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**It Seems Factual, But Is It? Effects of Using Sharp Versus Round Numbers in Advertising Claims**

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# It Seems Factual, But Is It?
# Effects of Using Sharp versus Round Numbers in Advertising Claims

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## ABSTRACT

This paper compares sharp versus round numbers in advertising claims. Round numbers have a salient conceptual basis (e.g., 10 years are a decade). Sharp numbers do not (e.g., 11 years). Estimates tend to be expressed with round numbers. An experiment is described that examines whether consumers make the false assumption that claims using sharp numbers are less likely to be estimates (i.e., are more factual) than those using round numbers and, if so, whether this makes sharp-number claims more believable. The results demonstrate that such assumptions do occur, even for those consumers considered to be advertising skeptics.

## INTRODUCTION

A newspaper advertisement for a career-training program highlighted the claim that their recent graduates were earning between $43,000 and $57,000 per year. This salary claim could have just as easily been expressed using the phrases such as, "are well-paid," "earning around $50,000," or "earning from $40,000 to $60,000." The advertising copywriter had to make a decision as to which wording would be best received. Current views of advertising effectiveness stress not just what the advertiser claims, but what inferences are made about these claims by the consumers (e.g., Kardes, Posavac, and Cronley 2004). The present paper explores one type of inference that consumers might make about an advertiser's claim–that it is based on actual empirical data and not just on the advertiser's general impressions.

## LITERATURE REVIEW

The study of persuasive communications has identified numerous factors that affect whether or not the audience accepts the information and recommendations offered in the message (e.g., MacInnis, Moorman, and Jaworski 1991). One relevant factor is the choice to present advertising claims in a numerical or verbal form. For example, research by Yalch and Elmore-Yalch (1984) established that numerical messages ("many people do 95% of their banking ...") were better received than an equivalent verbal claim ("many people do virtually all of their banking...") when attributed to expert sources but not when presented by nonexpert sources. Other research supports the finding of a numerical-superiority effect (Scammon 1977; Viswanathan and Narayan 1994). Childers and Viswanathan (2000) attribute some of this superiority to the fact that numerical evidence is processed at a surface level, making it faster to recognize and compare numerical information compared to the equivalent verbal information.

Related to the above discussion, Darley and Smith (1993) draw a distinction between objective and subjective claims. Objective claims are those that have an element of verifiability and cite specific factual information. On the other hand, subjective claims rely on emotions and impressions. Their manipulation of the presence of objective information consisted of the use of numerical descriptors ("Loom woven of a 75% acrylic and 25% wool blend for shape retention and softness") versus only verbal descriptors ("Proudly woven with the very finest shape-retaining material; the blanket is unusually soft and delightfully elegant") for the subjective message. They found that objective claims were more persuasive than subjective claims, especially when based on factual evidence.

In thinking about numerical claims, we propose that there may be differences between numerical claims much as there are differences between numerical and verbal claims. In particular, we are interested in the distinction between round numbers and the other numbers, which could be called "sharp numbers" (Dehaene 1997, p. 108). Round numbers are those whose conceptual status gives them mental salience. For example, numbers such as 10, 20, and 30 receive salience by initiating decades in our base-ten number system, and numbers such as 15 and 25 receive salience by being midpoints of these decades (Dehaene and Mehler 1992; Schindler and Kirby 1997). Some numbers have salience, and thus roundness, only in certain contexts. For example, in time estimation, the period of seven days is salient because it represents a week (Huttenlocher, Hedges, and Bradburn 1990).

As a result of their salience, round numbers are the numbers that are most likely to come to mind when a person is trying to estimate a quantity that is uncertain. For example, in a variety of numerical estimation tasks, people show a strong tendency to produce 0- and 5-ending numbers (e.g., Hornik, Cherian, and Zakey 1994; Kaufman et al. 1949). This use of round numbers leads them to become indicators of the use of an estimation process rather than actual counting. Thus, if it is said that there are 100 people in a room, the use of the round number would lead listeners to interpret the statement as an approximation. The true number could be perhaps anywhere from 80 to 120 people. On the other hand, if it is said that there are 106 people in a room, the use of the sharp number would suggest that some counting has occurred.

It is interesting that the tendency to interpret a round number as a result of approximation is so pronounced that to communicate otherwise requires some additional wording. For example, if a count has determined that there are 100 persons in the room, one would have to say that there are *exactly* 100 individuals in the room to indicate that this is not an approximation (Dehaene 1997, p. 109).

Our research combines the round-versus-sharp-number distinction with Smith and Darley's objective-versus-subjective distinction. We propose that sharp numbers are assumed by consumers to be objective and factually-based because they imply a high level of accuracy that could be achieved only through an empirical analysis. On the other hand, round numbers suggest an approximation that is likely to be a subjective estimate that may bear little relationship to reality. For example, a claim that a new allergy drug is 46% more effective than a popular competitor implies that the claim is based on some clinical research whereas the claim that it is 50% more effective indicates that the communicator lacks knowledge of the true level of differential effectiveness.

## RESEARCH QUESTIONS

On the basis of the preceding literature review, a series of research questions were developed related to the relative effectiveness of advertising claims expressed with sharp numbers compared to round numbers.

1) Are numerical claims judged differently than equivalent verbal claims? Prior research has established that numerical claims

[1]The authors thank Hiralkumari Udawat for her assistance in the data collection for this study.

are superior to equivalent verbal claims, especially when used by high credible sources (Yalch and Elmore-Yalch 1984). As both sharp and round numbers are numerical, it was expected that they would be judged more believable than an equivalent verbal claim.

2) Are numerical claims judged differently when a sharp rather than a round number is used in the claim? The belief here is that consumers will infer that the advertiser's use of a sharp number is the result of an empirical analysis and not merely an approximation or a number that the advertiser has made up in order to impress the consumer. Consequently, it was expected that consumers would judge the sharp number as being more accurate and empirically-determined relative to the round-number claim.

3) If sharp numbers are assumed to be more empirically-based, will that make the overall claim more believable and persuasive? Prior research has shown that the use of objective evidence (claims based on empirical testing) enhances the persuasiveness of an advertising message (e.g., Darley and Smith 1993). However, this prior research used multiple verbal claims compared to multiple numerical claims as the objective evidence manipulation. No study has looked at the more subtle difference between round and sharp numbers in making a single claim. Here, there is a minimal implicit suggestion that one claim is more credible and persuasive than the other.

4) Does advertising skepticism, an individual difference in the overall belief in the honesty of advertising, moderate the effects of numerical-versus-verbal claims and of sharp-versus-round numerical claims? Prior research has established that consumers differ in their general skepticism toward advertising and advertising claims. Obermiller and Spangenberg (1998) developed a nine-item scale to measure consumers' tendencies to question advertising claims. Their research demonstrated substantial construct validity, with advertising skepticism being positively associated with unfavorable attitudes toward marketing and advertising in general. The scale developers speculated that high skeptics would reject testimonials and many other forms of advertising, such as demonstrations. However, it was not determined if they would reject all forms of advertising. We propose that because advertising claims expressed with sharp numbers are interpreted as being more likely to result from authentic empirical analysis than those using round numbers, that advertising skeptics may be less inclined to reject them than round-numbered claims. Consequently, we predicted an interaction between the type of number used in a claim and advertising skepticism. Specifically, we expected that high skeptics would be less likely than low skeptics to accept a round-number claim but equally likely to accept a sharp-number claim.

## METHOD

The above-mentioned research questions were explored in an experimental study of consumer responses to paired advertisements. Subjects were asked to compare two color advertisements for the same product that differed only in the main claim made on behalf of the product. In all cases, one of the two advertisements used a verbal format. The second advertisement in the pair was varied such that one third of the subjects saw the claim expressed with a sharp number that was slightly lower than a round number, one-third saw the claim expressed with a sharp number that was slightly higher than the round number, and the remaining third saw the ad's claim expressed with the round number. After examining the pair of advertisements, the consumers responded to a three-page questionnaire.

### Test Advertisements

We decided to use a fictitious body-spray deodorant as the advertised product, because the product category could plausibly support an objective claim and because it is a category relevant to most people. The ad we constructed featured a young man and woman dancing on an outdoor deck. The key claim was that the brand, Amor, was a long-lasting body-spray deodorant. The claim using the verbal format was, "Lasts far longer than any other deodorant." The three numerical claims were, "Lasts [47%, 50%, or 53%] longer than any other deodorant." The claim was made in both the headline and the last line of the body text of the advertisement. The ads were presented side-by-side to facilitate comparisons. The verbal message was paired with one of the three numerical messages. Half of the time, the verbal message was on the left and half of the time on the right. Although hemispheric lateralization studies suggest that verbal and numeric information may be processed differently depending on the field of vision, an analysis revealed no position effect so the data were combined across the two positions.

### Measures

Immediately below the two advertisements was a set of nine questions asking subjects to compare the two ads. These looked at two aspects – credibility and perceived accuracy. Credibility was assessed using four items (more true, more believable, more trustworthy, and more convincing). Perceived accuracy was assessed using four items (more accurate, more exaggerated, based on actual scientific evidence, and better documented). The last of the nine items asked which of the two ads in the pair made the subjects more interested in trying the product. All items were judged using 5-point scales with the labels Ad A definitely, Ad A probably, Both ads are about the same, Ad B probably, and Ad B definitely.

The second page of the questionnaire included the nine questions making up the Obermiller and Spangenberg (1998) ad skepticism scale. The items included statements such as "Advertising is generally truthful" and "I feel that I am accurately informed after viewing most advertisements." A 5-point response scale was used with the labels Strongly agree, Somewhat agree, Neither agree nor disagree, Somewhat disagree, and Strongly disagree.

The third page of the questionnaire asked about the subjects' interests in solving problems and thinking about situations. Neither proved useful in understanding the phenomenon of interest. The last item was an open-ended question regarding the purpose of the study. No subjects indicated that it involved sharp-versus-round numbers in claims. This is not surprising since no subject was exposed to both a sharp- and a round-number claim.

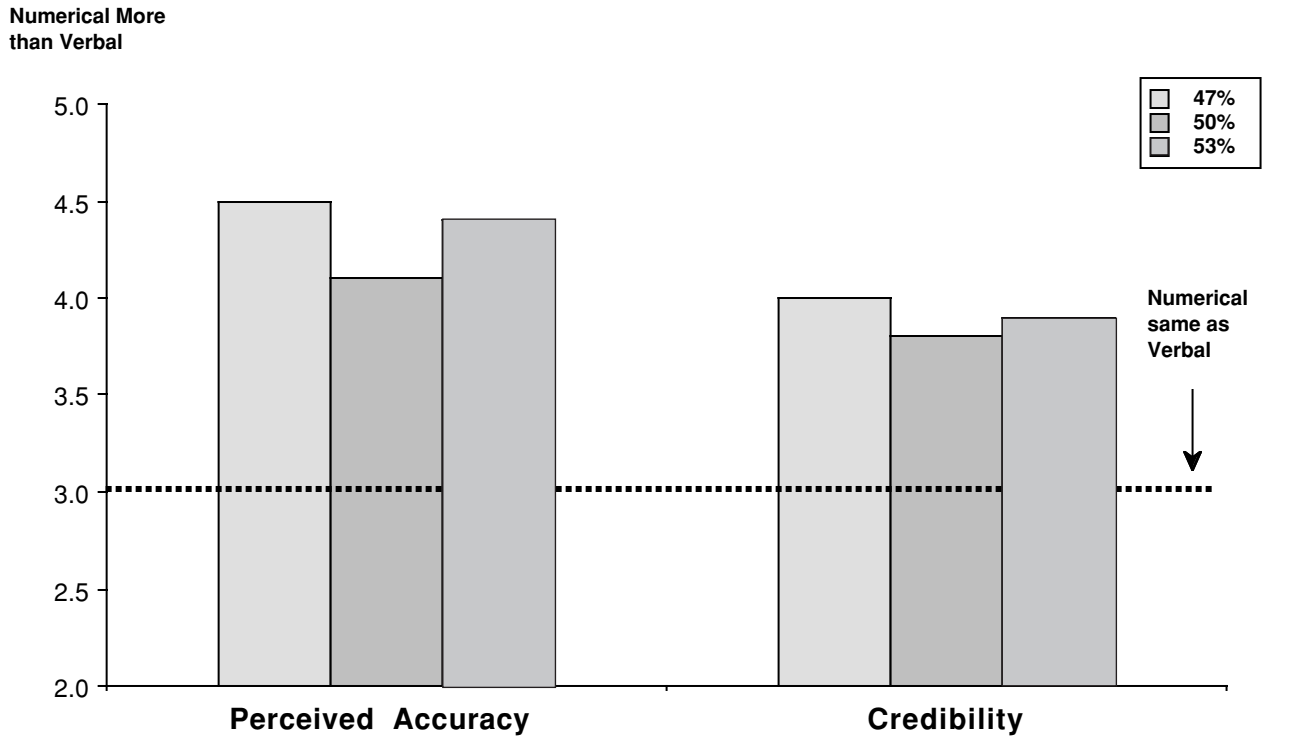
### Subjects

One hundred and ninety-nine university students served as subjects in this study. They were recruited by campus advertising to report to a testing room where they completed the questionnaire for this study along with questionnaires for two unrelated studies. They were paid $10 for their participation in the three studies.

## RESULTS

The responses to the four items making up the determination of the ad's credibility were combined (Cronbach's alpha=.85) to form a credibility scale, CREDIBILITY. Three of the other four items were combined to form the perceived accuracy scale, ACCURACY. The fourth item, more exaggerated, was deleted because the reverse wording appeared to confuse many subjects as they rated claims they considered more accurate, more likely based on scientific testing, and better documented as more, not less, exaggerated. Both a factor analysis and the reliability analysis argued for not including this item with the others. The reliability of the three-item scale was low (Cronbach's alpha=.52), but still usable. The nine items related to ad skepticism were summed to form an overall advertising-skepticism score (Cronbach's alpha=.86). A median

**FIGURE 1**
Message Evaluations by Ad Claim




split was made such that those scoring 3.25 or less were grouped and labeled low skeptics. Those scoring above 3.25 were labeled high skeptics.

Figure 1 shows the results for the perceived accuracy and credibility scales by the three message conditions. The first research question as to whether numerical claims are evaluated better than verbal claims was tested with a t-test of the perceived accuracy and credibility scores versus the null hypothesis value of 3 (equivalent to judging the numerical message the same as the verbal message). The results ($t=21.5$ for ACCURACY and $t=13.2$ for CREDIBILITY, both $p's<.001$, $n=199$) strongly support the view that numerical claims were judged to be more empirically-based and more credible than an equivalent verbal claim.

The second research question related to whether sharp numerical claims would be judged as being more accurate and empirically-determined than round numerical claims. A one-way ANOVA compared the three group means for the ACCURACY measure. The result was statistically significant ($F(2, 196)=7.48$, $p<.001$). A post hoc comparison of the means showed that the sharp-numbered claims (47% and 53%) were judged to be more likely based on empirical evidence than the round-numbered claim (50%), using a Student-Newman-Keuls test ($p<.05$). The difference between the two sharp-numbered claims was not significant, indicating that the inference that a sharp number was more likely to be empirically-based did not change when the comparison claim was rounded up or rounded down.

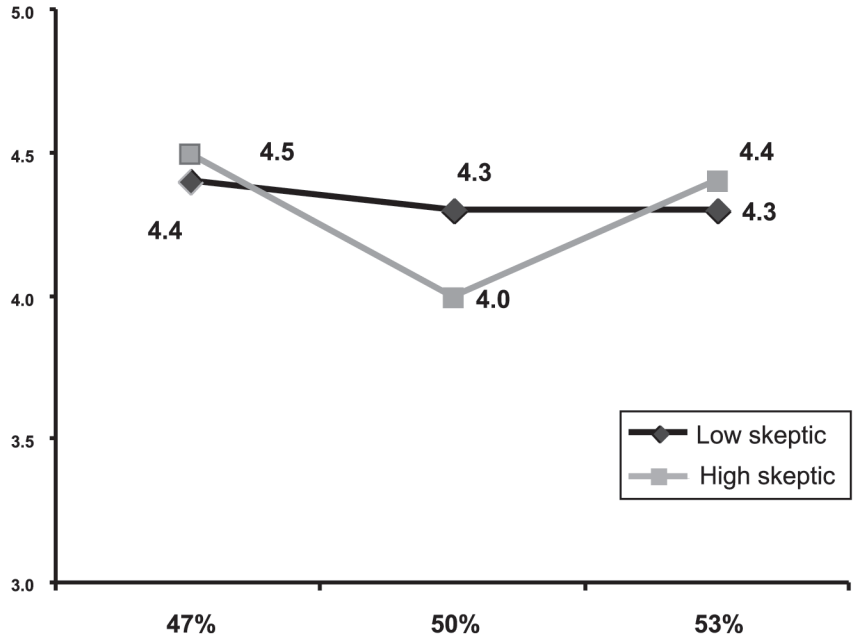
The third research question considered whether being seen as a claim that is more accurate without an explicit statement that this was the case would translate into greater credibility for the claim. A one-way ANOVA compared the three group means for the CREDIBILITY measure. The differences were not statistically significant ($F(2,196)<1$), indicating that the implicit belief that there was evidential support for the claim did not make the claim more believable. Similarly, there were no significant differences between the three groups in the subjects' interest in trying the advertised product.

The final research question concerned ad skepticism and whether or not it moderated the relationship between using sharp-numbered claims and judgments that these claims were based on empirical evidence. This question was addressed using a two-way ANOVA on the perceived accuracy measure. The independent variables were type of claim (47%, 50%, or 53%) and ad skepticism, with groups assigned on the basis of a median split of the subjects' self-reported beliefs about advertising. The results revealed a main effect of the type of claim ($F(2, 193)=5.98$, $p<.01$) and a marginally significant interaction of claim type with ad skepticism ($F(2, 193)=2.51$, $p<.09$). As shown in Figure 2, the cause of the interaction was the tendency of the high ad skeptics to doubt the evidential basis for the round-numbered claim relative to the low skeptics but to not do that for the sharp-numbered claims. However, as was true for the combined sample, the interaction effect between claim type and ad skepticism for perceived accuracy was not significant for claim credibility of the messages (claim type by ad skepticism, $F(2, 193)=1.67$, $p>.1$).

## DISCUSSION

The results of this experiment support the conjecture that advertising claims stated in terms of sharp numbers are more likely

**FIGURE 2**
Perceived Accuracy for Claim by Ad Skepticism




to be judged by consumers as having originated from some empirical data and therefore are more accurate than equivalent round-numbered or verbal claims. The effect is particularly noteworthy in that it appears to be due primarily to those consumers who consider themselves to be highly skeptical of advertising claims. Although these high skeptics indeed showed a smaller advantage of numerical over verbal claims when round numbers were involved, they were just as likely as the low skeptics to make the unjustified inference that a sharp-number claim is empirically-based. This finding suggests that Obermiller and Spangenberg's (1998) view that advertising skeptics tend to be suspicious of advertising devices such as testimonials and demonstrations should be modified to state that ad skeptics are not more skeptical of everything advertisers do. This research shows that more subtle methods used in advertising may not be as readily rejected.

The evidence in this study that the use of sharp numbers suggests the involvement of detailed, empirical analysis may also be applied to our understanding of everyday verbal communication. Consider, for example, how you might perceive a friend if, rather than saying, "I'll be back in a half hour," the friend said, "I'll be back in 27 minutes." Santos, Leve, and Pratkanis (1994) found that a panhandler can get more money by asking for 17 or 37 cents rather than requesting a quarter. Although they explained this phenomenon by the attention-getting properties of the sharp numbers, the results of the present study would suggest an alternative explanation. It may be that when one is approached for 37 cents, the sharpness of the number suggests that there is a very specific need, say, that the requestor is only a few cents short of what he needs to buy a bus ticket home. By contrast, the request for a round amount of money might suggest that there is no specific need – rather, the requestor just wants money.

## LIMITATIONS AND FUTURE RESEARCH

The present research is exploratory, and the conclusions must be judged tentative since only one ad with only one headlined claim was tested. Further, ads were compared directly against each other, making it likely that the subjects would focus on the numerical claim. As this should increase scrutiny of the numerical claim relative to a more natural exposure situation, this provides a strong test of the proposition that audiences infer an empirical basis for claims stated in terms of sharp numbers. In a more complex exposure situation, where consumers typically do not expend the resources to consider the possibility that the claim is being falsely stated to look like it was empirically-based, the possibility of such an unwarranted assumption should be greater.

Individuals concerned about truth in advertising should be heartened by the finding that the sharp-numbered claim was not judged to be highly persuasive. There may be a countervailing influence whereby consumers may be more suspicious of advertisers who use empirically-based claims such that the greater credibility of the claim is countered by a lowered trustworthiness. This could easily be tested by varying the perceived trustworthiness of the source to see if there is an interaction between source credibility and type of numerical claim.

It would also be useful to determine whether the effects are enhanced when consumers lack the resources or motivation to properly evaluate sharp-number claims. As noted by MacInnis et al. (1991), advertisers should recognize that there are tradeoffs such that an executional device designed to attract attention (sexy models or humor) may interfere with the processing of brand information. The mere fact that a numerically-stated claim appears more accurate and factual than a round-number claim because it is

assumed to be empirically-based may cause the audience to pay less attention to the message, thus reducing comprehension and storage of the information. It would be useful to determine whether there is a memorability difference between sharp and round numbers. Childers and Viswanathan's (2000) research comparing the representation of verbal and numerical information is a good reference for thinking about this issue.

## CONCLUSIONS

Advertisers have used sharp numbers for many years. Proctor & Gamble's trademarked claim that Ivory soap is 99 and 44/100% pure dates to the 19th century and may be one of the best-known examples of a sharp-number claim. Interestingly, this claim is based on a chemist's analysis of a sample of the product (http://www.ivory.com/history.htm). Other advertisers use similar numerical claims that also appear highly precise but may not be based on scientific research. The present research shows that even in the absence of a clear reference to an empirical basis for the numerical claim, consumers are likely to assume that it is based on research when the claim is stated in terms of a sharp number rather than a round one.

## REFERENCES


Childers, Terry and Madhubalan Viswanathan (2000), "Representation of Numerical and Verbal Product Information in Consumer Memory," *Journal of Business Research*, 47, 109-120.

Darley, William K. and Robert E. Smith (1993), "Advertising Claim Objectivity: Antecedents and Effects," *Journal of Marketing*, 57 (October), 100-113.

Dehaene, Stanislas (1997), *The Number Sense: How the Mind Creates Mathematics*, New York: Oxford University Press.

Dehaene, Stanislas and Jacques Mehler (1992), "Cross-Linguistic Regularities in the Frequency of Number Words," *Cognition*, 43 (April), 1-29.

Hornik, Jacob, Joseph Cherian, and Dan Zakey (1994), "The Influence of Prototypic Values on the Validity of Studies Using Time Estimates," *Journal of the Market Research Society*, 36 (April), 145-147.

Huttenlocher, Janellen, Larry V. Hedges, and Norman M. Bradburn (1990), "Reports of Elapsed Time: Bounding and Rounding Processes in Estimation," *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 16 (March), 196-213.

Kardes, Frank R., Steven S. Posavac, and Maria L. Cronley (2004), "Consumer Inference: A Review of Processes, Bases, and Judgment Contexts," *Journal of Consumer Psychology*, 14 (3), 230-256.

Kaufman, E. L., M. W. Lord, T. W. Reese, and J. Volkmann (1949), "The Discrimination of Visual Number," *American Journal of Psychology*, 62 (October), 498-525

MacInnis, Deborah, Christine Moorman and Bernard Jaworski (1991), "Enhancing and Measuring Consumers' Motivation, Opportunity, and Ability to Process Brand Information from Ad," *Journal of Marketing*, 55 (October), 32-53.

Obermiller, Carl and Eric Spangenberg (1998), "Development of a Scale to Measure Consumer Skepticism Toward Advertising," *Journal of Consumer Psychology*, 72 (2), 159-186.

Santos, Michael D., Craig Leve, and Anthony R. Pratkanis (1994), "Hey Buddy, Can You Spare Seventeen Cents? Mindful Persuasion and the Pique Technique," *Journal of Applied Social Psychology*, 24 (9), 755-764.

Scammon, Debra (1977), "Information Load and Consumers," *Journal of Consumer Research*, 4 (December), 148-155.

Schindler, Robert M. and Patrick N. Kirby (1997), "Patterns of Rightmost Digits Used in Advertised Prices: Implications for Nine-Ending Effects," *Journal of Consumer Research*, 24 (September), 192-201.

Viswanathan, Madhubalan and Sunder Narayan (1994), "Comparative Judgments of Numerical and Verbal Attribute Labels," *Journal of Consumer Psychology*, 3 (1), 79-101.

Yalch, Richard and Rebecca Elmore-Yalch (1984), "The Effect of Numbers on the Route to Persuasion," *Journal of Consumer Research*, 11 (June), 522-527.