean Marketing Review*, Vol. V No.1 (March), 261-276.
- Han, Choong-Min and Byoung-Woo Lee (1992), "Country Images for Foreign Products in Europe: An Analysis of Korean, Japanese, U.S., and German Automobiles," *Korean Management Review*, Vol. XXI No.2 (May), 223-248.
- Hwang, Myung T. (1993), "An Examination of the Validity of Behavioral Intention Model-Applied on Smoking Cessation Behavior," *Korean Marketing Review*, Vol. VIII No.2 (September), 189-198.
- Härtel, Charmine E. J. (1993), "Rating Format Research Revisited: Format Effectiveness and Acceptability Depend on Rater Characteristics," *Journal of Applied Psychology*, Vol. 78 No. 2, 212-217.

- Jacoby and Matell (1971), "Three-Point Likert Scales Are Good Enough," *Journal of Marketing Research*, Vol. VIII (November), 495-500.
- Jahoda, M., M. Deutsch and S. W. Cook (1951), *Research Methods in Social Relations*, New York: Dryden Press.
- Jeon, In Soo and Jae Young Han (1994), "The Effect of Market Orientation on Business Performance," *Korean Marketing Review*, Vol. IX No.1 (March), 75-91.
- Jun, Sunkyu, Sunkoo Lee, and James W. Gentry (1994), "Acculturation of American Expatriates in Korea: Delineation of the Behavioral and Attitudinal Dimension," *Journal of Marketing Studies*, Vol. 3 No. 2 (February), 141-152.
- Kim, Beom Jong and Seo Il Cha (1991), "Impact of Strategic Marketing Effort and Market Environment on Performance," *Korean Marketing Review*, Vol. VI No. 1 (March), 43-69.
- Kim, Dong Ki, Soo Hyun Bae and Jong Won Park (1993), "Effects of the Consumers Involvement and Product Knowledge on the Attitudes and Behaviors," *Korean Marketing Review*, Vol. VIII No. 2 (September), 1-17.
- Kim, Jae Il (1993), "Effects of Purchase Situation and Organizational Characteristics on the Importance of Information Sources and Decision Criteria," *Korean Marketing Review*, Vol. VIII No. 1 (April), 70-81.
- Kim, Jong Bae (1992), "An Empirical Study on the Key Factors Influencing New Product Performance," *Korean Marketing Review*, Vol. VII No. 1 (March), 121-145.
- Kim, Jong Myung and Myung Ho Park (1994), "The Working Relationship's Effect between Franchise Strategy and Performance," *Journal of Marketing Studies*, Vol. 4 No. 1 (August), 17-24.
- Kim, Kyung Hoon (1991), "Consumer Attributes of Brand Loyalty for Low b-Involvement Products," *Korean Marketing Review*, Vol. VI No. 1 (March), 82-111.
- Kim, Kyung Hoon (1993), "Reliability: A Review of Recent Marketing Practices and Problems," *Korean Marketing Review*, Vol. VIII No. 2 (September), 199-230.
- Kim, Kyung Hoon (1994), "Determinants of Industrial Consumers' PC Purchasing Decision," *Journal of Marketing Studies*, Vol. 4 No. 1 (August), 85-93.
- Kim, Kyung Hoon (1994a), "Effects of Outliers on Transformation of Consumer Satisfaction Data," *Journal of Marketing Studies*, Vol. 3 No. 2 (February), 1-17.
- Kim, Kyung Hoon and Kyo-Wan Chu (1991), "Limitations of Factor Analysis in the Research of Consumer Satisfaction," *Journal of Marketing Studies*, Vol. 1 (October), 1-26.
- Kim, Mee-Kyung and Jae-Wan Cho (1993), "A Study on Strategy Development of Service Marketing Mix of Hotel Enterprises," *Journal of Marketing Studies*, Vol. 3 No. 1 (August), 17-37.
- Kim, Min-Jeong (1993), "An objective and Subjective Well-Being According to Life-Cycle," *Journal of Marketing Studies*, Vol. 3 No. 1 (August), 39-63.
- Kim, Sung Hwan (1992), "A Study on the Shopping Propensity of Korean Consumer's," *Korean Marketing Review*, Vol. VII No. 1 (March), 11-33.
- Kim, Yong Kook (1992), "A Study on the Influence of the Peripheral Cues in Ad on the Consumer's Attitude on Products," *Korean Marketing Review*, Vol. VII No. 1 (March), 102-120.
- Komorita, A. W. and William K. Graham (1965), "Number of Scale Points and the Reliability of Scales," *Educational and Psychological Measurement*, Vol. 25 (November), 987-995.
- Komorita, S. S. (1963), "Attitude Content, Intensity, and the Neutral Point on a Likert Scale," *Journal of Social Psychology*, Vol. 61 (December), 327-334.
- Lee, Chang Ro and Chang Soo Kim (1993), "An Empirical Study on the Evaluation and the Measurement



- of Bank's Service Quality," *Korean Marketing Review*, Vol. VIII No. 2 (September), 163-188.
- Lee, Chong Ha and Sejo Oh (1991), "Environmental Dynamism Effects on Bureaucratic Structuring and Conflict in Marketing Channels," *Korean Marketing Review*, Vol. VI No. 1 (March), 26-42.
- Lee, Chul (1990) "A Modification of the Fishbein Behavioral Intention Model for Korean Consumers," *Korean Marketing Review*, Vol. V No. 1 (March), 182-209.
- Lee, Doo Hee (1993), "An Empirical Study of Brand Awareness Caused by Advertisements: Intensity Effects and Valence Effect," *Korean Management Review*, Vol. XXIII No. 1 (November), 1-20.
- Lee, Doo Hee and Taek Kyung Lim (1993), "A Cornerstone of Korean Advertising Theory Building," *Korean Marketing Review*, Vol. VIII No. 2 (September), 231- 258.
- Lee, Hak sik (1991), "Emotional Responses as Mediator of Advertising Effects: Moderating Roles of Product Experiences and Involvement," *Korean Management Review*, Vol. XXI No. 1 (November), 345-367.
- Lee, Hak Sik, Kyu Hak Chae and Ho Bae Lee (1992), "Influences of Personality and Life Style on Consumption Communication," *Korean Marketing Review*, Vol. VII No. 1 (March), 65-79.
- Lee, Jong Whan (1994), "A Study on the Measuring Service Value," *Journal of Marketing Studies*, Vol. 4 No. 1 (August), 41-66.
- Lee, Joo Hyoung (1994), "Traits of Environmentally Conscious Consumers on Lifestyle Research," *Journal of Marketing Studies*, Vol. 3 No. 2 (1994), 97-114.
- Lee, Sang-Hwan (1992), "Bank Selection Attributes and Segmenting a Bank's Customer Set," *Journal of Marketing Studies*, Vol. 1 No. 2 (February), 73-82.
- Lee, Seong Taek (1993), "An Empirical Study on Product Involvement for the Change of Consumer's Attitude-With Special Reference to the Attitude Change of University Students," *Korean Marketing Review*, Vol. VIII No. 1 (April), 97-122.
- Lee, Wha In (1993), "The Effects of Perceived Crowding and Cognitive Control on Consumer In-Store Exploratory Behavior," *Korean Management Review*, Vol. XXIII No. 1 (November), 173-199.
- Lehmann, Donald R. and James Hulbert (1972), "Are Three-Point Scales Always Good Enough?" *Journal of Marketing Research*, Vol. IX (November), 444-446.
- Lissitz, Robert W. and Samuel B. Green (1975), "Effect of the Number of Scale Points on Reliability: A Monte Carlo Approach," *Journal of Applied Psychology*, Vol. 60 No. 1, 10-13.
- Martin, Warren S. (1973), "The Effect of Scaling on the Correlation Coefficient: A Test of Validity," *Journal of Marketing Research*, Vol. 10 (August), 316-318.
- Martin, Warren S. (1978), "Effects of Scaling on the Correlation Coefficient: Additional Considerations," *Journal of Marketing Research*, (May), 304-307.
- Matell, Michael S. and Jacob Jacoby (1972), "Is There an Optimal Number of Alternatives for Likert-Scale Items? Effects of Testing Time and Scale Properties," *Journal of Applied Psychology*, Vol. 56 No. 6, 506-509.
- Miller, George A. (1956), "The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information," *The Psychological Review*, Vol. 63 No. 2 (March), 81-97.
- Noh, Jeon Pyo (1991), "The Effect of Perceived Risk on Industrial Buyer's Different Preferences for Risk Handling Strategies," *Korean Marketing Review*, Vol. VI No. 1 (March), 131-145.
- Nunnally, J. (1967), *Psychometric Methods*, New York: McGraw-Hill Book Co. .
- Oh, Sejo, Byung Soo Rhim and Sung Il Kim (1993), "Effects of Relational Norms and Bureaucratic Structuring on Conflict in Industrial Buyer-Seller Relationships," *Korean Marketing Review*, Vol. VIII No. 1 (April), 1-11.

- Oh, Sejo, Jinyoung Park, and Kang Hoseok (1994), "Relational Norms, Bureaucratic Structuring and Power Structures in Industrial Buyer-Seller Relationships," *Korean Management Review*, Vol. XXIII No. 4 (November), 1-16.
- Oh, Sejo, Kyung Do Park, and Sung Il Kim (1992), "The Effects of Environmental Munificence and Channel Configuration on Internal Economic Structures in Marketing Channels," *Korean Management Review*, Vol. XXI No. 2 (May), 29-53.
- Oh, Sejo, Sung Il Kim and Da Heen Choi (1994), "The Effects of Bureaucratic Structuring and Relational Norms on Opportunism and Trust in Marketing Channels," *Korean Marketing Review*, Vol. IX No. 1 (March), 57-74.
- Pahng, Sukbaum (1993), "A Content Analysis of Message Cues in Television Advertisement of Korea, the U. S and Japan," *Korean Marketing Review*, Vol. VIII No. 1 (April), 84-95.
- Park, Chan Wook and Yong Jin Hyun (1994), "The Memory of Newspaper Ads as Affected by Ad Size and Article Involvement," *Korean Marketing Review*, Vol. IX No. 1 (March), 39-56.
- Park, In Soo (1994), "A Study on R&D and Marketing Cooperation," *Journal of Marketing Studies*, Vol. 3 No. 2 (February), 55-76.
- Park, Jong Hee (1993), "The Effects of Environmental Dynamism and Interchannel Competition on Internal Political Economy in Franchise Channels of Distribution," *Korean Management Review*, Vol. XXIII No. 1 (November), 391-422.
- Park, Jongmoo (1993), "A Study of Influences on Export Expansion Strategy," *Journal of Marketing Studies*, Vol. 3 No. 1 (August), 65-75.
- Park, Myung Ho (1993), "A Study on the Buying Behavior of Credit Card Users," *Korean Marketing Review*, Vol. VIII No. 1 (April), 123-144.
- Park, Yeung Kurn (1994), "Logistics Strategy of Manufacturing Firms," *Journal of Marketing Studies*, Vol. 3 No. 2 (February), 35-53.
- Peabody, D. (1962), "Two Components in Bipolar Scales: Direction and extremeness," *Psychological Review*, Vol. 69, 65-73.
- Peter, J. Paul (1979), "Reliability: A Review of Psychometric Basics and Recent Marketing Practices," *Journal of Marketing Research*, Vol. XVI No. 1 (February), 6-17.
- Shin, Bong Dae (1994), "A Study on Influence Determinants of Buying Center Members," *Journal of Marketing Studies*, Vol. 3 No. 2 (February), 77-95.
- Shin, Ji-Yong (1992), "Influential Factor Analysis on Consumer Satisfaction in Distribution Channels of Electric Home Appliance," *Journal of Marketing Studies*, Vol. 1 No. 2 (February), 83-117.
- Song, Yong Sup (1994), "Alternative Direction for Restructuring Marketing Curricula in Korea," *Korean Marketing Review*, Vol. IX No. 1 (March), 1-22.
- Sung, Sam Kyung, Jong Hoo Choi and Jae Chang Lee (1993), "Statistical Errors in Research Papers in Korean Management Review," *Korean Management Review*, Vol. XXII No. 2 (June), 163-198.
- Symonds, P. M. (1924), "On the Loss of Reliability in Ratings Due to Coarseness of the Scale," *Journal of Experimental Psychology*, Vol. 7, 456-461.
- Wang, Eui Rok (1993), "An Empirical Study on Multi-Stage Brand Evaluation Model," *Korean Management Review*, Vol. XXIII No. 1 (November), 233-260.
- Yae, Jong Suk and Myung Kook Kim (1992), "A Study on the Actual Conditions of Marketing Applications in Korean Firms," *Korean Marketing Review*, Vol. VII No. 1 (March), 80-101.
- Yoon, Mahn Hee (1993), "A Cross-Cultural Investigation of the Reliability of LOV (List of Values)," *Journal of Marketing Studies*, Vol. 2 No. 2 (February), 87-105.