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A Census of Multi-Item Scales Used in Marketing Research

by

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A CENSUS OF MULTI-ITEM SCALES USED IN MARKETING RESEARCH

The multi-item psychometric scale is a commonly used measurement tool in contemporary marketing research in both academia and industry. Yet, past studies have typically observed that individual measures have been reported with minimal evidence of psychometric quality (Heeler & Ray, 1972, p. 369; Kassarjian, 1971, p. 415; Jacoby, 1978, p. 91; Peter 1979, p. 16; Peter, 1981, p. 16). Even less is known about marketing-related scaled measures as a whole or how their use and properties vary across the sub-disciplines within the field.

The problem in the 1960s and 1970s was the over usage of single-item scales and the lack of scales developed specifically for use in marketing (Kassarjian, 1971, p. 415; Peter 1981, p. 138). However, the 1980s presented a different problem: while there is a sense that progress was made in terms of scale development and usage there is little comprehensive knowledge about how far the field progressed in the nature and quality of that usage. In a review of the period, Malhotra expressed concern about the quality of the scales being developed and used (1988, p. 20). Many assumptions are made about our field's measures and this study was conducted in an effort to shed some much needed empirical light on these issues.

Background

The need for better scale development and scale usage in published research literature has been a problem restraining research in many fields for years. As early as 1938, Buros deplored the state of scientific research, citing the lack of critical test reviews, both in professional journals and in textbooks. In 1975 he reiterated, "It is my considered belief that most standardized tests are poorly constructed, of questionable or unknown validity, pretentious in their claims, and likely to be misused more often than not" (p. xvii).

This poor state of research is perpetuated every time a scale with questionable validity and/or reliability is utilized. Buros censured researchers who published scales without citing critical reviews or validity information concerning the scale.

Chun, Cobb, and French (1975) note that naive researchers believe scale construction is easy, resulting with inadequate scales adding to the plethora of single-use measures. Only about 30% of the published psychological scales have been utilized more than once (Chun, Barnowe, Wykowski, Cobb, & French, 1972). In a similar study in sociology, 72% of the scales cited in the literature were used only once (Bonjean, Hill, & McLemore, 1967). This high level of scale development yet high degree of one-time usage indicates a lack of learning by researchers which further suggests a sense of futility and

wasted effort in published research efforts.

Borrowing Scales

Scale design can be very difficult for the researcher. As a result, quality of scales and standardization of research often is worse when the researcher devises new scales than when the researcher builds upon existing scales (Shaw & Wright, 1967).

Borrowing of highly reliable and valid scales is encouraged to save time, increase the quality of research and better enable researchers to expand/refine existing research (Chun et al., 1975; Sudman & Bradburn, 1982; Green, Tull, & Albaum, 1988). However, Anastasi (1985) warns that use of borrowed scales requires a knowledge of the domain and context of prior studies and how they relate to the current study. She indicates many misuses of borrowed scales stem from the researcher wanting quick answers and taking shortcuts.

Frequent use of a scale appears to be more a matter of convenience for many researchers rather than a matter of the scale's reliability and validity. High frequency of scale usage has been found to be associated with the test and scoring key published in the article, with correlation tables being published, and with published scale reliability. One should note, however, that low validity reliability scales are reused just as frequently as high reliability validity scales (Chun, Cobb, French, & Seashore, 1973).

Buros (1970) suggests that "convenient" scales can

inhibit progress unless researchers build upon the scale and seek continued improvements in the scale. Shaw and Wright (1967) advocate borrowing the best available scale, but the scale should be carefully applied due to differing underlying assumptions in the new research setting.

Marketing Scale Reviews

As the review above indicates, examinations of scale usage in psychology have been a common source of discussion. In contrast, there have been very few efforts in marketing to understand and describe the scales researchers are using.

One of the first empirical assessments was by Peter (1979). He reviewed 400 articles in the area of consumer behavior from five sources for a period in the mid-1970s. Detailed examination was limited to the nineteen studies which included some form of reliability assessment. In another study, Peter (1981) surveyed more than 450 articles from one source for the years 1973 to 1979. His concern was with twelve studies in which construct validation was specifically addressed.

A much larger analysis was made by Churchill and Peter (1984; Peter & Churchill, 1986). They reviewed 6,484 articles, notes, and papers from seven sources for the period of 1964 to 1982. The analysis reported in Churchill and Peter (1984) was concerned with the effect of research design on scale reliability and was based upon 154 uses of scales from 101 studies. Peter and Churchill (1986) used 162 measures,

apparently from the same set of studies, to examine a model of the relationships among research design variables and various types of validity.

More recently, Edris and Meidan (1990) reviewed eleven marketing sources published between 1966 and 1986. Their investigation concerned itself with the reliability of measurement in 100 studies which involved psychographic research.

Purpose of the Study

Given the lack of recent thorough examination of one of our field's most used types of measures, this study was conducted. A few of the relationships examined by Churchill and Peter (1984) will be retested here, particularly those which were found to be significant. The majority of hypotheses composing this study, however, have not been tested previously in any known marketing-related study.

The first two hypotheses are rather straight forward though there is no known empirical data to support them. That is, the field of marketing is assumed to have made increasing use of multi-item scales over the 1980s and the scales gradually improved in reliability over time. These seem to be reasonable expectations based upon the impact of certain key articles published in the 1970s and early 1980s which advocated greater development of scales intended for use in marketing (Kassarjian, 1971), greater use of multi-item scales (Jacoby, 1978; Peter, 1979), and greater attention to

reliability and validity (Churchill, 1979; Peter, 1981). These articles most likely affected the journal editors and reviewers first which in time influenced the body of submissions made to marketing journals. Given this information, the following two hypotheses are proposed:

H1: Scale usage has increased in marketing over time.

H2: The internal consistency of scales used in marketing has increased over time.

The internal consistency of a scale as estimated by coefficient alpha is mainly influenced by the number of items composing a scale and the degree of covariation among them (DeVellis 1991, p. 86). The latter effect is due to the fact that the formula for calculating coefficient alpha allows the variance terms in the numerator to increase arithmetically with the number of added items while the covariance terms in the denominator increase geometrically (e.g., Peter, 1979, p. 9). Most pertinent here is that such a finding was reported by Churchill and Peter (1984) with respect to the group of scales they examined. This leads to the following hypothesis:

H3: The number of scale items and level of internal consistency are positively correlated.

While acknowledging suggestions to the contrary (Bocker, 1988; Jacoby & Matell, 1971), it appears that reliability typically increases as the number of scale points increase (Nunnally, 1978, p. 595). After reviewing the available literature, Cox (1980) also concluded that increasing the

number of scale points tends to help reliability but he added that the potential for improvement is likely to be minor compared to other factors. Again, the most relevant finding was by Churchill and Peter (1984) who reported a significant positive association for the measures in their database. Therefore, the following hypothesis is presented:

H4: The number of response alternatives and level of internal consistency are positively correlated.

An unexpected finding of Churchill and Peter (1984) was a negative relationship between sample size and reliability. A related issue involves the ratio of respondents to scale items. Peter (1979) points out that sampling errors are related positively to the number items and negatively to the number of subjects. Thus, when the sample size and/or the ratio of respondents to items are low, chance is likely to affect inter-item correlations (DeVellis, 1991, p. 78). Given this, it has been suggested that there should be at least five to ten times as many respondents as items (Comrey, 1988; Nunnally, 1978, p. 279; Tinsley & Tinsley, 1987). The extent to which scale usage has been affected by these findings and suggestions is unknown but it seems reasonable to test the following two hypotheses:

H5: Sample size and internal consistency are negatively correlated.

H6: The ratio of sample size to number of scale items is five or greater for the majority of scale

The assumption is made by many researchers that the majority of scales used in marketing have been borrowed from other fields. This opinion may have been fostered by statements such as those of Kassarjian (1971, p. 415) when he criticized the misadaptation and misapplication by marketers of scales developed in other disciplines. Peter's (1981, p. 138) observation a decade later is even clearer; he stated that over half of the studies he examined used multi-item scales developed in other fields. However, it is reasonable to assume that as scale usage became more prevalent in marketing that the degree of borrowing scales from outside the field decreased and usage of scales developed within marketing increased. Further, as concern for scale quality increased in the 1980s it is likely that authors were more likely to clearly indicate the origin of the scales they used. Given these assumptions and observations the following hypotheses are proposed:

H7: The percent of scales originated within marketing studies has increased during the 1980s.

H8: The percent of scales borrowed from previous marketing research has increased during the 1980s.

H9: The percent of scales used in marketing studies but developed outside of marketing decreased during the 1980s.

H10: The percent of scales used in marketing studies of unknown origin decreased during the 1980s.

Quantity and Quality of Scale Usage By Journal

There is little doubt that perceptions of journal quality vary among academicians and practitioners (Browne & Becker 1985; Fry, Walters, & Scheuermann, 1985; Luke & Doke, 1987). While rank ordering was not exactly the same, the consistent finding across these three studies was that the three journals perceived to be of the highest quality and importance were *Journal of Marketing* (JM), *Journal of Marketing Research* (JMR), and *Journal of Consumer Research* (JCR). The next most important journals (of those included in this study's domain) were *Journal of the Academy of Marketing Science* (JAMS), *Journal of Advertising* (JA), and *Journal of Advertising Research* (JAR).

What is not known is whether there are significant differences in the quantity and quality of scaled measures reported in the various journals. Differences might come from a number of sources such as the age of the journal, its mission, its intended audience, the editors, and the level of rigor used by reviewers. Over time, these factors influence perception of the journals which in turn effect the nature of submissions. It is expected that journals which have images of higher quality publish articles containing scales with higher reliability than those journals with less high perceptions. Given these expectations the hypothesis below follows:

H11: JM, JMR, and JCR have reported scales with higher

mean internal consistency than have JAMS, JA, and JAR.

While the quantity of scales reported in the journals is likely to vary, there is no clear basis to support a specific directional hypothesis, especially if one considers the scale usage per article published rather than in total. Therefore, the following hypothesis is stated in null form:

H12: There is no significant difference among journals in their mean number of scales reported per article published.

Scale Usage By Construct Groups

Three of the most frequently studied areas within marketing are consumer issues, advertising issues, and organizational issues (Malhotra 1988).[1] Likewise, most of the scales reported in marketing journals can be identified as belonging to one of these three broad categories. Given those groups, some differences in scale properties and usage may be identifiable and relevant. However, there is no known empirical evidence which indicates that the consumer, advertising, and organizational scales are psychometrically different from each other. Therefore, each of the hypotheses below is stated in its null form.

H13: There is no difference in the number of scales which have been used to measure consumer, advertising, and organizational constructs.

H14: There is no difference in the mean levels of

internal consistency between the scales used to measure consumer, advertising, and organizational constructs.

Scale Type

The type of scale employed to measure a construct was tested by Churchill and Peter (1984) to determine if it made any difference in a scale's internal consistency. The mean alpha for Likert scales was found to be 75.9 compared to an 83.3 for semantic differentials. Despite this apparent difference in the two types of scales the authors concluded that there was no significant relationship because the confidence intervals for the means overlapped. Although the null version of the hypothesis will be tested, the evidence from Churchill and Peter (1984) could lead one to expect that if the null is rejected it will be due to semantic differentials having higher mean alphas than Likert-type scales.

H15: There is no significant difference in mean internal consistency between Likert-type scales and semantic differentials.

Method

Collecting and coding the scales used in published marketing research required several years worth of effort. Limits were imposed to make the task achievable in some reasonable time period. The two main limits placed on the

domain of review were the number of journals and years of publication. There was also a particular concern that three areas of study (consumer behavior, advertising, and organization) should be especially well represented. Six journals were ultimately selected: JM, JMR, JCR, JAMS, JA, and JAR.[2] While it is not advocated that these are necessarily the top six journals in marketing it does seem clear that during the 1980s they were among the most well known and respected journals in the field (Browne & Becker, 1985; Fry, Walters, & Scheuermann, 1985; Luke & Doke, 1987). Further, it was assumed that most scales of any reasonable quality and value to the field would have been reported at least once in these journals during the period reviewed.

The time frame reviewed focused on the 1980s given that previous studies have already examined scale usage of the 1960s and 1970s. Further, instead of taking a sample of scales from that period, every instance of scale usage was examined. However, only those scales which met certain criteria were included in the database. Measures had to contain two or more items. Also, a minimum amount of information had to be known about each scale, particularly with regard to reliability and item content. This information generally was gathered from within the articles themselves or from other published sources. Attempts to obtain information from the authors themselves were also made with mixed results. The group of scales analyzed here, therefore, while close to

being the population of published multi-item scales from the prescribed domain lacks those measures for which the minimum required information could not be obtained.

Most of the variables examined in this study were not particularly difficult to code. What made the job tedious was the number of scale uses to code and the difficulty of gathering the data, particularly when the information was not clearly stated in the article. The scale codes and inter-coder reliabilities are provided in Table A1. The levels of intercoder reliability are in the range of acceptability except for scale origination.[3] Adjustment in coding instructions for the origination variable was made followed by a second round of testing. The level of inter- coder reliability improved substantially but was still lower than the ideal level. Further changes were made with little success so the data regarding origination should be viewed more cautiously than the other information reported here.

In total, 2,458 articles, comments, and research notes were examined for measures which met the stated criteria for inclusion in the database. Seven-hundred-and-fifty uses of codable scales were found in 181 different articles.[4] These 750 uses are broken down by year of publication and journal in Figure 1 and Figure 2, respectively.

[Figures 1 and 2 about here]

Given that the data set is virtually the population from the defined domain, "significant difference" is more of a

conceptual than a statistical issue. Further, most of the tests were run with each instance of scale use for which data was available, the maximum being 750. In those cases, significance testing used an alpha level of .01. Another indication of substantive significance in the ANOVA tests comes from examination of confidence intervals; overlapping intervals suggest nonsignificance (Hunter, Schmidt, & Jackson, 1982, pp. 23, 24, Sawyer & Peter, 1983).

FINDINGS

Figure 1 indicates the number of scales reported per year in the 1980s. It illustrates a six- fold increase in the number of scales from 24 uses in 1980 to 152 uses in 1989. There was a correlation of .87 between year of publication and number of scales reported. Although there was not an increase every year, the high positive correlation provides strong evidence in support of H1.

The mean level of internal consistency for the whole period was found to be a respectable .77. Yet, there was an extremely wide range, from .28 to .98, with more than 26% below .70. The data in Table 1 provide weak support for H2 given that the correlation between year of publication and scale reliability was only .12. Figure 3 indicates graphically the lack of a clear linear trend. Therefore, although there was some slight increase in scale reliability

over the 1980s the decade did not end with the average reliability at a higher level than when it began.

[Table 1 & Figure 3 about here]

H3 stated that a positive correlation would be found between the number of scale items and reported reliability. Indeed, such a relationship was found. Based on the domain of literature reviewed, there was a correlation of .21. The corresponding estimate from the Churchill and Peter (1984) sample was .32.

Weak evidence was found in support of H4. There was a correlation of .14 between scale points and internal consistency compared with a correlation of .22 in the Churchill and Peter (1984) study. A refinement of this hypothesis was also tested since it has been suggested that the influence of scale points on reliability might be greater for tests with few items than it is for those with a great many items (Komorita, 1963). The partial correlation between number of points and reliability was .19 when the number of items in the scale was controlled for.

To further examine this relationship an ANOVA was performed on three groups of scales: those with two, three,and four points; those with five, six, and seven points; and, those with eight to eleven points. Mean internal consistency was highest for the group with the most response alternatives (.78) and lowest for the group with the least scale points (.73). However, it is questionable if anything should be made

of this difference given that the test was insignificant and the confidence intervals for all three groups overlapped ($F=1.96$, $p=.14$). The expectation stated in H5 was that there would be a significant negative relationship between sample size and internal consistency. This relationship was confirmed in the present study. Specifically, the correlation was -.21, quite similar to the -.22 correlation found by Churchill and Peter (1984).

H6 was tested using a specially developed subset of the full data set. The subset was constructed by using only one scale per unique sample (study) in the domain. When multiple scales were administered to a sample, data regarding longest was used. Doing this resulted in 199 uses of scales with subject/item ratios ranging between .90 to over 597. Seven percent of the studies had less than five times as many respondents as they had items. Nine-and-a-half percent of the studies had subject/item ratios of between five and ten. The rest of the studies (83.5%) had ratios of 10 or better bearing out H6.

Given the data discussed above it is reasonable to conclude that the ratio of sample size to scale items is negatively correlated with reliability. Using the subset of the full database described above, the correlation between subject/item ratio and internal consistency was -.14. This means that there was a slight tendency for scale reliability to diminish as the ratio of items to subjects increased.

Since an increase in subjects and items are generally desirable methodological characteristics the implication is that studies with low subject/item ratios have a greater tendency to report scales with high reliability. But, those figures should be viewed skeptically since they are more susceptible to chance.

With regard to scale origin, the data supported only H9, not H7, H8, or H10. (See data in Table 2). Instead of there being an increased amount of originality in scale usage, there was a decrease in the percentage of scales developed in the studies rather than borrowed from previous work (r=-.53). There was no measurable trend over the decade involving the percent of scales borrowed from previous marketing research (r=.06) though borrowing from other fields decreased somewhat (r=-.36). Further, the portion of scales of unknown origin increased (r=.69) rather than decreased over the decade. Any conclusions drawn from these apparent trends must be tempered by the fact that nearly 30% of the all the scales were of unknown origin. If their origination status where known it might radically influence these results.

[Table 2 about here]

In support of H11, it was found that the two groups of journals did differ substantially in their levels of scale reliability. Specifically, the group composed of JM, JMR, and JCR had a mean level of scale internal consistency of .78 whereas JAMS, JA, and JAR had a mean of .73. The t-test was

significant well below the p=.001 level (t=4.99).

To further investigate this difference, an ANOVA was performed on the six journals. It indicated there was a significant difference in the mean levels of internal consistency between the journals (F=7.02, p=.0001). The means ranged from a high of .79 for both JCR and JMR to a low of .72 for JAMS (Table 3). Both Bonferroni and Scheffe's methods indicated that significant differences existed between JAMS at one extreme and JCR and JMR at the other since their confidence intervals did not overlap.

[Table 3 about here]

The number of scales reported per journal did vary substantially as shown in Figure 2. However, H12 was tested more precisely by dividing the number of scales reported in each journal by the number of articles published in the time period. Table 3 shows that not only did JMR report more scales in total in the 1980s but it also had a higher degree of scale usage per article than any other journal of those examined. The amount of scales reported in JAR was considerably lower than the others but may be biased downward to some degree due the study's methodology.[5]

H13 was tested by examining the number of scales associated with the three construct groups. Nearly half (47%) of all scale uses were found to involve consumer constructs. Forty-one percent of the scales related to organizational issues and the remainder of the scales (12%)

were used to assess advertising constructs.

Not only were there different quantities of scales associated with the three groups (H13) but their qualities seem to be different as well (H14). Specifically, an ANOVA was used to examine their internal consistencies. The advertising group was found to have the highest mean (.82), followed by the organizational and consumer groups (both approximately .76). The ANOVA was significant ($F=8.23$, $p=.0003$) and the Bonferroni confidence intervals for the organizational and consumer groups did not overlap with that of the advertising group. (Scheffe's confidence intervals indicated a slight overlap between the organizational and advertising groups.) This evidence indicates that while measures of organizational and consumer constructs were nearly indistinguishable in their internal consistencies, advertising scales were noticeably higher.

About 78% of the scales reviewed were of the Likert-type with around 16% being semantic differentials. With regard to H15, semantic differential scales were found to have much higher mean reliability (.85) than Likert-type scales (.75). Yet, while these mean reliabilities are very similar to what was reported by Churchill and Peter (1984), the conclusion is different. H15 is rejected based upon the fact that the confidence intervals did **not** overlap. It seems safe to say, therefore, that the difference in the means is not only conceptually significant but statistically significant as

well.

Since it was known that scale length has an effect on internal consistency (H3) and that length might vary based on scale type, the test was rerun to be more certain of the result. However, when the number of items composing a scale was used as a covariate the conclusion was still the same: the semantic differential scales used in the 1980s tended to have much higher reliability than the Likert-type scales.

Discussion

The review of a decade's worth of articles indicated that there were 750 uses of multi-item scales reported in 181 articles. The number of scales and their reliabilities varied among the journals in which they were reported as well as the construct-areas studied.

The significant relationships found by Churchill and Peter (1984) were confirmed in this study. Specifically, internal consistency was found to be positively related to number of scale items and points but negatively associated with sample size.[6] The combined impact of these associations on the overall reliability of scales used in published marketing studies could be characterized as modest at best. A regression analysis indicated that number of items, points, and sample size produced a R-squared of only .1 ($p=.0001$).[7] So, even though these factors should receive serious attention when developing and using individual measures, they appear to explain only a small amount of variance in scale

reliability for the population as a whole.

Despite the need for greater reliability, use of scales with more items is not likely to occur given the growing tedium respondents seem to have with long surveys. Over fifty percent of the scale uses examined here had between two to four items. Therefore, scale users would do well to remember this simple rule: the fewer the items in the scale then the greater the number of response alternatives to use. That is, if one must have a short scale then at least a response scale of seven, eight, or nine points should be utilized. In contrast, if a scale with many items is used then reliability may not suffer substantially if fewer response alternatives are offered. The impact of these decisions on validity need to be explored further, however.

The general level of scale internal consistency in the domain was acceptable. However, there were many instances of articles having scales that provided little evidence of reliability or validity. While the data appears to show some slight improvement in reliability over time in the 1980s, it is interesting that the values are almost identical to those found by Churchill and Peter (1984) for scales from an earlier time period.

The author was struck by the number of times researchers attempted to justify low reliabilities ($\alpha < .7$) by citing the older edition of Nunnally (1967, p. 226) rather than the more recent edition (1978, pp. 245, 246) in which higher levels

were recommended. In other words, the standards of acceptability increased from the 1960s to the 1970s. Further, what was acceptable in the late 1970s may not be acceptable for certain forms of research in the 1990s. It is suggested, therefore, that instead of using scales with low reliabilities and searching for citations to justify their use, effort should be expended on the development and use of higher quality measures.

Some may argue that lower standards of reliability may be acceptable in those studies for which scales are not the primary focus of examination. However, the attenuating effect of low reliability on those relationships which are the focus must then be acknowledged. That is, insignificant findings may result due to low reliability rather than invalid theoretical propositions. Use of a multiple scales with low reliability in the same analysis only compounds the problem.

The knee-jerk reaction to simply maximize internal consistency is not being proposed, however. Although little discussed, high internal consistency can actually work against high validity, particularly when attempting to measure a construct with broad content (Kline, 1986, pp. 118-121). If scale developers merely select those items from a pool which maximize internal consistency then the result is what Cattell called a "bloated specific" (e.g., 1978, p.289). Therefore, high internal consistency may be a worthy goal but it should not be pursued at the expense of content validity.

About 27% of the instances of scale usage composing the database were judged to be original. While that by itself is not bad, it appears that measures have been developed too many times when "good" ones have already been reported in the literature. This is in contrast to what Peter (1981) observed a decade ago when he said that those interested in studying marketing-related issues ". . . have little to choose from in the way of theory or multi-item measures developed in their own literature" (p. 138). Now there are literally hundreds of scales available to assess a wide variety of marketing-related constructs. Therefore, the challenge facing most scale users today is not so much having to construct good scales from scratch or having to borrow and adapt measures from other fields, it is a matter of doing proper reviews of the marketing literature before questionnaires are prepared. The field appears to have disregarded Churchill's suggestion that "researchers should have good reasons for proposing new measures . . . and those publishing should be required to supply their rationale" (1979, p. 67).

In a related issue, it seems unfortunate that so many authors have not been more specific about the origin of their measures. Nearly 30% of the instances of scale usage were not described sufficiently so that a determination of origination status could be made. This lack of information affected inter-coder reliability and may also have masked the trends which were expected (H7 to H10). Certainly, authors should be

more forthcoming about this matter so readers may know whether a scale was constructed specifically for the study being reported or was borrowed from previous research.

It also does not seem defensible to use a scale if little or no published information attests to its quality. In contrast, if a scale has been used previously and there is sufficient evidence of its validity then users may not have to examine and report its psychometric properties in great depth. However, even with well tested scales certain types of information may still be useful. Measures of internal consistency are easy to compute and should be reported now in all journals as a matter of course. In addition, if we are to make use of computer-aided interviewing technology that can customize the length of scales in real time for individual respondents then we must be more forthcoming about reporting the requisite information for building item response banks (e.g., Singh, Howell, & Rhoads, 1990).

Greater concern for scale quality might occur if journals, particularly those most devoted to publishing empirical research, more vigorously solicited manuscripts regarding scaling issues. Not only should presentations of new measures be welcomed but so should articles which critically evaluate and compare alternative measures of the same construct. The *Journal of Personal Selling & Sales Management* began a section in 1993 totally devoted to scales and the time is ripe for journals which deal with other

topical areas to do likewise. Although it may have been considered previously, the notion of starting a new journal totally devoted to articles of this nature would appear to be worth revisiting at this point in the discipline's development.

The validity of measures was not addressed in this study but is worthy of investigation in future studies. There was a clear sense from this study, however, that providing evidence of a scale's validity was the exception rather than the rule. While it was expected that sophisticated examination of some forms of validity would be rare, it was surprising that indications of such fundamentals as content validity and unidimensionality were not routinely provided. Complicating the examination of validity is the inconsistent use of terminology and a lack of agreement on the methods of assessment.

A contribution could also be made in future research by dividing the scales into many construct groups and noting their psychometric characteristics. Not only could this help determine for which constructs good alternatives scales exist but also those for which few if any scales now exist. The major hurdle to accomplishing this task would be to first develop a mutually exclusive and collectively exhaustive set of marketing constructs and their operational definitions. Given the difficulty of such a task, less lofty goals may have to be acceptable for the short term.

Summary and Conclusions

This article describes some of the findings of the most recent and largest examination of scales in marketing. The decade of the 1980s was one of tremendous growth by researchers in the use of multi-item summated scales. The quantity of usage increased dramatically over the period but the quality (reliability) of the scales did not show a similar degree of improvement. This effort and those changes being implemented by our field's journals will hopefully raise the sensitivity level of scale users. If that can occur then a meaningful advancement in the quality of research being published in marketing should ultimately follow.

FOOTNOTES

1. The term "organizational" is used broadly here to refer to constructs relating to sales management, personal selling, channels, and other constructs involving marketing management that are not directly related to consumers or advertising. Further, it is admitted that these three categories (consumer, advertising, and organizational) are rather crude. However, repeated attempts to develop a larger set of mutually exclusive and collectively exhaustive groups were unsuccessful. The efforts continue and may at some point yield a hierarchical schemata of marketing constructs which can be used to more specifically examine scale usage.

2. The task of reviewing each article in the cited journals, describing each instance of scale usage, contacting scale users for more information, building the database, and analyzing the data required over three years of intensive work. While the inclusion of other journals would have improved the research, the time and manpower resources to do so were not available given that the research had to be finished and published in a reasonable timeframe before the data became dated and less relevant.

3. Inter-coder reliability was estimated using fourteen scales. Using the Perreault and Leigh (1989) formula, reliability was above .90 for all variables except for origination status. Data were also collected with regard to a scale's degree of modification compared to its original form. However, repeated attempts to bring bring inter-coder reliability up to even minimum acceptable standards were unsuccessful.

4. These 750 "uses of scales" should not be interpreted as 750 different scales much less 750 different constructs. Since several scales have been employed in multiple studies, the exact number of unique scales is lower than 750. Although an exact count was not made for this study, an estimate of the number of scales with substantially different item sets is between 590 and 600. The exact number depends upon the way uniqueness is operationalized since many studies have employed sets of items with varying degrees of similarity to measure the same constructs.

5. Although the authors stand by the description of JAR as having fewer uses of scales per article, we admit that several instances of scale usage were not included due to lack of sufficient information in the articles or supplied by authors. While this was also true for the other journals it may have occurred more frequently for

JAR.

6. These results should not be interpreted as an independent replication of Churchill and Peter (1984) since the databases of the two studies overlap for the 1980 to 1982 period for four journals.

7. The regression analysis was run both on the whole database (n=750) as well as the subset described earlier (n=199) with similar amounts of variance explained.

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Table A1
Scale Codes, Instructions, & Inter-Coder Reliabilities

GROUP CODE: [consumer behavior=1 advertising=2 organizational=3] Code based upon examination of scale items, and, if necessary, the context in which a scale was used (theory tested, nature of sample). (100%)[a]

ARTICLE CODE: Three digit number assigned to each article corresponding to number of physical file containing copy of article and other relevant materials.[b]

YEAR PUBLISHED: Last 2 digits of the year in which an article was published (80 to 89).[b]

JOURNAL: [JM=1 JMR=2 JCR=3 JAMS=4 JA=5 JAR=6] The journal in which an article was published.[b]

NUMBER OF ITEMS: The number of items for a particular use of a scale.(100%)[c]

NUMBER OF RESPONSE ALTERNATIVES: The number of points for a particular use of a scale; if different number of points were used for different items, the majority rules.(100%)[c]

SCALE TYPE: [Likert-type=1 semantic differential=2 other=3].(95%)[a]

INTERNAL CONSISTENCY: Report two-digit alpha from the sample, if known, otherwise report split-half, Spearman-Brown, LISREL reliability, etc.(92%)[c]

SAMPLE SIZE: The sample size reported in an article upon which reliability was estimated.(92%)[c]

ORIGINATION STATUS: [developed in this use=1 developed in previous marketing research=2 developed in non-marketing research=3 unknown=9] Code as "unknown" unless it is very clear that it was original or borrowed.(72%)[a]

[a] Inter-coder reliabilities for nominal level data were calculated using the formula offered by Perreault and Leigh (1989).

[b] Information regarding these variables was supplied by the lead author on coding forms to insure that coders were examining the appropriate scales. Inter-coder reliabilities were not calculated.

[c] Reliabilities for ratio level data were calculated by dividing the number of agreements among the judges by the number of observations they made.

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Table 1

Correlations, Means, & Standard Deviations
For Metric-Level Variables

	Year Published	Scale Length	Scale Points	Reliability	Sample Size
Year Published	1				
Scale Length	-0.13[a]	1			
Scale Points	-0.02	-0.20[a]	1		
Reliability	0.12[a]	0.21[a]	0.14[a]	1	
Sample Size	0.04	-0.08	-0.13[a]	-0.21[a]	1
Means	1986[b]	5.96	6.06	0.77	327.58
Standard Deviations	2.59	6.08	1.38	0.13	297.89

[a] $p<.001$

[b] median year of publication

Table 2

Origination Status, Scales Published & Reliability By Year

Year of Publication	Original (%)	Borrowed/ Marketing (%)	Borrowed/Non-Marketing (%)	Unknown (%)
1980	45.83	4.17	41.67	8.33
1981	41.94	16.13	29.03	12.90
1982	18.18	52.27	0	29.55
1983	32.08	39.62	16.98	11.32
1984	25.64	20.51	25.64	28.21
1985	19.20	30.40	14.40	36.00
1986	32.95	13.64	38.64	14.77
1987	28.00	18.67	6.67	46.67
1988	24.37	36.13	8.4	31.09
1989	25.66	19.74	17.76	36.84
Overall[a]	26.80	26.00	17.60	29.60

[a] These figures represent proportions of the whole data set.

Table 3

Number of Scale Uses Per Article
For Each Journal

Journal	Scales Reported[a]	Articles Published[b]	Scales Per Article	Mean Reliability
JM	96	404	.24	.76
JMR	231	504	.46	.79
JCR	164	499	.33	.79
JAMS	162	396	.41	.72
JA	82	239	.34	.76
JAR	15	416	.04	.76

[a] These are the numbers of multi-item scales for which sufficient information was available to qualify them for inclusion in the database.

[b] The count of articles included research notes and comments.

Figure 1

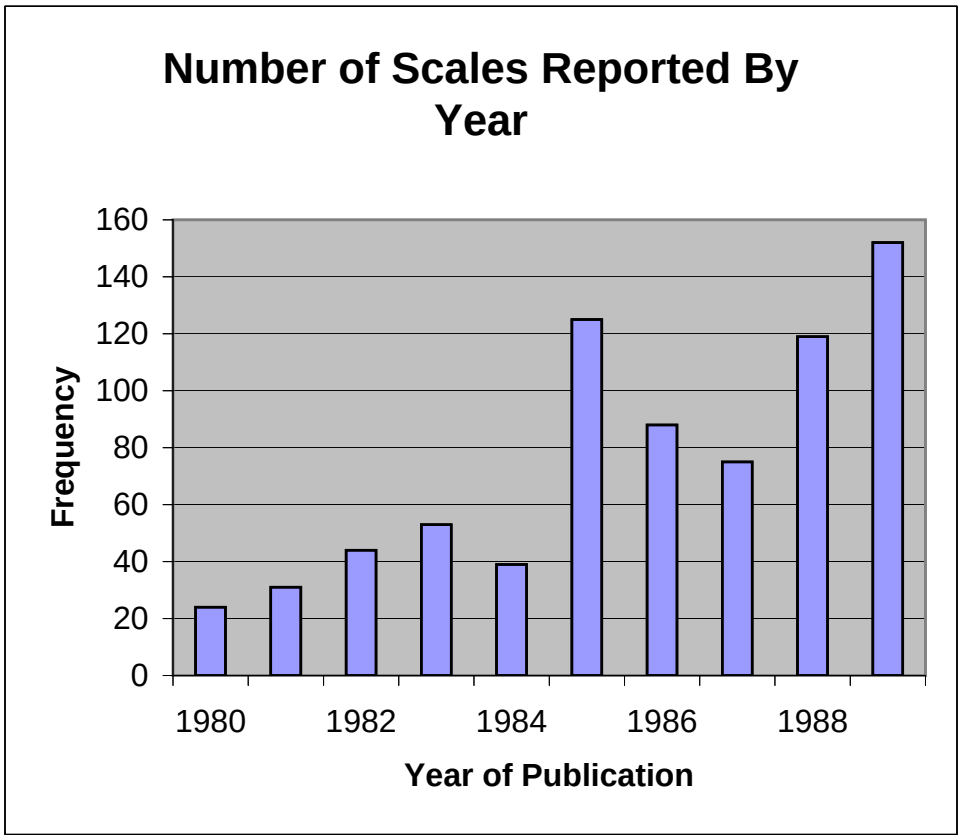

Number of Scales Reported By Year
160
140
120
100
80
60
40
20
0
Frequency
1980
1982
1984
1986
1988
Year of Publication

Figure 2

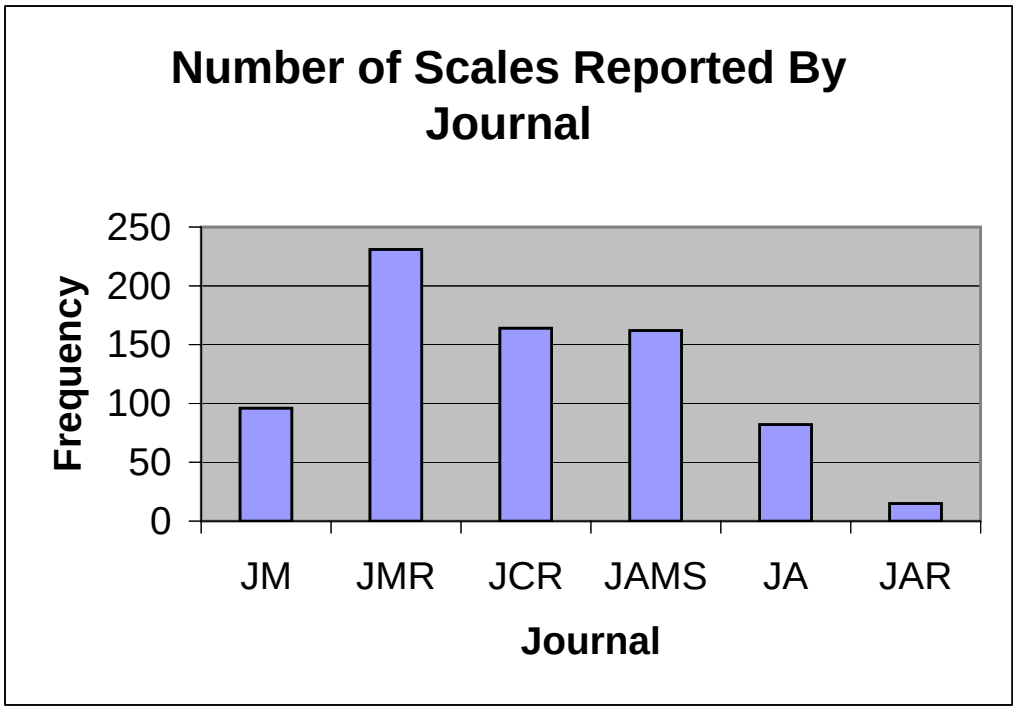
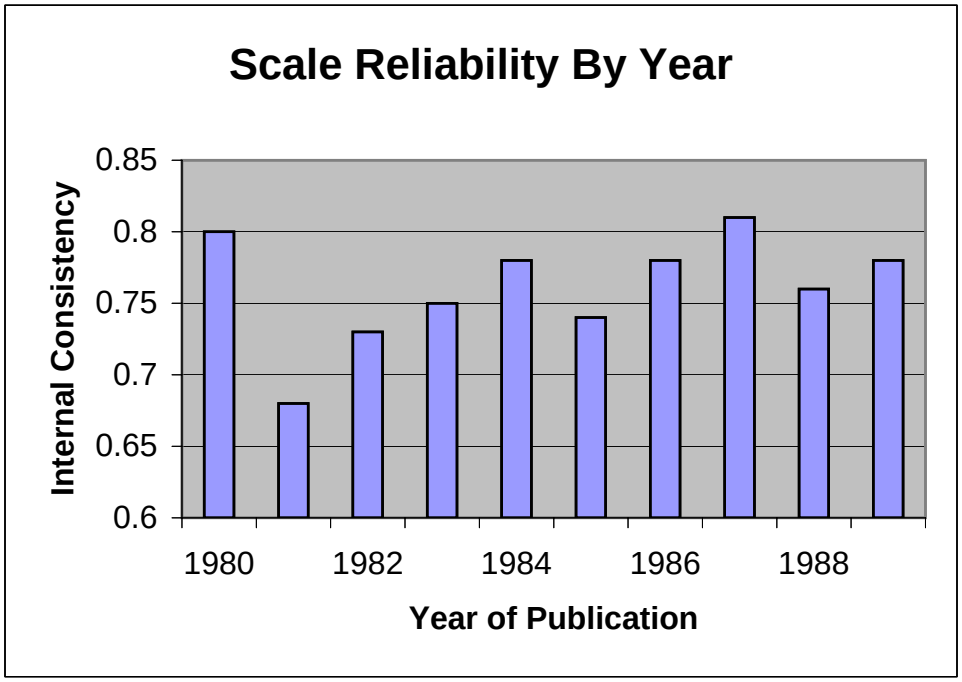

Number of Scales Reported By Journal
Frequency
250
200
150
100
50
0
JM
JMR
JCR
JAMS
JA
JAR
Journal

Figure 3


Scale Reliability By Year
Internal Consistency
0.85
0.8
0.75
0.7
0.65
0.6
1980
1982
1984
1986
1988
Year of Publication